

NovEx

School Name State University of New York, Suffolk Community College, Suffolk, NY
Course Name Adult Physical Health Nursing I
Course Format Web-enhanced lecture, flipped, clinical

Key Results Data indicate that students using the NovEx program earned ATI scores five percent higher than students who did not complete the course using NovEx. In addition, the percentage of students earning a level 2 or 3 on the ATI test was 20 percent higher than the previous cohort which did not use NovEx, indicating that more students are likely to achieve higher scores on the NCLEX exam.

Submitted by

Sue McCabe, Associate Professor
Helene Winstanley, Professor

Course materials

NovEx cases used for oxygenation topics (pneumonia, tuberculosis, asthma, COPD, tracheostomy), immune topics (immune excess, sepsis) and perfusion topics (hypertension)

Setting

Suffolk County Community College, sponsored by the State University of New York and Suffolk County, is a two-year public college on Long Island, NY, with three campuses: Brentwood, Riverhead, and Selden. Its School of Nursing prepares students for associate nursing degrees via both day and evening programs at the Selden campus. Students form a diverse demographic: baby boomers to millennials and tech savvy to digitally naïve; the average student age is 35 years. The school is fully accredited by the Accreditation Commission for Education in Nursing.

Adult Physical Health Nursing I is a five-credit course required of all nursing majors and comprising 2.5 hours of lecture, 2 hours of nursing lab, 1 hour of clinical simulation, and 3.5 hours of clinical. It is the first course of a two-semester, medical-surgical sequence and enrolls 170 students per year. This course continues student learning around the delivery of patient- and family-centered care with an emphasis on critical thinking to plan and prioritize individual adult health care needs. The application of emerging concepts in pharmacology, nursing process, caring, health promotion and maintenance, communication, documentation, teaching and learning, teamwork and collaboration, legal and ethical principles, evidence-based practice, quality improvement, and informatics are incorporated into the course.

Challenges and Goals

Sue McCabe, associate professor, Helene Winstanley, professor, and their colleagues embraced the Carnegie Foundation report by Dr. Patricia Benner that called for changes in nurse education, emphasized stronger integration of clinical and classroom instruction, and stressed more-rigorous scholarship demands on nursing students in several content areas, including nursing science and technology. They agreed that a more-active learning environment could decrease the knowledge gap between what students learned about nursing from books and real nursing practice. Furthermore, McCabe and Winstanley recognized that the bedside experience during clinical provides the richest learning environment for nursing students. In spring 2015, McCabe and Winstanley piloted a redesigned flipped classroom model using NovEx and its unique case format.

Spring 2015 pilot

The purpose of the pilot was to determine the efficacy of technology-assisted situated coaching using NovEx Cases and to measure its impact on outcomes in nursing knowledge, clinical reasoning, clinical competency, and ethical comportment in Adult Physical Health Nursing I students.

Nursing knowledge was assessed by standardized assessment; clinical reasoning, clinical competency, and ethical comportment was assessed in clinicals and simulations using the Creighton Competency Evaluation Instrument (CCEI) and in simulations using the Lasater clinical judgment rubric (LCJR).

Evidence-based rubrics were used to measure performance in clinicals and simulations. Participating faculty completed required training, leveling, and testing at various proficiency levels to ensure the interreliability of tool/rubric scores. Collected data was analyzed to determine if the use of NovEx cases in Adult Physical Health Nursing I impacted outcomes in these areas.

NovEx was used to teach students new concepts and enable them to practice what they were learning both at home and in class. The instructor's role was to assign content, introduce new concepts, and support active learning activities in class.

Implementation

NovEx is a digital, situated-learning solution that helps move students beyond the development of critical-thinking skills to the clinical-reasoning and problem-solving skills required of professional nurses. The program enmeshes lecture with clinical, bringing clinical information into the classroom. NovEx cases provided students with practice-centered experiences that were aligned with evidence-based content designed to enhance clinical knowledge.

Teaching methods

Teaching methods included NovEx cases, unfolding case studies using situated coaching where students worked collaboratively in the role of a registered nurse and responded to the patient situation. In addition, online resources, clinical experiences, clinical simulations, and a clinical skills labs were utilized.

NovEx was used to teach students new concepts and enable them to practice what they were learning both at home and in class. The instructor's role was to assign content, introduce new concepts, and support active learning activities in class. Program components in the classroom included the following:

- **NovEx lessons.** Digital lessons designed to replace text-book readings and classroom lectures. Students completed two to four lessons per week as lecture prep in the flipped classroom. Students were expected to spend up to two hours per topic in NovEx before each lecture.
- **NovEx cases.** Cases included patient evaluations after intervention and were based on real patient situations.
- **NovEx coaching cases.** Coaching cases were used in lecture and included one to three context-specific questions per week embedded in e-cases. Coaching cases encourage students to think like nurses and help McCabe and Winstanley share their clinical experiences.

Students worked in teams on simulation activities that promoted quality and safety. Before the use of clinical simulations, students might have done incorrect or inappropriate things during clinicals, as the professor could not oversee everyone at the same time. Simulation activities engaged students and helped them develop reasoning and imagination skills; the

team format offered an opportunity for peer assessment and facilitated student preparation.

Approach to case coaching

Case coaching was completed in several steps. First, students were debriefed using prep practice cases. Faculty then outlined what students should anticipate in caring for the client in the coaching case presented in class. Students mentally rehearsed/visualized their patient approach and any patterns of potential complications or concerns. They then guided the actions of a nurse in coaching cases and were encouraged to speak in the voice of a nurse in response to faculty-guided questions. Over time, students began to value listening to a patient before checking the vital signs. They were then debriefed on coaching cases with regard to strengths, weaknesses, and areas for improvement. Finally, instructors and students reviewed case reports, summaries of nursing actions submitted during the case, to learn what could be done better the next time.

Instruments used for evaluation

- ATI Fundamentals Content Mastery Series® NCLEX 2013 test plan
- Pearson ReadyPoint Basic med-surg assessment (clinical reasoning, competency, and ethical compoment)
- CCEI
- LCJR

Faculty training for instruments

- A faculty training video for CCEI and LCJR
- CCEI and LCJR discussion sheets for scoring simulation and clinical following training
- LCJR faculty scorers limited to three coinvestigators, who frequently partnered to score students' final simulations
- Simulation lab faculty were mentored by LCJR mentors from the study team.
- Clinical faculty were mentored by CCEI mentors from the study team.
- Student training video integrated into lab and clinical orientation

Students completed three faculty-developed exams: the first two comprised approximately 50 multiple-choice questions and/or alternate-item questions, the third comprised 75 multiple-choice questions. Questions mirrored NCLEX questions; content included material from both lecture and lab.

Dosage calculation students completed a dosage calculation test during the course. They were required to score at least 80 percent on their first attempt; if they did not, they could retake the exam once, and were required to score at least 90 percent on the subsequent exam.

Students needed to earn an average grade of at least a C (69.5 percent) in order to progress to the next level.

Assessments

95 percent	Exams (multiple choice, three)
5 percent	ATI Fundamentals Assessment Examination
Pass/fail	Laboratory skill competencies
Pass/fail	Clinical evaluation tool
Pass/fail	Written clinical assignments
Pass/fail	Dosage calculation test

Failing any course component resulted in failing the course.

Results and Data

McCabe and Winstanley modeled their pilot after a National Council of State Boards of Nursing (NCSBN) simulation study that compared simulation activities as a replacement for 10, 25, and 50 percent of clinical hours. Nursing knowledge was measured using both the ATI Fundamentals Content Mastery Assessment and a computer-based formative assessment available in Pearson's Ready Point™ application. Clinical reasoning, competency, and ethical comportment were measured using the Creighton Clinical Competency Tool (CCEI) at each clinical session; the Lasater Clinical Judgment Rubric (LCJR) was scored at each simulation session. School instructors were trained in the use of the CCEI as part of a National Council of State Boards of Nursing study.

[A]fter implementation of NovEx in spring 2015, ATI scores increased five percent over fall 2014 ATI scores.

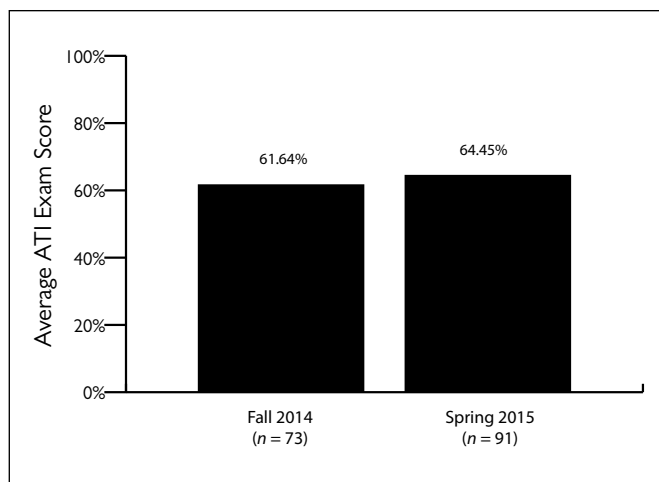


Figure 1. Average ATI Exam Scores, Fall 2014 and Spring 2015

	Fall 2014 ATI (n = 73)	Spring 2015 ATI (n = 91)
Mean	62%	64%
Variance	0.8%	0.7%
Standard Deviation	9%	8%
Observations	73%	91%
Pooled Variance	.07%	
df	162	
t Stat	-2.07	
P(T ≤ t) one-tail	0.02	
t Critical one-tail	1.65, significant at .05	

Table 1. ATI Exam Grade t-Test (Two-Sample Assuming Equal Variances), Fall 2014 and Spring 2015

Fall 2014 students who did not use NovEx were scored in clinical, simulation, and proctored computer-based testing at the end of the semester. Their scores in nursing knowledge, clinical competency, clinical reasoning, and ethical comportment represented the control group. Students enrolled in Adult Physical Health Nursing I in spring 2015 used NovEx and participated in NovEx cases. They were scored in clinical, simulation, and proctored computer-based testing at the end of the semester.

After implementation of NovEx in spring 2015, ATI scores increased five percent over fall 2014 ATI scores (Figure 1). Students from spring 2015 (M = 64 percent, SD = 8 percent, n = 91) earned higher ATI scores than did students in fall 2014

Students using NovEx scored a combined average of 22 percent higher on all 11 dimensions of the LCJR rubric than did students who took the course without NovEx.

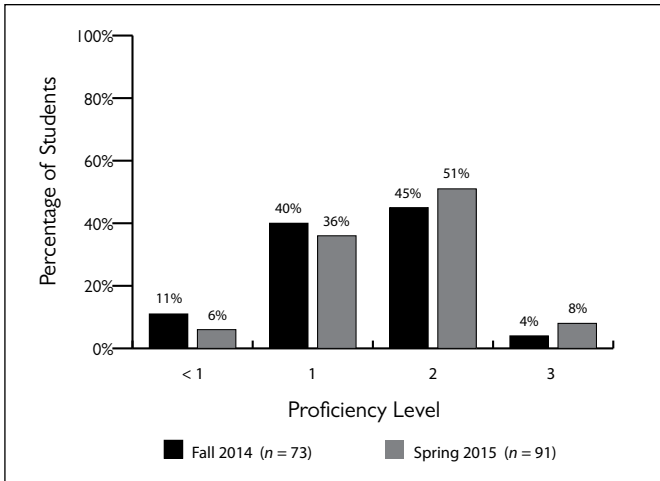


Figure 2. Proficiency Levels before and after Implementation of NovEx, Fall 2014 and Spring 2015

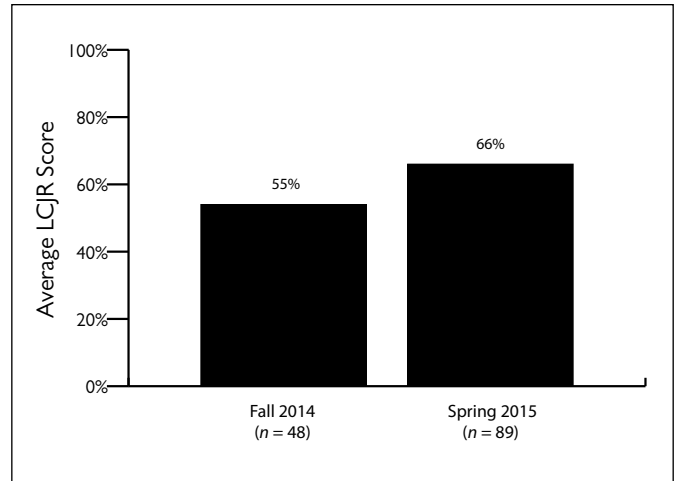


Figure 3. Average LCJR Scores before and after Implementation of NovEx, Fall 2014 and Spring 2015

(M = 62 percent, SD = 9 percent, n = 73). The increase is statistically significant where $t(162) = -2.07$ and $p < .05$ (Table 1).

According to ATI Testing, students who score a level two or three at the ATI proficiency level are expected to readily meet or exceed NCLRX-RN expectations for the content area. The percentage of students earning a two or three on the ATI test was 20 percent higher in spring 2015 after NovEx implementation (Figure 2), indicating that students in the pilot section were more likely to achieve higher scores on the NCLEX exam. The level 2 cut point is 63.3 percent.

The LCJR was scored at each simulation session and calculated for 11 dimensions with a maximum score of 4 per dimension. Figure 3 shows the average LCJR score before and after NovEx implementation. Students in spring 2015 (after implementation, n = 89, M = 65.99, SD = 11.07) scored a combined total of 20 percent higher on all 11 dimensions on the LCJR rubric than did students who took the course without NovEx (n = 48, M = 55.35, SD = 7.01). There was a significant effect for the intervention group, $t(135) = 6.032$, $p < 0.0001$. In fall 2014, 48 students were scheduled for the simulation sessions due to time constraints; in spring 2015, 89 students (all but two absent students) were scored.

The Student Experience

In spring 2015, students were asked to participate in a voluntary, end-of-semester survey administered by McCabe and Winstanley. Survey questions covered students' use of NovEx and its impact on their learning and assessment. Of the students who participated:

- 74%** Responded Yes when asked if their understanding of course material improved as a result of using NovEx for the full course.
- 67%** Responded Yes when asked if they would recommend NovEx to students taking this course in the future.
- 52%** Responded Yes when asked if their clinical confidence improved as a result of using NovEx.

In the same survey, McCabe's and Winstanley's students shared the following positive comments about NovEx.

"I liked the scenarios that require critical thinking."

"It was very interactive and looked like a real hospital setting."

"It was interactive. I liked that I was able to gain clinical experience and knowledge by working through the cases."

McCabe and Winstanley believe that NovEx is helping them to diminish the practice–education gap that currently exists in nursing.

“My favorite part about NovEx was how realistic the case studies were. I thought the hospital room setup was very beneficial to my learning.”

“I liked how interactive the program was. Being able to click here and there and have several treatment options was beneficial to my learning because it allowed me to think critically.”

Conclusion

McCabe and Winstanley believe that NovEx can help them to diminish the practice–education gap that currently exists in nursing. In today’s highly specialized world, where no one faculty member can cover all areas of a course at an expert level, they rely on the learning aids in NovEx to help fill any gaps and integrate the online, classroom, and clinical learning experience.

Best practices identified

- Leverage screencast video or equivalent to reinforce core content and support technology implementation.
- Provide video training for faculty on use of instruments and written, leveled, discussion sheets outlining performance requirements at each level.
- Make use of GOTO meeting or equivalent for study debriefing and clarification.
- Use study team members to function as CCEI and LCJR mentors to support faculty.
- Limit the number of CCEI and LCJR raters for simulation to minimize concerns with scoring.

Lessons learned and future considerations

- Consider rewarding students who complete practice cases (participation points).
- Work with small groups doing practice cases for students who are struggling and timing out.
- Have an IT support plan for faculty and students and expect to a lot of initial handholding.
- Develop a communication plan to keep faculty consistently aware of study progress.
- When possible, consider the use of standardized assessments with extensive psychometric data.
- Consider providing an algorithm worksheet as a reference for students doing practice cases.

This user-report case study documents implementation practices and evaluates possible relationships between program implementation and student performance. These findings are not meant to imply causality or generalizability beyond this specific instance. Rather, findings from this study demonstrate associations that are potentially useful for further theory testing in future experimental studies. For this case study, a mixed-methods design was applied, and the data collected included qualitative data from interviews, quantitative program usage analytics, and student performance data. An open-ended interview protocol was used to guide data collection.