Summer 2024

Validation of a Tool to Evaluate Nursing Students' Electronic Health Record Competency in Simulation

Susan McBride
University of Texas at Tyler, susanmcbride@uttyler.edu

Laura Thomas
University of North Texas Health Sciences Center

Sharon Decker
Texas Tech University Health Sciences Center

Matthew Pierce
Texas Tech University Health Sciences Center

Shelley Burson
Texas Tech University Health Sciences Center

See next page for additional authors

2.5 ANCC Contact Hours

OPEN

Validation of a Tool to Evaluate Nursing Students' Electronic Health Record Competency in Simulation

Susan McBride, Laura Thomas, Sharon Decker, Matthew Pierce, Shelley Burson, Huaxin Song, and Katie Haerling (Adamson)

Abstract

AIM The aim of the study was to establish reliability and validity of the Competency Assessment in Simulation of Electronic Health Records (CASE) tool.

BACKGROUND Effective teaching and learning practices, including valid and reliable assessment of students' electronic health record (EHR) competency, contribute to safe, high-quality, efficient nursing care.

METHOD The study used a mixed-methods design to test reliability and validity of the CASE tool.

RESULTS A nationally representative sample of faculty from universities representing 27 states provided scores for videos using the CASE tool. Forty-seven participants completed the first scoring survey; 22 of the 47 participants (47%) completed the second-round scoring. Intraclass correlation for the final score between the first and second responses shows the consistency of test-retest reliability (ICC = .78, $p < .001$).

CONCLUSION The CASE tool provided evidence of validity and reliability in evaluating EHR competency in simulation.

KEY WORDS Competency – Documentation – Electronic Health Records – Simulation

The Centers for Medicare & Medicaid Services Electronic Health Record Incentive Program and the Health Information Technology for Economic and Clinical Health Act of 2009 led to the widespread adoption of electronic health records (EHRs) in ambulatory and acute care settings in the United States. With this transition, the conventional practice of reading through a paper-based chart to obtain the full picture of a patient shifted into a more complex, multidimensional process requiring interaction with the electronic environment. This created a significant change in the way clinicians access, read, digest, and use information within the EHR. To prepare nursing students to practice in a technology-rich environment, nurse educators must include electronic documentation as part of nursing school curricula (Williams et al., 2021). An objective method to evaluate student competency with EHR documentation is needed to ensure a seamless transition into the workforce.

The aim of this study was to establish the reliability and validity of the Competency Assessment in Simulation of Electronic Health Records (CASE) tool for measuring nursing students' competency with EHR documentation in simulation. Simulation was used to develop and test the CASE tool because it provides a safe environment for students to build competencies without putting patients at risk. Also, many health care agencies continue to restrict students' use of the EHR (Hansbrough et al., 2020).

The CASE tool provides faculty with a psychometrically sound instrument to generate valid and reliable results about the quality of EHR documentation by nursing students in simulation. The tool also

About the Authors *Susan McBride, PhD, RN-BC, CPHIMS, FAAN, is a professor and associate dean of research, The University of Texas at Tyler School of Nursing, Tyler, Texas. Laura Thomas, PhD, RN, CNE, is a professor, University of North Texas Health Sciences Center College of Nursing, Fort Worth, Texas. Sharon Decker, PhD, RN, FSSH, ANEF, FAAN, is professor emeritus, Texas Tech University Health Sciences Center School of Nursing, Lubbock, Texas. Matthew Pierce, MS, NREMT, CHSOS, is director of health information, Texas Tech University Health Sciences Center School of Nursing. Shelley Burson, MEd, is coordinator of special projects, Texas Tech University Health Sciences Center School of Nursing. Huaxin Song, PhD, is assistant professor, The University of Texas at Tyler School of Nursing. Katie Haerling (Adamson), PhD, RN, CHSE, is a professor, University of Washington Tacoma School of Nursing and Healthcare Leadership, Tacoma, Washington.* *This research was supported by funding from the Dorothy Otto Research Award under the National League for Nursing Research Awards in 2021. The research team acknowledges the contributions of the University Medical Center Health System, Lubbock, Texas, and the following nurses, faculty, and technology support: Rebecca Clark, Erin Gibson, Heather Guest, Courtnie Moore, Belen Ramirez, Tammy Williams, Bill Eubanks, Autumn Harris, Apryl Keaty, George Esquivel, Emmanuel Sanchez, Adam Wood, and William McGaghie. For more information, contact Dr. McBride at susanmcbride@uttyler.edu.*

The authors have declared no conflict of interest.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website (www.neponline.net).

doi: 10.1097/01.NEP.0000000000001240

aligns with Competency III of the National League for Nursing (NLN) Nurse Educator Core Competencies: to assess and evaluate student learning in a variety of settings and in all domains of learning (Halstead, 2019). The CASE tool was designed to focus on assessing EHR documentation in general, in contrast to vendor-specific EHRs that encourages diverse application of the tool for assessment in the psychomotor, affective, and cognitive domains. EHR use in simulation improves students' documentation skills through learner engagement, and those skills translate to the clinical setting, reducing unintended consequences while improving the safety of patient care (Wilbanks & Aroke, 2020).

BACKGROUND

Tools currently available to faculty for evaluating informatics competencies are primarily subjective self-assessment tools that evaluate computer skills (Forman et al., 2020; Ting et al., 2021; Yoon et al., 2009). This study evaluated the reliability and validity of an objective EHR documentation evaluation tool. To assess the quality of documentation in the EHR, the CASE tool was originally developed using Lynn's (1986) method of content validity. A combination of nominal group and Delphi techniques was used to identify 15 domains of best practice in documentation. Nominal group technique is a structured method of obtaining consensus among stakeholders. Delphi is a technique that measures judgment from highly knowledgeable subject matter experts regarding content for instrument development. Participants with expertise in academic education, simulation, and informatics provided input into the development of the tool.

The tool evolved over three rounds of Delphi that refined the language and provided anchors to promote accurate assessment of students' documentation. The results of the Delphi narrowed 15 domains down to 10 domains. After three rounds of Delphi, the final content validity index score for the instrument was .97 (McBride et al., 2020). With content validity established, this study focused on establishing criterion and construct validity and reliability of the tool.

Review of Relevant Literature

The current focus on competency-based learning and technology competencies established by informatics experts makes the CASE tool a timely addition to the nurse educator's toolbox. Simulation centers across the United States have integrated EHRs into simulation activities to develop student competencies in documentation (Ravert et al., 2020; Sweeney et al., 2019). This integration of EHRs is essential to develop and evaluate students' competencies in critical functions such as electronic medication administration, computer provider order entry, and clinician decision-making (Forman et al., 2020; McBride et al., 2020).

Simulation provides an active learning environment where students can safely use the EHR for documentation, enabling students to obtain skills in recognizing patient safety issues and competencies that translate to the clinical setting (Wilbanks & Aroke, 2020). Simulation-based learning requires students to actively participate in dynamic experiences, in contrast to static, traditional modes of learning. Simulation-based experiences (SBEs) can be conducted in various settings, including simulation centers, flipped classroom settings, or in situ (the actual patient care environment), and provided through multiple modalities, such as standardized patients, manikins, partial trainers, and avatars (Watts et al., 2021). Research has demonstrated that when SBEs are designed purposefully to meet specific objectives and integrated appropriately throughout the curriculum, the experiences promote clinical judgment, skills acquisition and retention, and interprofessional teamwork, and they have a positive impact on patient outcomes (Fernandez et al., 2017; Mollart et al., 2021; Watts et al., 2021). However, barriers related to integrating EHRs into SBEs persist, including the "availability of educational EHRs, decreased functionality compared with EHRs in clinical use, high acquisition costs, and the labor needs to implement and use educational EHRs" (Wilbanks et al., 2018, p. 265).

Once an EHR is implemented, nurse educators must be able to objectively measure the student's documentation competency (Thomas et al., 2023). Competencies establish a standard by which students can be measured to achieve course outcomes (Giddens, 2020). Englander et al. (2013) define *competency* as "an observable ability of a health professional, integrating multiple components such as knowledge, skills, values, and attitudes" (p. 1089). The American Association of Colleges of Nursing (AACN, 2021) developed *The Essentials: Core Competencies for Professional Nursing Education* using the Englander et al. definition of competency. This document provides nurse educators with a competency framework to develop nursing curriculum content for all levels of nursing education (AACN, 2021). Competency frameworks can create structure in nursing education and provide consistency in evaluation of knowledge (Bell & Fredland, 2020). Core competencies related to use of EHRs include the skills required to obtain appropriate information in a timely manner, use of the information to support clinical judgment, care documented as part of the patient care routine, and the ethical use of the computer system with information obtained (McBride et al., 2020). The development of these competencies requires nursing students be provided the time and experiences to process and assimilate their learning in a safe environment unencumbered by the fear of harming a patient (Wilbanks & Aroke, 2020).

SCENARIO DEVELOPMENT

To utilize validated scenarios for this study, current NLN Advancing Care Excellence (ACE) modules were critiqued, and one unfolding case was selected as the scenario for the study. ACE scenarios are established, uniform, unfolding case was scenarios that incorporate knowledge domains and learning actions into students' experiences (NLN, 2022). Based on pilot testing and development strategies, the Red Yoder ACE.S scenario was chosen for the complexity of care that would be provided for a patient with a diagnosis of sepsis; it was enhanced significantly to include electronic documentation and corresponding EHR data. Additional information was added to the scenario to incorporate actions relevant to CASE tool competencies; these required the learner to appropriately retrieve, interpret, and utilize electronic data. Two expert clinicians were engaged to critique the Red Yoder case and ensure current practice standards were met as part of the scenario.

Rater Communication and Instruction

Communication to recruit and enroll faculty as raters took place via email. NLN recommendations for high-stakes simulation assessment and training of evaluators on what competence looks like supported the creation of training materials (Rizzolo et al., 2015). The importance of well-developed training materials is critical to establish intra- and interrater reliability among raters for high-stakes assessment of clinical performance in simulation (Holland et al., 2020). A recorded video explaining each domain of the CASE tool was provided on a web portal housed on the school of nursing servers. A link to the recorded

video was provided to each rater prior to viewing the simulated scenario and EHR documentation. The instructions included a standard vendor-agnostic approach to inspect the EHR for quality of nursing documentation. Raters were instructed on how to use the CASE tool to evaluate the competency of EHR documentation during the recorded simulated patient experience; common errors the raters may expect to see in the scenario were included. Qualtrics was used to house the CASE tool for data collection and analysis.

Theoretical, Conceptual, Philosophical Basis for the Study

The research team developed the CASE tool as part of a larger project, the Electronic Health Record-Enhanced Simulation Program. This program encompasses the development of the CASE tool for use with interprofessional teams to develop safe, high-quality EHR documentation. The overarching framework for the current study aligns with concepts adopted by the Interprofessional Collaborative Panel (2011).

The researchers used the model and will further validate its use with interprofessional teams. According to Plake et al. (2014), a conceptual framework for scoring performance and testing is shaped by the ways in which test scores will be used. As such, the CASE tool has gone through conceptual validation for each EHR competency domain.

The tool has four levels and 10 domains that map to the AACN Essentials (AACN, 2021). As part of each competency domain, faculty must assess the expectations of students at different points in the undergraduate nursing program. For example, using data within the EHR for critical decision-making at the point of care would be expected toward the end of an undergraduate program. The four levels established within the CASE tool can be mapped to the curricula of undergraduate programs. The conceptual framework underpinning the CASE tool is reflected in Figure 1.

METHOD

The research design was a mixed-methods study for establishing reliability and validity of the CASE tool. The quantitative component replicated a novel approach with video-simulated scenarios demonstrating competencies within the clinical workflow, virtual education, and email communication for recruitment and management of participants (Adamson et al., 2011; Todd et al., 2008). The qualitative component utilized a content analysis of the nursing narrative in the comments section for each domain of the CASE tool. The research question was: Is the CASE tool a valid and reliable tool to evaluate competency in use of the EHR within SBEs? Investigators received an institutional review board (IRB) certificate of exemption for human subject involvement. The IRB did not require the informed consent of participants.

Instrumentation

The CASE tool is a 10-item Likert scale instrument based on prior research using nominal group and Delphi techniques to identify domains of best practice for the use of the EHR for nursing documentation (McBride et al., 2020). Raters assigned the following performance scores for the first three domains on the CASE tool: 0 = *strongly disagree or incomplete,* 1 = *disagree with seven or more errors*, 2 = *neutral with four to six errors*, 3 = *agree with one to three errors*, and 4 = *strongly agree with no errors*. The fourth domain is also scored from 0 to 4: 0 = *strongly disagree or not completed*, 1 = *disagree or missing four to five assessments*, 2 = *neutral or missing two to three assessments*, 3 = *agree or missing one assessment*, 4 = *strongly agree with no errors*. The fifth to the tenth domains are scored as either 0 = *not completed* or 1 = *no errors*. If N/A was selected for the item, the item would not be included in the final score calculation.

The raters evaluated each domain on the CASE tool for its relevance to the scenario being used, the minimal expectation of EHR use in that domain given the clinical scenario, expected clinical documentation behaviors for the scenario, and the education level of the student. The comments section and open-ended questions were included to gain an understanding of how participants interpreted the domains on the CASE tool and how they rated the observed behaviors in the videos. The final score was the percentage calculated using the sum of the items with scores divided by the maximum score of those items. Scores of 75 percent or greater were passing scores, with anything below 75 percent considered failing. In this study, the investigators determined the minimal expected EHR documentation behaviors and identified common errors that might violate each domain. Common errors may include inaccurate or incomplete documentation, armband discrepancies, missing assessment data, documenting other when the charting by exception is appropriate, administering incorrect medications, and failing to document education.

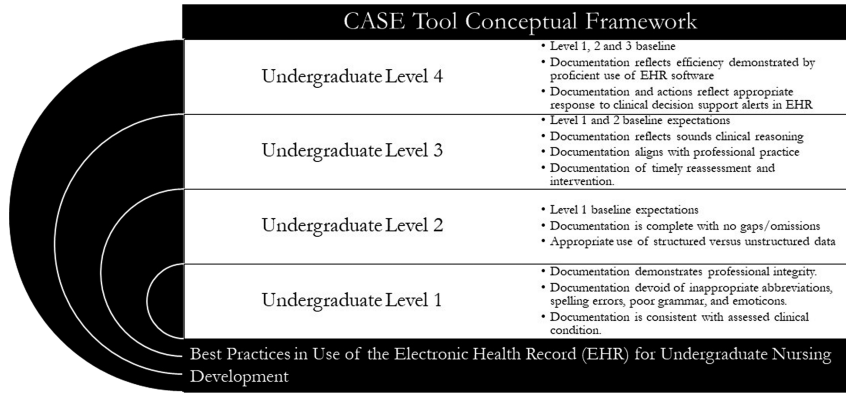

Figure 1. CASE tool conceptual framework. The CASE tool conceptual framework contains recommendations on which competencies are expected at which level of a nursing program based on a Level 1–4 model of curriculum.

Video Production for Documentation Competencies

To assess the reliability and validity of the CASE tool as an observation-based performance evaluation instrument, it was helpful to have standardized, video-recorded scenarios for raters to observe and score. Video development and production of the standardized scenarios using the EHR was one of the most challenging components of this study protocol. A storyboard of the clinical scenarios was developed to support standardization of scripting for clinicians reflecting EHR use. The clinical scenario was standardized, and the variation was introduced explicit to the EHR. Standardized scenarios ensure inclusion of the necessary evaluation targets and allow raters to view a wide range of performance quality (poor, acceptable, good, and best). Furthermore, video recordings of the standardized scenarios allowed for multiple raters to asynchronously view and score the same performance to determine the amount of agreement using the raters' data.

The research team created archived video scenarios depicting four degrees of performance in the unfolding Red Yoder scenario using the EHR to support nursing care delivery and documentation. Working with clinicians, informaticists, nurse educators, and simulation subject matter experts, performance levels and associated errors were introduced to determine the poor, acceptable, good, and best levels of performance reflected in the videos. Correct and incorrect actions identified by nurse educators through evaluation of EHR documentation were introduced into the standardized clinical scenarios; they could be observed or evaluated from inspection of the EHR documentation to score the video scenarios.

The research team used video hosting and recording software to produce the video of the clinical care provided. The video of clinical care was then paired with a live screen capture of the EHR's use. Viewers were able to see both videos simultaneously and toggle between picture-in-picture or side-by-side view.

The nurses caring for Mr. Yoder documented the patient's admission and assessment in one of four varying degrees of competency of electronic nursing documentation within the clinical workflow. The videos also included an inspection of the documentation within the EHR that represented a structured, standardized method for quality based on the 10 domains for the CASE tool. Although the videos were specific screen captures of the EHR vendor within the simulation center, the approach taken for instrument development and use was designed to be generic best practices in use of the EHR that were not vendor specific. The research team attempted to develop an efficient yet thorough process to observe clinical performance and EHR use and review the EHR post-simulated documentation within the EHR.

Participants and Recruitment

Raters were recruited from within the university system and through a national professional nursing organization. A targeted mailing list from the Society for Simulation in Healthcare (SSH) was queried to identify educators who met inclusion criteria for the study. Raters included in the study were faculty teaching in prelicensure baccalaureate and associate degree nursing programs in the United States. A minimum of one year of simulation experience, with clinical experience using an EHR within the past 10 years, was also required. Raters were excluded if they failed to provide any scoring.

The SSH list included 342 emails of individuals who were invited to complete a demographic survey to determine eligibility; of these, 293 completed the demographic survey. A second email was sent to the 293 respondents, inviting them to view the training video, review the instruction materials, and take part in the initial video scoring. Forty-seven respondents completed Score 1. A third email was sent two months after the initial scoring, inviting the participants to rescore the same video. One round of reminder emails was sent after four weeks to those who failed to rescore. A total of 28 respondents completed Score 2.

Landis and Koch (1977) characterized values of reliability coefficients as follows: slight (.20), fair (.21 to .40), moderate (.41 to .60), substantial (.61 to .80), and almost perfect (.8 to 1.00). To achieve .80 power and a significance level at .05, seven measurements (raters) per subject (video) were needed for each of four videos to demonstrate a reliability coefficient >.2 (Donner & Eliasziw, 1987). With an estimated attrition rate of 20 percent, at least 34 raters need to be recruited for the study.

Data Collection and Analysis

After completing the study training, raters were emailed instructions on accessing and scoring one of the four-level scenarios. The researchers assessed test-retest reliability by having raters score the same scenario in Rounds 1 and 2. Raters were asked to score the same video a second time, two months after the initial scoring. Participants' scores were tracked on a Microsoft Excel spreadsheet to ensure scores were kept separate and there was no use of previous scoring. Data collection took place over six months via a secure network using a Qualtrics survey format.

The sequence of the scenarios for Round 1 was randomized for each rater, blinded for level of performance that the raters reviewed and scored. The design was not fully crossed because no scenario was evaluated by all participants. Each participant rated the same scenario twice. The fully crossed design allows for the assessment of systematic bias between raters, which in turn helps to improve the overall estimates of interrater reliability (IRR; Hallgren, 2012). The videos were named *circle, square, triangle,* and *rectangle* to avoid bias from numerical or alphabetical designations. IBM SPSS© Version 29 was used for conducting the following analysis.

VALIDITY Construct validity (both discriminant validity and convergent validity) was verified utilizing exploratory factor analysis (EFA) with principal component extraction method. Because only one component/factor was expected, rotation was not applied. Items loaded > .40 were considered for the final tool. Factors with eigenvalues >1.00 were considered latent variables for evaluation. Criterion validity was verified by evaluating the association between the CASE tool score and the initial rating of the scenarios.

INTERRATER RELIABILITY Reliability was established to address measures of consistency. The analysis assessed the consistency of scores assigned by the different raters using intraclass correlation (ICC) agreement to determine IRR. In this study, this research design required IRR assessment to demonstrate consistency among multiple raters' observational ratings (scores) of the four randomly assigned and blinded scenarios. We elected to assign one level of the scenarios to each participant twice with pre/post review. IRR was evaluated through an ICC based on a two-way mixed model for absolute agreement and consistency (Koo & Li, 2016; Nichols, 1998).

INTRARATER (TEST-RETEST) RELIABILITY To assess the consistency of scores assigned to the same scenario by the same rater (faculty) from the first review to the second review, the research team used the CASE tool's total score to determine the consistency

between the first score and the second score. The ICC consistency is used across all four scenarios (Shrout & Fleiss, 1979).

INTERNAL CONSISTENCY Internal consistency was examined as a measure of both reliability and validity, assessing whether the 10 items of the CASE tool were measuring the same construct. A Cronbach's alpha coefficient was used to measure internal consistency of the items within the instrument.

FINDINGS

Sample Description

The final study sample of raters included faculty from diverse locations and programs with experience in simulation and EHR documentation and faculty who may not have had experience with EHR integration into simulation. Raters were undergraduate or associate degree nursing faculty: 293 potential raters from 41 states across the nation and various public and private universities. Raters were excluded if they failed to provide any scoring. Of the 293 initial respondents, 223 returned the demographic survey; of these 47 (21%) completed the first scoring survey. Twenty-two of the 47 participants (47%) completed the second-round scoring survey. The final sample size for scoring was 47 participants (see Supplemental Content for a table with participant demographics, http://links.lww.com/NEP/A521).

The 47 participants were randomly assigned to four different video groups. See Table 1 for the frequency distribution of Score 1 and Score 2 for each level of video performance. The best practice video was circle, with the poorest performance being triangle. The raters identified the video by shapes assigned to each level of performance.

Instrument Reliability Test

EFA was conducted using all participants' responses from the first round of scoring. One factor is identified with all item factor loading >.4 (see Supplementary Content for table, http://links.lww.com/NEP/A522). The ICCs for IRR for each video were between .76 and .90, which indicates absolute agreement between raters, Cronbach's alpha = .90, indicating internal consistency. The ICC for the final score between first and second evaluation shows test-retest consistency, ICC = .78 (.46, .91), $p < .001$. From the multiple regression model, after controlling age and institute, there is no significant difference in the total score identified between the four types of videos. However, the pass rate for Video A, which is designed with the least errors, has the highest pass rate of 60 percent compared with 25 percent, 40 percent, and 47 percent of the other videos.

Qualitative Analysis

Qualitative data were derived from rater text data where raters were asked to add comments as appropriate for noted violations of each of the domains. Raters were also asked: Is there anything you would like to share regarding your experiences with use of the CASE tool to evaluate competencies in use of EHR within simulation? These data were analyzed and synthesized for qualitative themes.

The text, pulled directly from the Qualtrics survey to ensure accuracy, was organized in an Excel file and read and reviewed systematically to identify key concepts. The concepts were reorganized and summarized into categorical statements. The data were compared with participants scoring on the CASE tool to ensure consistency between scores and comments. Trustworthiness was established through review of the data by two researchers using the same review method. Descriptions provided by the raters were brief and described reasons for the way the documentation was scored. Comments across the 10 domains of the CASE tool were analyzed into themes including documentation errors, nursing interventions, technical issues, and use of the CASE tool.

DOCUMENTATION ERRORS Assessment of each domain of the CASE tool resulted in comments related directly to documentation of care provided in the scenario. In general, most of the comments for each domain related to what was not documented in the EHR during the scenario. However, participants also stated that the nurse who did the assessment should have done the documenting, rather than dictating the assessment to another nurse. Documentation errors that were intentionally placed in the scenarios were recognized by the participants including "documentation of temperature was incorrect," "wound measurement was not described," "did not chart skin assessment," and "documentation did not reflect low BP." Although most comments related to documentation, others addressed the provision of nursing interventions and care.

NURSING INTERVENTIONS Comments on the care provided by the nurses in the scenarios included a participant suggesting that even though the patient was disoriented, explaining care and providing patient teaching were warranted. Workarounds were identified such as medication ordered was not scanned but still given and task alerts should have been triggered and followed up on for completion. It should be noted that the intentional integration of documentation errors resulted in actions by the nurses that would not have been done in providing optimal patient care. One participant thought that the scenario was too short, noting that students would not have time to do a head-to-toe assessment, document appropriately, and complete nursing interventions in 15 minutes. Some of the comments addressed the ability to see the EHR documentation.

Table 1: Frequency Distribution of Video Scores for Round 1 and Round 2

	Video				
	A Best Practice	B Acceptable Practice	C Good Practice	D Poor Practice	Total
Score 1	11	10	12	10	15 47
Score 2	22	6	5	6	5 22

Note. Distribution of video assignment reflected with total count of scores per video. Video A reflected the best competency performance, and Video D reflected the poorest competency performance within the videos.

TECHNICAL ISSUES The clarity of one of the videos was the main technical issue in the study. Although the research team found the videos clear on review, the participants may have had bandwidth issues that interfered with video playback. Comments included "The resolution of the EHR screen could be better so the evaluator can read detail" and "difficult to see documentation at times." The size of the screen to view the EHR was another problem for participants. They were instructed to use the double arrows in the upper right corner of the screen to switch back and forth between the scenario and the EHR screen; however, even with enlarging the EHR screen, it was difficult to view some of the documentation.

USE OF THE CASE TOOL Participants commented on the CASE tool as helpful for schools but needed to be condensed for faster scoring. The CASE tool has been put in a more usable, electronic format that will be posted on the website for faculty use. Other participants stated that "the CASE tool identifies key aspects associated with EHR competencies," "I felt the tool was easy to understand with clear examples of appropriate and inappropriate behaviors," "this is a great tool to teach and for students to practice EHR," and "[The CASE tool] is easy to use and does reflect the important (essential) competencies in the expectations of EHR charting." One participant stated, "The assessment tool makes a few generalizations that are not quantifiable, for example, documentation is honest and demonstrates professional integrity."

LIMITATIONS

The convenience sample of faculty raters from across the nation presented limitations; however, the selection of raters was determined by inclusion and exclusion criteria. The sample lacked diversity with only four participants in the first round and two in the second round identifying as non-White. The most significant limitation of our study was difficulty in clearly visualizing text and dialogue prompts within the user interface of the EHR. Some participants reported challenges clearly noting some of the documentation; other participants did not report any challenges with the same video. We believe that bandwidth in certain areas of the nation and the computing equipment of the participants may have impacted the quality of video streaming. The COVID-19 pandemic may have impacted the number of participants who completed the second component of the study. Because of the impact of the pandemic on educators, moving from in-person to online instruction for undergraduate students may have led to time constraints and their ability to finalize second-round scoring in the study (Leaver et al., 2022).

DISCUSSION

EHR use in the health care setting necessitates that nursing schools provide education and practice in electronic documentation as part of the academic curriculum. Nurse educators must ensure that the evaluation tools used to assign passing and failing grades are valid and reliable to provide consistency in student assessment. Competent electronic documentation ensures accuracy, efficiency, safety, and privacy of patient information. This study established reliability and validity of the CASE tool, providing faculty with an objective method of evaluating students' electronic documentation in the simulation environment. In addition, this study fills an important gap in developing and evaluating critical competencies in using EHRs to document clinical nursing care delivered; thus, it helps transition nurses into the practice setting better prepared to deliver and document nursing care.

The methods used in this study replicated the study by Adamson et al. (2011), which used video scenarios, a virtual classroom, webinar, and email to further establish the reliability and internal consistency of the Creighton Simulation Evaluation Instrument. Standardized videos provided raters with the opportunity to identify errors in documentation performance regardless of the EHR vendor. No comments were related to the type of EHR used in the scenarios, making vendor specificity irrelevant. Raters were able to recognize errors intentionally embedded in the video scenarios without difficulty. It is notable that documentation errors also unintentionally introduced patient care errors in the scenarios.

As reported in this article, reliability and internal consistency were high when the CASE tool was used by a national sample of nurse faculty evaluating standardized video simulations. Scoring student documentation performance using the CASE tool provides educators with a method to clearly delineate between high and low scorers and students with midrange scores. It can be a challenge for faculty to distinguish between students' scores in the midrange, and this can be explored more fully in subsequent studies.

Implications for Nurse Educators

The CASE tool provides valid and reliable data reflecting competencies in use of the EHR. providing nurse educators with a method for evaluating competencies aligned with the AACN essentials (AACN, 2021). The tool also aligns with international efforts to create educational materials and methods to evaluate EHR competencies for the digital age of health care. As such, it should be helpful for educators and also has the potential to be used in the practice setting to evaluate nursing competencies. Nurse educators might consider how the tool can be utilized to develop educational materials for the different levels of curricula within undergraduate nursing programs. Furthermore, textual comments reflect the value for nurse educators in using the CASE tool to evaluate competencies and the potential to further refine and clarify domains. An important lesson learned from this study was the need to modify existing clinical scenarios, such as the Red Yoder sepsis case, to include EHR data and information that require the individual to gather data, analyze, and incorporate information into nursing care.

Implications for Future Research

This study has significant implications for future studies to expand upon our evaluation strategies for use of the CASE tool. Further rigorous psychometric assessment in different settings with larger and more diverse samples will provide for refinement of the instrument. The development and use of additional scenarios with better ability to visualize and inspect EHR screenshots and documentation quality would also improve the quality of the IRR data and further delineation of performance, from best practice to poor practice as well as intermediary performance levels. Further research is needed to evaluate and compare student competencies between groups who are exposed to different teaching modalities. In addition, the CASE tool and the methods utilized in the study to map video footage have potential future implications for storyboards to develop gaming technologies to develop and evaluate EHR competencies. Finally, the tool may have utility in the clinical setting for evaluating best practices in clinicians' performance while using the EHR.

CONCLUSION

Nursing students' electronic documentation skills are an important part of their education experience. Simulation centers provide a safe

environment for students to practice documentation skills before entering the clinical setting. To evaluate nursing student EHR documentation competency, the CASE tool was developed and tested using recorded clinical video scenarios. Varying documentation quality in the videos provided a means to test its reliability and validity. The CASE tool demonstrated agreement in scores between participants and consistency in measuring the domains on the tool. This study indicates the CASE tool provided evidence of validity and reliability in evaluating EHR competency in simulation.

REFERENCES

Adamson, K. A., Parsons, M. E., Hawkins, K., Manz, J. A., Todd, M., & Hercinger, M. (2011). Reliability and internal consistency findings from the C-SEI. *Journal of Nursing Education*, *50*(10), 583–586. https://doi.org/10.3928/01484834-20110715-02

American Association of Colleges of Nursing. (2021). *The essentials: Core competencies for professional nursing education* https://www.aacnnursing.org/Portals/42/Downloads/Essentials/Essentials-Draft-Document-10-20.pdf

Bell, R., & Fredland, N. (2020). The use of theoretical frameworks guiding interprofessional simulation: An integrative review. *Nursing Education Perspectives*, *41*(3), 141–145. https://doi.org/10.1097/01.Nep.0000000000000615

Donner, A., & Eliasziw, M. (1987). Sample size requirements for reliability studies. *Statistics in Medicine*, *6*(4), 441–448. https://doi.org/10.1002/sim.4780060404

Englander, R., Cameron, T., Ballard, A. J., Dodge, J., Bull, J., & Aschenbrener, C. A. (2013). Toward a common taxonomy of competency domains for the health professions and competencies for physicians. *Academic Medicine*, *88*(8), 1088–1094. https://doi.org/10.1097/ACM.0b013e31829a3b2b

Fernandez, R., Shah, S., Rosenman, E. D., Kozlowski, S. W. J., Parker, S. H., & Grand, J. A. (2017). Developing team cognition: A role for simulation. *Simulation in Healthcare*, *12*(2), 96–103. https://doi.org/10.1097/sih.0000000000000200

Forman, T. M., Armor, D. A., & Miller, A. S. (2020). A review of clinical informatics competencies in nursing to inform best practices in education and nurse faculty development. *Nursing Education Perspectives*, *41*(1), E3–E7. https://doi.org/10.1097/01.Nep.0000000000000588

Giddens, J. (2020). Demystifying concept-based and competency-based approaches. *Journal of Nursing Education*, *59*(3), 123–124. https://doi.org/10.3928/01484834-20200220-01

Hallgren, K. A. (2012). Computing inter-rater reliability for observational data: An overview and tutorial. *Tutorial in Quantitative Methods for Psychology*, *8*(1), 23–34. https://doi.org/10.20982/tqmp.08.1.p023 (IN FILE).

Halstead, J. A. (2019). *NLN core competencies for nurse educators: A decade of influence*. National League for Nursing.

Hansbrough, W., Dunker, K. S., Ross, J. G., & Ostendorf, M. (2020). Restrictions on nursing students' electronic health information access. *Nurse Educator*, *45*(5), 243–247. https://doi.org/10.1097/nne.0000000000000786

Holland, A. E., Tiffany, J., Blazovich, L., Bambini, D., & Schug, V. (2020). The effect of evaluator training on inter- and intrarater reliability in high-stakes assessment in simulation. *Nursing Education Perspectives*, *41*(4), 222–228. https://doi.org/10.1097/01.Nep.0000000000000619

Interprofessional Collaborative Panel. (2011). *Core competencies for interprofessional collaborative practice: Report of an error panel*. https://www.aacnnursing.org/portals/0/pdfs/population-health/IPECReport.pdf

Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155–163.

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, *33*(1), 159–174.

Leaver, C. A., Stanley, J. M., & Goodwin Veenema, T. (2022). Impact of the COVID-19 pandemic on the future of nursing education. *Academic Medicine*, *97*(3S), S82–S89. https://doi.org/10.1097/acm.0000000000004528

Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, *35*(6), 382–385.

McBride, S., Thomas, L., & Decker, S. (2020). Competency assessment in simulation of electronic health records tool development. *CIN: Computers, Informatics, Nursing*, *38*(5), 232–239. https://doi.org/10.1097/cin.0000000000000630

Mollart, L., Newell, R., Noble, D., Geale, S. K., Norton, C., & O'Brien, A. P. (2021). Nursing undergraduates' perception of preparedness using patient electronic medical records in clinical practice. *Australian Journal of Advanced Nursing*, *38*(2), 44–51. https://doi.org/10.37464/2020.382.282

National League for Nursing. (2022). *ACE.S teaching strategies*. https://www.nln.org/education/teaching-resources/professional-development-programsteaching-resourcesace-all/ace-s/teaching-strategies

Nichols, D. P. (1998). Choosing an intraclass correlation coefficient. *SPSS Keywords*, *67*, 1–2.

Plake, B. S., Wise, L. L., Cook, L. L., Drasgow, F., Gong, B. T., Hamilton, L. S., Hansen, J., Herman, J. L., Kane, M. T., Kolen, M. J., Puente, A. E., Sachett, P. R., Tippins, N. T., Way, W. D., & Worrell, F. C. (2014). *Standards for educational and psychological testing*. https://www.testingstandards.net/uploads/7/6/6/4/76643089/standards_2014edition.pdf

Ravert, P., Whipple, K., & Hunsaker, S. (2020). Academic electronic health record implementation: Tips for success. *Clinical Simulation in Nursing*, *41*, 9–13. https://doi.org/10.1016/j.ecns.2019.12.008

Rizzolo, M. A., Kardong-Edgren, S., Oermann, M. H., & Jeffries, P. R. (2015). The National League for Nursing project to explore the use of simulation for high-stakes assessment: Process, outcomes, and recommendations. *Nursing Education Perspectives*, *36*(5), 299–303. https://doi.org/10.5480/15-1639

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, *86*(2), 420–428. https://doi.org/10.1037//0033-2909.86.2.420

Sweeney, A. B., Morse, C. Y., & Carofiglio, C. (2019). Integrating simulated electronic health record patients across multiple nursing courses. *Journal of Nursing Education*, *58*(8), 495–496. https://doi.org/10.3928/01484834-20190719-14

Thomas, L., McBride, S., Decker, S., Pierce, M., & Tietze, M. (2023). Developing competencies in nursing for an electronic age of health care. In S. McBride, & M. Tietze (Eds.), *Nursing informatics for the advanced practice nurse* (3rd ed. pp. 557–574). Springer https://doi.org/10.1891/9780826124890.0023

Ting, J., Garnett, A., & Donelle, L. (2021). Nursing education and training on electronic health record systems: An integrative review. *Nurse Education in Practice*, *55*, 103168 https://doi.org/10.1016/j.nepr.2021.103168

Todd, M., Manz, J. A., Hawkins, K. S., Parsons, M. E., & Hercinger, M. (2008). The development of a quantitative evaluation tool for simulations in nursing education. *International Journal of Nursing Education Scholarship*, *5*, 41 https://doi.org/10.2202/1548-923x.1705

Watts, P. I., McDermott, D. S., Alinier, G., Charnetski, M., Ludlow, J., Horsley, E., Meakim, C., & Nawathe, P. A. (2021). Healthcare simulation standards of best practice™ simulation design. *Clinical Simulation in Nursing*, *58*(14–21), 27 https://doi.org/10.1016/j.ecns.2021.08.009

Wilbanks, B. A., & Aroke, E. N. (2020). Using clinical simulations to train healthcare professionals to use electronic health records: A literature review. *CIN: Computers, Informatics, Nursing*, *38*(11), 551–561 https://doi.org/10.1097/cin.0000000000000631

Wilbanks, B. A., Watts, P. I., & Epps, C. A. (2018). Electronic health records in simulation education: Literature review and synthesis. *Simulation in Healthcare*, *13*(4), 261–267 https://journals.lww.com/simulationinhealthcare/Fulltext/2018/08000/Electronic_Health_Records_in_Simulation_Education.7.aspx

Williams, C., Moody, L., & Martinez, D. (2021). Electronic medical record use in nurse education curricula: A systematic review. *Teaching and Learning in Nursing*, *16*, 227–234 https://doi.org/10.1016/j.teln.2021.02.007

Yoon, S., Yen, P. Y., & Bakken, S. (2009). Psychometric properties of the self-assessment of nursing informatics competencies scale. *Studies in Health Technology and Informatics*, *146*, 546–550.

Lippincott® NursingCenter®

NCPD Nursing Continuing Professional Development

TEST INSTRUCTIONS

- Read the article. The test for this nursing continuing professional development (NCPD) activity is to be taken online at **www.nursingcenter.com/CE/NEP**. Tests can no longer be mailed or faxed.
- You'll need to create an account (it's free!) and log in to access My Planner before taking online tests. Your planner will keep track of all your Lippincott Professional Development online NCPD activities for you.
- There's only one correct answer for each question. A passing score for this test is 8 correct answers. If you pass, you can print your certificate of earned contact hours and access the answer key. If you fail, you have the option of taking the test again at no additional cost.
- For questions, contact Lippincott Professional Development: 1-800-787-8985.
- Registration deadline is June 5, 2026

PROVIDER ACCREDITATION

Lippincott Professional Development will award 2.5 contact hours for this nursing continuing professional development activity.

Lippincott Professional Development is accredited as a provider of nursing continuing professional development by the American Nurses Credentialing Center's Commission on Accreditation.

This activity is also provider approved by the California Board of Registered Nursing, Provider Number CEP 11749 for 2.5 contact hours. Lippincott Professional Development is also an approved provider of continuing nursing education by the District of Columbia, Georgia, West Virginia, New Mexico, South Carolina, and Florida, CE Broker #50-1223. Your certificate is valid in all states.

Payment: The registration fee for this test is $24.95.