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White Paper

Measuring Efficiency in Nursing Student Patient Care Skills

Using the Digital Clinical Experiences (DCE)™

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INTRODUCTION

As nursing students graduate and take their first jobs as registered nurses, they face the responsibility of providing patient care without the safety net of their nursing program faculty. This transition into the reality of practicing nursing leads to an array of novel concerns for the new nurse. A recent survey of new graduate nurses identified time management and anxiety about their new role as their top concerns (Wong, Valimaki, Zimmerman, Bennett & Calero, 2021). Time management is a multifaceted concern stemming from their patient assignments, the pressure of prioritizing care, and a lack of understanding of the work environment as a whole. New nurses struggle with developing efficiency in their patient care as the responsibility shifts from learning under clinical faculty to the reality of caring for their own patients.

When nurses feel that they do not have enough time to complete all needed nursing tasks, they prioritize tasks. Prioritization is a valuable strategy for making the most of limited time (Vinckx, Bossuyt & Dierckx de Casterlé, 2018). However, when under time pressure, nurses tend to prioritize patients' physical rather than psychological needs (Jones, 2016). Nurses feel that time pressure prevents them from identifying patient needs (Vinckx et al., 2018), and the patients of time-pressed nurses have a lower-quality care experience (Teng, Hsiao & Chou, 2010).

One area identified for more discovery was the connection between communication and efficiency. Appropriate and efficient communication can improve the quality of nursing care while allowing nurses to manage their time (Bundgaard, Delmar & Soerensen, 2019; Jones, 2010).

THE RESEARCH AIM

The Shadow Health® Digital Clinical Experience™ (DCE) provides learners with standardized patient experiences in which they complete multiple patient care activities. This includes collecting subjective and objective patient data, applying therapeutic communication skills, and creating care plans. Completion of DCE patient interactions builds clinical reasoning skills using conversation-based activities. This white paper will explore whether learners become more efficient in the collection of subjective and objective data, therapeutic communication, and care planning as they go through the Health Assessment DCEs.

THE RESEARCH PROCESS

The research team at Shadow Health and Elsevier used a sample of first-semester, pre-licensure nursing students from a public university in the Southwestern United States that integrated the in-simulation pre- and post-test with the Chest Pain: Focused Exam DCE for Health Assessment in the spring of 2021. Learners completed the exact same patient case with one attempt each time, no interview guide assistance*, no limit on time to complete, and no access to their results until the conclusion of the course. Final sample inclusion criteria included completing both the pre- and post-test assignments, spending at least 10 minutes but no more than four hours on the assignment, assessing the virtual patient in each interaction, and obtaining an overall raw score greater than zero in each assignment. The final sample used for the study consisted of 2,246 students.

For this study, the research team defined efficiency by the number of correct findings per minute spent with the virtual patient across all components of learner performance, including subjective and objective patient data collection, therapeutic communication, and care plan creation. Changes in overall efficiency, time spent with the virtual patient, therapeutic communication efficiency, and care plan efficiency from the pre-test to the post-test are reported. Changes in efficiency are also reported after controlling for time spent with the virtual patient, the number of interview questions asked, the number of educational and empathetic statements made, and overall assignment performance.

RESEARCH FINDINGS

The results illustrated in Table 1 show that the average number of findings per minute increased by 41% from the pre-test to the post-test assignment, with 82% of learners showing an increase in overall efficiency. While assignment scores increased, 62% of learners showed a decrease in overall time spent with the virtual patient from the pre-test to the post-test assignment. When it came to the learners' ability to recognize and act on patient needs for education and empathy, 67% of learners showed an increase in their therapeutic communication statements per minute from the pre-test to the post-test assignment. Finally, the quality of the care plans learners created also improved from the pre-test to the post-test assignment, with 68% of learners showing an increase in the number of correct care plan components identified per minute.

Table 1: Averages and change in efficiency from the pre-test to the post-test

Measure	Pre-test average	Post-test average	Percentage change	Percentage of students showing positive change
Overall efficiency (findings per minute)	1.19	1.68	41%	82%
Time spent (in minutes)	68 min	58 min	15%	62%**
Education and empathy score	1	2	100%	67%
Care plan score	8	9	13%	68%

**The interview guide provides students with additional help collecting subjective data during patient encounters in the form of an expandable menu, showing the essential patient interview topics they must cover in their interview, and a progress bar of their subjective data collection score.*

***For time spent with the virtual patient, the positive change represents the percentage of students showing a decrease from pre-test to post-test.*

The research team was also interested in whether gains in efficiency across all components of in-simulation performance remained true after adjusting for differences in the learners' pre-test performance, as well as specific components of their post-test assignment attempts. To test this hypothesis, researchers ran a multiple-regression analysis using post-test efficiency as the outcome variable. After controlling for the effect of pre-test efficiency and time spent with the virtual patient on the post-test, these areas all had a statistically significant positive effect on post-test efficiency:

a. the number of interview questions asked on the post-test,
b. the number of empathetic and educational statements made on the post-test

Table 2 includes the details of these results. Additionally, spending less time with the patient was associated with higher efficiency on the post-test. High efficiency in the pre-test was associated with high efficiency in the post-test.

Table 2: Regression results using post-test overall efficiency as the criterion

Predictor	***b***	***b*** **95% CI** **[*LL*, *UL*]**	***r***
(Intercept)	1.40**	[1.31, 1.49]	
Pre-test efficiency	0.04**	[0.01, 0.06]	.29**
Time spent (post-test)	-0.03**	[-0.03, -0.03]	-.72**
Assignment performance (post-test)	0.04**	[0.03, 0.04]	.21**
Number of interview questions (post-test)	0.00**	[0.00, 0.00]	.04
Number of empathetic statements (post-test)	0.01**	[0.00, 0.01]	.03
Number of educational statements (post-test)	0.01**	[0.01, 0.02]	-.01
Model fit			R^2 = .812** 95% CI [.80, .82]

NOTE: A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. *r* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively. * indicates $p < .05$. ** indicates $p < .01$.

IMPLICATIONS FOR PRACTICE

Nursing practice requires prioritizing tasks to make the most of the time available, and new nurses frequently struggle to manage their time appropriately (Wong, et al., 2021). Shadow Health's DCEs provide learners with the opportunity to practice their efficiency as they gather patient data, apply therapeutic communication, and create care plans. In a sample of first-year, pre-licensure nursing students completing the Health Assessment DCEs, learners demonstrated significant efficiency gains as measured by findings per minute from the pre-test to the post-test. These results indicate that Shadow Health is a useful tool for improving learners' practice readiness.

Shadow Health Digital Clinical Experiences™ provide a complete patient interaction that helps learners to improve their ability to collect patient data, apply therapeutic communication, and create care plans. By practicing these skills in the DCEs, learners become more efficient at performing these necessary skills. As learners progress through the assignments in each course, they become more comfortable with how to collect data and determine how to dig deeper with their questions and uncover important data points. Developing the skill for efficient data collection in the simulated environment boosts learners' ability to become more efficient in their patient interactions while at the same time providing high-quality care.

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