

Medical Training magazine

Volume 7 • Issue 3.2018

medicalsimulation.training

FORMERLY

MedSim
MAGAZINE



TECHNOLOGY

Virtual Reality Comes of Age

NURSING

A Rater-Mediated Performance Assessment Test

TRAINING CENTRE

Bristol Medical Simulation Centre



- 03 **Editor's Comment.** Editor-in-Chief *Judith Riess* discusses how medical advances during the 21st Century will exceed those of the 20th Century and provide a safer environment for patients.
- 06 **Bristol Medical Simulation Centre (BMSC).** *Judith Riess* learns more about the Bristol Medical Simulation Centre.
- 10 **A Rater-Mediated Performance Assessment Test.** Quantum assesses student's progress from basic skills to higher-level clinical judgment and reasoning ability used in decision making for safe, effective nursing practice.
- 14 **Closing the Training Gap: How Technology is Tackling Surgery's Most Critical Challenges.** *Justin Barad, MD*, discusses the need to change the way we train surgeons to ensure patient safety.
- 18 **Virtual Reality Comes of Age.** New technology gives us the opportunity for standardized medical education, training and assessment.
- 22 **Nurses Using Non-Evidence Based Processes for Common Procedures.** The Patient Safety Movement column describes how old procedures that are not evidence-based are being used in the placement of NG tubes.
- 24 **HLTH Future of Healthcare Conference.** The inaugural HLTH Future of Healthcare Conference broke down silos, disrupted the status quo and drove collaboration across the healthcare spectrum.
- 26 **Seen & Heard.** Updates from the medical community. Compiled and edited by the Halldale editorial staff.

On the cover: Cutting-edge immersive technologies are leading to innovations in the healthcare learning environment. Image credit: Jump Simulation at OSF Health.

Medical Training magazine

Editorial

Editor in Chief Judith Riess, Ph.D.
e. judith@halldale.com
Group Editor Marty Kauchak
e. marty@halldale.com
News Editor Lori Ponoroff
e. lori@halldale.com

Advertising

Sales Contact: Holly Foster
North America t. +1 818 994 0191
e. holly@halldale.com
Sales Contact: Stephen Reed
Rest of the World t. + 44 (0)1252 532007
e. stephen.reed@halldale.com
Sales & Marketing Joanne Smeets
Co-ordinator t. +44 (0)1252 532002
e. joanne@halldale.com

Operations

Design & Production David Malley
t. +44 (0)1252 532005
e. david@halldale.com
Distribution & Circulation Stephen Hatcher
t. +44 (0)1252 532010
e. stephen@halldale.com
Artworker Mark Draper
t. +44 (0)1252 532011
e. markdraper@halldale.com

Halldale Media Group

Publisher & CEO Andy Smith
e. andy@halldale.com

US Office Halldale Media, Inc.
735 Primera Blvd
Ste 220
Lake Mary, FL 32746
USA
t. +1 407 322 5605
f. +1 407 322 5604

UK Office Halldale Media Ltd.
Sentinel House
Harvest Crescent
Fleet, Hampshire
GU51 2UZ, UK
t. +44 (0)1252 532000
f. +44 (0)1252 512714

Subscriptions

4 issues per year at US\$60
t. +1 407 322 5605
t. +44 (0)1252 532000
e. mtm@halldale.com

Website: www.medicalsimulation.training



Halldale Group

www.halldale.com

Also produced by The Halldale Group:



www.civilaviation.training



www.militarysimulation.training

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise – especially translating into other languages – without prior written permission of the publisher. All rights also reserved for restitution in lectures, broadcasts, televisions, magnetic tape and methods of similar means. Each copy produced by a commercial enterprise serves a commercial purpose and is thus subject to remuneration.

Medical Training Magazine, printed July 2018, is published 4 times per annum by Halldale Media, Inc., 735 Primera Blvd, Ste 220, Lake Mary, FL 32746, USA at a subscription rate of \$60 per year.



A Rater-Mediated Performance Assessment Test

Quantum helps students master clinical skills and improve performance through assessment and simulation. Bonita Longo, MS, RN, Jessica Marraffa, MSN, RN, Rose DeSiena, M.Ed, RN and Stephen Hetherman, EdD explain.

Nursing education has reached a point where students can be assessed for competency in a simulation lab.

Faculty are concerned about how to objectively evaluate students' performances, especially because of the differences in how faculty members grade. This article describes a new product called Quantum, which is a rater-mediated, performance assessment test. Students are individually evaluated on their performances after reading the scenario. Faculty pull up the selected scenario's rating sheet on the mobile app and mark the completed evaluation criteria as the student progresses through the scenario. Afterward, Quantum's software normalizes the differences between each faculty member as well as differences in the difficulty of the evaluation criteria. The normalization process is so important because the evaluations are now objective and defensible!

With the looming nursing shortage, it is important that pre-licensure nursing education programs produce entry-level practitioners who can safely enter the professional realm. A long-standing issue within the nursing education arena has

been the ability to evaluate the clinical competency of student nurses.

Clinical settings alone have become a questionable learning opportunity; continuity and follow through are hindered by short stays in acute care facilities, and long-term facilities follow client care regimens that do not necessarily provide an opportunity to learn and practice entry-level clinical skills. Couple these issues with the natural variances among clinical instructors, and the question of how to evaluate student nurses' clinical readiness looms heavily.

Simulation labs offer great opportunity to overcome clinical short comings, and promote safety in patient care, however, the issue of evaluation is still challenged by rater subjectivity. National Council of State Boards of Nursing (NCSBN) has endorsed that a program may use simulation (Gaba, 2004) as a substitute for traditional clinical experiences, not to exceed fifty percent of its clinical hours per course as long as the clinical scenario is appropriate for the student nurses and it is meaningfully measured (Goldman, 2017). Appropriate scenarios reflect content, quality, and suitability to the student nurses' educational levels. Meaningfully measured, requires the assessment to provide validity evidence on content, substantive, structural, generalizability, external, consequential, and interpretability. The interpretation of test scores rely on all available validity evidence (AERA, APA & NCME, 2014).

Nursing practice is evolving to meet the standards of a health care arena impacted by regulations and technology. It is only natural that nursing education should evolve in the same direction. Quantum provides the means to incorporate nursing standards and technology into nursing programs at all levels of education.

Above
Simulated clinical
experience with
simulator.
Image credit:
Objectivity Plus.

What is Quantum?

Quantum is a comprehensive performance assessment program that provides all facets of the simulated clinical experience, allowing faculty to access pre-briefing, the scenario, scripts, simulation set-up, participant preparation and objectives, debriefing, evaluation criteria, score reports, and reliability estimates all in one place. All validated clinical scenarios are developed by subject matter experts with clinical and nursing education expertise. A psychometrician oversaw the test development process for each clinical scenario based on validation study samples (Hetherman, Lioce, Gambardella & Longo, 2017), educational learning theories, applicable standards (INACSL, 2016; AERA, APA & NCME, 2014), legal aspects of clinical nursing education, and other pertinent resources.

Creating a Scenario

Quantum offers a library of pre-designed, validated RN and LPN/LVN clinical scenarios. When selecting a validated clinical scenario, faculty are presented with corresponding participant objectives based on difficulty level and expectations. Faculty may upload an existing scenario or create a course-specific scenario. When creating a scenario, faculty decide on the scenario's progression outline, participant objectives, pre-briefing materials, simulation set-up, evaluation criteria, and debriefing. Faculty, in conjunction with a psychometrician, often collaborate to ensure the clinical scenarios are written according to the guidelines, in preparation for field testing.

Equally important, Quantum's mobile application (app) runs on devices such as smartphones and tablet computers substantially reducing use of paper (Objectivity Plus, 2016). Quantum's app serves a multitude of purposes, including: a performance assessment test in a simulation lab via Rater or Standardized Patient; a debriefing report immediately after the performance assessment test, if you choose; and a supervised assessment in the clinical setting by incorporating your school's clinical evaluation form. For this reason, the program will start gathering valid data on students' performances, quantifying performances, and documenting clinical competency with known reliability.

Quantum was field tested on student nurse samples (see Table 1). The purpose of the field test process was to evaluate the psychometric properties of the data arising from Quantum (Hetherman, et al., 2017).

In planning and analyses, these researchers discovered that each field test allowed incremental insight into establishing procedures, understanding and protecting against things that can go wrong, and obtaining the minimum sample size required to detect a reasonable, reliable rater effect. Field test studies have shown that when a pair of instructors rate 20 students, reliable rater severity estimates are obtained. This means that after the 20th student is rated, one instructor may rate the 21st student by him- or her-self for that specific clinical scenario. Some Raters will be identified as harder evaluators and others as easier; both of which are acceptable. The severity levels of the two Raters are accounted for by Quantum so that each student starts on a level playing field, regardless of which faculty member is doing the rating.

Gone are the days when a student nurse blames a faculty member because the student does not pass clinical. Quantum re-

	BSN(4)	ADN(5)	LPN/LVN(5)
Health Assessment	116	126	0
Fundamentals	109	140	117
Medical/Surgical	105	111	135
Obstetrics	102	108	140
Pediatrics	103	105	131
Mental Health	101	107	116
Leadership	93	32	0

Above
Table 1: Frequency Distribution of Sample by Core Pre-Licensure Nursing Course.

moves any possibility of Rater bias or subjectivity by accounting for Rater variation. Correcting for the influences of Rater effects improves the objectivity of the student score and the subsequent pass/fail decisions. The results are an evaluation process that is objective, valid, and legally defensible.

Faculty at Sacred Heart University's College of Nursing have been using Quantum to measure student nurses' clinical competency in its new simulation lab and have shared some of the details about how they manage the test administration process.

Rater Activity Prior to Testing

- Log into the Objectivity Plus website.
 - Become familiar with the pre-briefing materials (e.g. directions to the learner) and scenario being used.
 - Click on the "Manage Schedule" button, to view the dates, times, and students the Rater will be evaluating.

Rater on the Day of Testing

- Rater needs to make sure the set-up of the simulation lab is acceptable.
 - Most of the set up can be done ahead of time
 - Make sure the medications are stocked
 - Make sure the room has the appropriate equipment
- Rater needs to set the vital signs of the mannequin to match what is indicated on the simulation set-up document.
- Rater needs to make sure all items are in place prior to bringing the student in.
- Rater logs into the tablet and reviews test administration schedule.

Preparation of the Student

- The student designated on the tablet schedule is called by the Rater from the waiting area.
- Student is greeted and brought into a preparation room.
- Directions are read aloud to the student using the Quantum script.
- Students undergo a security protocol on the tablet.
 - The student takes a photo of him- or herself.
 - The student records his or her full name by speaking it aloud.
 - The student signs his or her full name on the tablet using a finger.

- The student is given ten minutes of preparation time.
 - The student reads through the scenario (e.g. patient information describing the situation to be managed).
 - Notes can be taken by the student during this time.
- At the end of the ten-minute preparation period, the tablet becomes grayed out, so standardized, and the student returns the tablet to the Rater.
 - A second set of standardized instructions are read by the Rater.
- Student is instructed to speak aloud and directly to the patient and state exactly what they are doing and the results that were obtained. This is due to the fact that the student is not actively charting, and the Raters need to know what the student is doing.
- Informed that he or she has 25 minutes to complete the simulation.
- The student enters the simulation room and the performance assessment test begins.

During the Simulation

- The Rater uses the tablet to mark the student on each evaluation criterion correctly completed.
 - Examples: introduce self to patient; check patient identification; ask if the patient has any allergies; inspect IVPB, etc.
- The Rater may also serve as the voice of the patient and/or the healthcare provider.
- SPECIAL NOTE: playing multiple roles within the scenario is simple and the scenarios flow smoothly.
 - A script is prepared by Quantum and the student's question to the patient are answered according to the script.
 - There is also a script for the healthcare provider as well, along with specific answers (verbal cues) to the student's questions.

Note: You may choose to record the encounter, but it is not required.

Following the Simulation

- After the 25 minutes have elapsed, the simulation is stopped, and the test is completed.
- Rater may access the debrief report and review it with student.
- Student is asked to complete a participant survey on the tablet.
 - Simultaneously, the Rater resets the simulation lab.
 - Remove medications that have been administered.
 - Set the room back to the original state for the next student.
- When all the students have completed testing, the lead instructor will grant access to the score reports with customized remediation.

The scenarios are well constructed and allow the assessment of the student's progress from basic skills to the higher-level clinical judgment and reasoning ability used in decision making for safe, effective nursing practice. Quantum provides an opportunity for the Rater to measure a student's performance during the simulation without judgment or preconceived notions about the student to interfere with the rating process.

Skills Assessment

Feedback from another University faculty member states, "Quantum from Objectivity Plus is extremely user friendly and straight forward to use. It is an objective tool which can be used to assess students fairly in a simulated environment." Quantum is also recognized for its ability to show clinical progress from the freshman to the senior level. The skills assessment is started with basic skills and progresses through the curriculum with the addition of two to three more skills.

Skills Assessment Progression Example

- Along with generalized tasks, the freshman student nurse may need to change a wound dressing and perform an objective assessment.
- A sophomore student nurse may receive an additional task of inserting an indwelling urinary catheter.
- At the junior and senior levels, the student nurse may be expected to recognize and address potential client needs and to respond accordingly. Example: placing a client with respiratory distress in a high Fowler position.

The skill and activity possibilities are endless. It is strongly suggested that the skills in the NCLEX Test Plan be reviewed and incorporated as much as possible.

Program Data Use

Sometimes the unknown is easier to deal with than the reality. With Quantum, the program knows exactly where student nurses are in their ability to demonstrate clinical competency. It is possible that the students in general may not do well, or they may all be stellar. It is natural that programs whose students fall into the first category may want to ignore or explain away the results. However, it is important to remember that up until this point, there has been no defensible or measurable method of evaluating clinical performance. It is clear that the ability to be a safe, entry level practitioner is the goal that all programs share with NCSBN. Poor scores in a Quantum evaluation point the way to improvement.

As a program, the scores should be reviewed for two purposes; 1) point out the strength of the program, and 2) point out the areas where improvement is needed. Discovering a need for improvement, and addressing the need, will help to build a better program. If your program is falling below the NCSBN's pass level, using Quantum validates the program's dedication to nursing and nursing education.

Accreditation visits are stressful, regardless of whether the program is doing well or indicating a need for improvement. But, the accreditation visits can be valuable for all programs if there is a statistically strong and legally defensible process by which students are evaluated, how deficiencies are addressed, and what changes occur related to program improvement interventions. No one is expected to be perfect all the time, but nursing education should always strive to become better.

Quantum offers advantages to the students, too. Students will gain great insight to what nurses do and why. As a result, they will also see where they individually need to grow. Students will be able to measure their own progress through the program and build clinical confidence. Quantum reports with

their individual clinical scores may give them an edge when it comes time to get that first job.

Quantum focuses on the student's ability to use clinical judgement and develop critical thinking skills, such as the ability to solve clinical problems by setting patient care priorities or responding to a change in the patient's condition (Benner, et al., 2010). The student needs to know they are capable of handling themselves in a safe manner after graduation. What better time or place to gain that confidence than during their nursing education.

Quantum reveals a comprehensive performance assessment program that is capable of determining student nurses' ability to perform clinically. The method is unbiased, legally defensible, and easy to use. The feedback is valuable to both the program and the student. The program can specifically identify strengths and weakness in clinical performances.

For nursing students, Quantum offers an opportunity to enter the profession with a higher level of competence and confidence. When Quantum is integrated into nursing education, the student understands what level of clinical performance is expected. The student has always been able to validate knowledge acquisition through the grades they receive in nursing course work. But, until now, clinical ability was largely assumed with an attitude that "if you passed nursing school, you knew what to do." Now, Quantum gives the student feedback, a reference point for improvement, and validation of clinical abilities.

As a profession, it is important that nurses identify and support opportunities to make sure entry-level nurses are prepared as safe practitioners. There is a responsibility to prepare strong well-



Above
Simulated clinical experience with SP.
Image credit: Sacred Heart University.

prepared entry-level nurses who can continue to grow; programs must make sure that entry-level skills are in place. The rapidly changing health care arena, and the looming nursing shortage, makes it even more important that entry-level nurses arrive ready to move toward nursing excellence.

Conclusion

Programs can easily and effectively "plug in" to a well-designed, highly effective method of technical clinical evaluation by using Quantum. Quantum offers an opportunity to integrate a performance assessment program that is statistically

sound and provides valid student learning outcome data as to the performances of student nurses in a simulated clinical experience. It is adaptable so that uniform and unbiased evaluation can also be performed in actual clinical settings. And finally, Quantum's capability to estimate and adjust for the various degrees of rater severity and the variations in evaluation criteria content and quality, is a distinct advantage over other approaches. *MTM*

About the Authors

Bonita Longo, MS, RN is an independent nursing education consultant. She worked in nursing education and taught academic success courses across the curriculum for over 20 years. Currently, she focuses on test development, evaluation, item development and contributed to multiple testing programs, research articles, and textbooks.

Jessica Marraffa, MSN, RN is a Clinical Nursing Simulation instructor at Sacred Heart University. Jessica began her nursing career in 2011 at Stamford Hospital working in the emergency department where she is currently still practicing.

Rose DeSiena, M.Ed, RN, has been teaching and facilitating healthcare simulation since 2013. Rose designed and facilitated simulations for undergraduate and graduate nursing students and in training Standardized Patients for several healthcare disciplines. In December of 2017, she successfully completed the INACSL/CAE Fellowship in Healthcare Simulation.

Stephen Hetherman, EdD, is a managing partner of Objectivity Plus. Over the past 25 years, he has constructed licensure, certification, and achievement examinations. These examinations varied in format from computer adaptive tests to essay tests.

REFERENCES

1. American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], & Joint Committee on Standards for Educational and Psychological Testing. (2014). Standards for educational and psychological testing. Washington, DC: AERA.
2. Benner, P., Sutphen, M., Leonard, V., & Day, L. (2010). Educating nurses: A call for radical transformation. San Francisco: Jossey Bass.
3. Gaba, D. (2004). The future vision of simulation in health care. *Quality and Safety in Simulation*, 13 (suppl 1), i2-i10.
4. Goldman, N. (2017, August). NCSBN simulation guidelines for preclicensure nursing programs. Paper presented at the annual meeting of the National Council State Board of Nursing, Chicago, IL.
5. Hetherman, S., Lioce, L., Gambardella, L., & Longo, B. (2017). Development of Quantum, an Instructor-Mediated Performance Assessment Test, and Student Measure Validation. *Journal of Nursing & Healthcare*, 3(1) 1-10. <https://www.objectivityplus.com/wp-content/uploads/2017/08/developmentQuantum.pdf>
6. International Nursing Association for Clinical Simulation and Learning [INACSL] (2016). Standards of Best Practice: SimulationSM. <https://www.inacsl.org/INACSL/document-server/?cfp=INACSL/assets/File/public/standards/SOBPEnglishCombo.pdf>
7. Objectivity Plus (2016). Quantum, a Performance Assessment Test (Version 2.0.1) [Mobile application software]. Retrieved from <https://play.google.com/store>.