Purdue University

NOMINATION FORM FOR

HELPING STUDENTS LEARN AWARD

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Name of Nominee

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Title

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Title of Innovation

Simulations in the Classroom: An Innovative Active Learning Experience

Name of Nominator

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(if other than self)

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Phone

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Nominations must be sent electronically to cie@purdue.edu. Nominations must be received no later than 5 pm, Friday, February 1, 2019.

1. How does the improvement facilitate learning? Describe the pedagogical method and theories driving the innovation as well as the innovation itself.

Students learn best when they actively participate in the learning process. By engaging students in their learning, educators can nurture a deeper understanding of the material and assist students to perform higher-order thinking by applying information through hands-on experiences (Jeffries, 2005; Kolb, 1984). Simulation, derived from the experiential learning theory, was first used in aviation to provide instructional scenarios during training in a high-risk setting. It has become a popular active learning strategy in nursing education. Nursing simulations strengthen students' skills, competency, and bridge the gap between nursing theory and practice while also providing a safe place for students to practice in an alternative setting without fear of harming patients (Shin, Sok, Hyun, & Kim, 2015). In nursing, health care advances and lifestyle choices result in sicker, more complex patients. Nursing students must be trained in such a way that they are competent to retrieve knowledge quickly in order to provide lifesaving, evidenced based care.

Although evidence supports the use of simulation in nursing curriculum, the majority of studies examine simulation performed in a laboratory setting. There are few examples of simulation activities used in the classroom. The faculty team consisting of Professors Becky Walters and Janelle Potetz created and implemented simulation activities in a 300-level nursing course following the Jeffries, Rodgers, and Adamson (2015) theory replacing 20% of traditional lectures with classroom simulations. Third year baccalaureate nursing students performed simulations at the end of specific content sections to reinforce and apply concepts learned during the lectures. Didactic material was presented in each of five units using a sequence of three to four traditional lectures followed by one simulation day and then a unit examination with the exception of unit three, which did not contain a simulation.

Simulation days occurred in the classroom, and student learners participated in the exercises within assigned small groups of eight students. Within each group, members were appointed to

various roles depending on the simulation scenario, for example, two nurses, one patient, one family member, one provider, and two to three observers. Each small group simultaneously worked through the simulation scenarios for about 30 minutes. Simulation examples included life-threatening situations such as blood transfusion reactions, opioid overdose, wound healing complications, and medical shock. Supplies needed to care for each simulated patient were brought to class (e.g., medications, dressings, oxygen tubing), and students were required to work together to apply solutions using the supplies as they would in real life thereby creating peer learning opportunities. The scenarios were structured to apply concepts from preceding lectures and permit groups to work through the activity at their own pace. Two faculty members were present to observe and guide students towards the path of discovery. Faculty members conducted a post simulation debriefing with the entire class to analyze thoughts and actions using Socratic questioning (Dreifuerst, 2015).

2. How is this work creative and/or innovative? Discuss the novelty and practicality of the current advancement.

Simulation has been used in clinical nursing courses within a simulated laboratory environment using a range of technology including high and low tech computerized simulators to no technology through role-playing. However, its use in the didactic setting has not been explored. The purpose of this innovation was to discover whether simulations conducted in a large didactic nursing course could effectively transform passive listening into active, collaborative learning where students perceived the learning environment to be more student centered and demonstrated improvement in course performance.

Using simulation in the lecture hall is a novel teaching approach in nursing education and is very practical to the expanding use of simulation education in healthcare. Exploring new ways to teach the next generation so that learning sticks and can be applied is vital to ensuring Purdue nursing graduates can provide high quality and safe patient care upon entering the work force.

3. What are the broad impacts? Make sure to discuss the number of students affected as well as the applicability of the method to other domains and universities.

The course has sustained this teaching innovation for eight consecutive semesters starting in Fall 2014. The class is a required nursing course and enrolls approximately 60 baccalaureate nursing students per semester. Professors Walters and Potetz have directly impacted approximately 450 students and will continue to impact all undergraduate nursing students. Further the team has indirectly impacted other faculty and students at Purdue and other universities through dissemination of this work at two national nursing education conferences and with a publication in *Clinical Simulation in Nursing* (Walters, Potetz, & Fedesco, 2017).

As programs seek to engage students in learning, faculty can consider activities that integrate simulation into the classroom to recreate real-life events and provide learning through actual experiences. Simulation based learning can provide deliberate practice of any scenario in a safe, classroom environment allowing learning to occur without the fear of mistakes. One benefit of simulation in a classroom versus simulation performed in a laboratory setting is that the classroom can accommodate a larger group of students helping to alleviate staffing issues, space limitations, and costly technology that are becoming challenges in expanding laboratory simulation centers.

4. What is the evidence of student learning? It is extremely important to show evidence of actual student learning. In the past, successful applicants were very detailed in their demonstration of the effects of the intervention.

Educators can rely on several indicators to help determine evidence of active learning. Perhaps the most common indicator is the impact an activity has on student performance on course assessments (e.g., quizzes, exams). Another equally valuable indicator that exists beyond student performance includes student perceptions of a learner-centered classroom. This perception of a positive learning environment is associated with a host of benefits including enhanced feelings of autonomy, perceived

competence on mastering course material, feelings of classroom connectedness, and an increase in motivation (Deci & Ryan, 1985; Levesque, Sell, & Zimmerman, 2006).

Data collected comparing semesters with and without the inclusion of simulations demonstrated that students enrolled in semesters that included simulations performed better on assessments and perceived the learning environment to be more student-centered. They felt more autonomous, competent, connected to the class, and motivated. Additionally the simulations promoted student engagement, prioritization, decision making, collaboration, and communication skills.

Impact on Student Performance (Table 1)

The students who participated in simulations had higher quiz and Exam 1 scores. However, students in the non-simulation semesters did better on Exam 3 compared to those in the simulation semesters. Interestingly, Exam 3 was the only exam not accompanied by a simulation. Students may have done worse on this exam, because they grew accustomed to learning the material through simulations and perhaps felt underprepared. Future research could test whether scores improve (or stay the same) if a simulation were introduced during this unit.

There were no differences in scores on exams that were accompanied by only one simulation (Exam 2, 4, final exam) indicating that simulations are not hurting student performance. However, students performed better on exams when they participated in two simulations (Exam 1). It could be reasoned that student learning may increase when they are exposed to more classroom simulations.

Table 1
Results of t-tests Comparing Student Performance for Non-Simulation versus Simulation Courses

	Non-Simulation	Simulation		
	M (SD) (N=94)	*M (SD)* (N=105)	*T*	Cohen's d
Quiz Mean	81.57 (12.43)	89.84 (9.69)	5.26**	.75
Exam 1	82.17 (7.61)	84.53 (6.68)	2.33*	.33
Exam 2	84.09 (6.71)	85.42 (6.12)	1.47	.21
Exam 3	84.61 (6.25)	75.96 (6.53)	9.52**	1.35
Exam 4	82.68 (10.56)	81.26 (6.62)	1.15	.16

Final Exam	77.55 (7.23)	78.13 (6.72)	.57	.08

*$p < .05$; **$p < .01$

Impact on Student Perceptions (Table 2)

Students in the simulation semesters felt the learning climate was substantially more student-centered than those in the non-simulation semesters. Participating in the simulations also had a moderate positive effect on feelings of autonomy. Students perceived a moderate improvement to perceived competence, relatedness, and motivation, although this relationship only approached significance likely due to limited statistical power because of the small sample size (N = 67).

Table 2
Results of t-test Comparing Student Perceptions for Non-Simulation versus Simulation Courses

	Non-Simulation	Simulation		
	M (SD) (N=43)	*M (SD)* (N=24)	*t*	Cohen's d
Learning Climate	5.52 (.98)	6.32 (.60) †	3.70**	.93
Autonomy	4.19 (.72)	4.70 (.69)	2.83**	.72
Competence	4.42 (.70)	4.80 (.86)	1.93*	.49
Relatedness	5.11 (.55)	5.40 (.59)	1.99*	.51
Motivation	13.12 (8.07)	16.90 (8.01)	1.84*	.47

†N=25; *$p < .10$; **$p < .01$

Given that all other elements of the course remained consistent across semesters, the improvement to these constructs is likely attributed to the incorporation of classroom simulations demonstrating that the inclusion of simulations leads to improvements in student performance *and* student perceptions. The impact of these results is improved student performance, engagement, and a student-centered learning environment that better prepares nursing students to critically think, prioritize, collaborate in teams, and make decisions in a rapidly changing healthcare system. Further student surveys consistently reveal a high level of student satisfaction, acknowledgement of the value to applied practice, and praise on teaching strategies in this course. Students regularly ask other faculty members to adopt this innovative teaching strategy.

References

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