

BACKGROUND

Simulation is a widely accepted educational strategy used to create realistic patient care opportunities for nursing students in a safe learning environment (National League for Nursing (NLN), 2015). Further, the National Council of State Boards of Nursing (NCSBN) landmark study exploring the role and outcomes of simulation in pre-licensure nursing education across the United States, concluded that simulation can be used as a substitute for up to fifty percent of traditional clinical experiences when delivered in a way that is evidence based (Hayden, Smiley, Alexander, Kardong-Edgren & Jeffries, 2014).

Currently, multiple modes of simulation are being used in various educational contexts to allow nursing students to apply theory into practice including the use of computers, low-to-high fidelity manikins, task trainers, standardized simulated patients, and standardized human patients. Unfortunately, many of the modalities used within simulation are expensive and not quantifiable in terms of return on investment.

Newer technologies such as augmented reality (i.e., Microsoft HoloLens ®) may be an answer to this dilemma. Augmented reality devices provide a computer-generated reality through the use of specialized ear and eyewear, which allow a student or group of students to experience a variety of visual and auditory stimulation. Overall, augmented reality devices are less expensive than traditional high-fidelity simulators, can be used anywhere and are technologically advanced (INACSL Standards Committee, 2016). However, its use has not been fully explored for reliability and validity within baccalaureate nursing education.

PURPOSE

The focus of this study was to determine whether the use of a Virtual Standardized Patient (VSP) delivered with the Microsoft HoloLens ® can improve the satisfaction and confidence of nursing students with regards to nursing assessment and intervention in a low-frequency, high-stakes scenario.

METHODS

A quasi-experimental design utilized the VSP scenario for anaphylaxis, which is a low-frequency, high-stakes scenario developed by Microsoft HoloLens ® as its augmented reality education treatment.

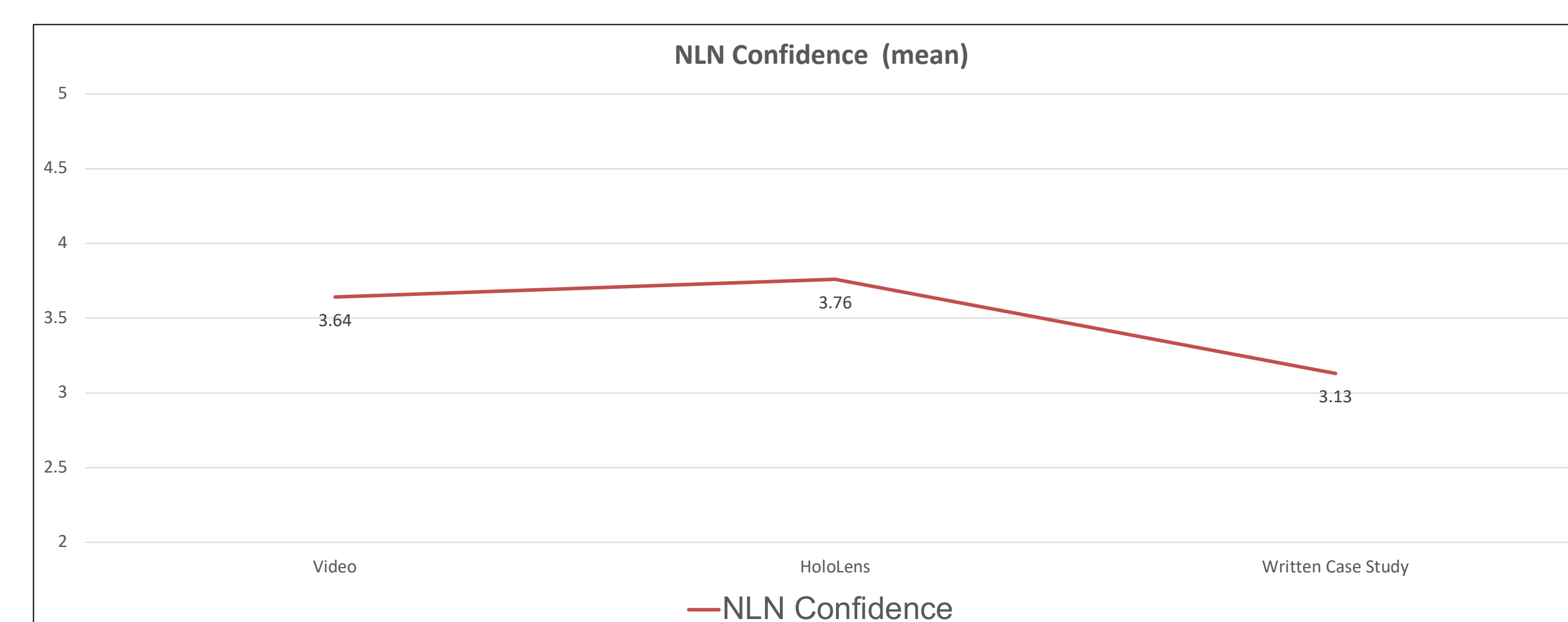
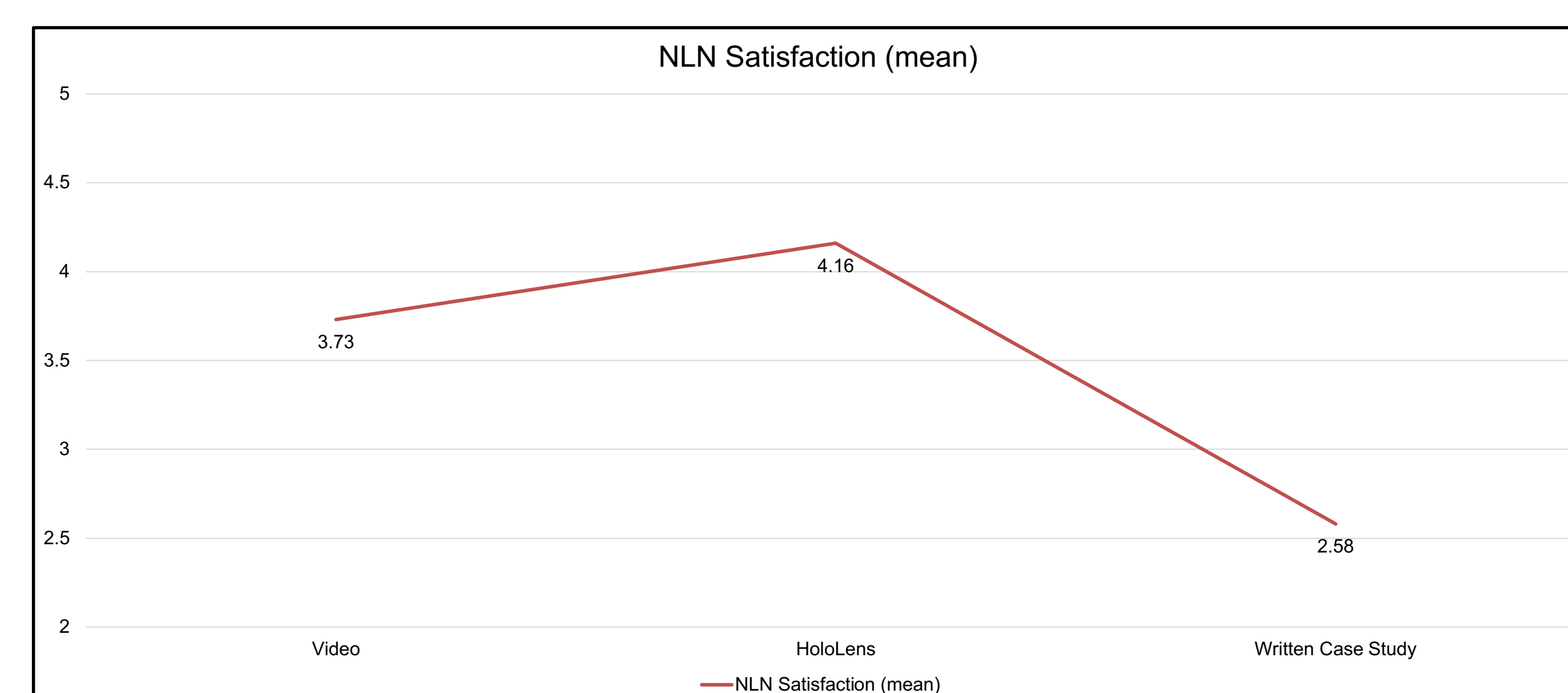
After the theory for caring for a patient experiencing anaphylaxis was reviewed in the classroom, students were randomly assigned to one of three groups. Each student received a packet including a: written case study, pre-survey, knowledge measures, and post-survey using the NLN Student Satisfaction and Self-Confidence in Learning instrument.

- 1) **Partial Dose**-students watch a video of taped Microsoft HoloLens ® anaphylaxis experience from the student's perspective
- 2) **Full Dose**-students who individually experience the anaphylaxis scenario using the Microsoft HoloLens ® technology, or
- 3) **Control**-students work through a written anaphylaxis case study.

FINDINGS

Demographic Data: Mean Age 21.57 (SD 4.11)

Research Group Distribution	N	%	BS Nursing Course Distribution	N	%
Partial Dose (Video)	54	33.5	N206: Fundamentals in Nursing	65	40.4
Full Dose (Microsoft HoloLens ®)	53	33.5	N300: Medical-Surgical Nursing I	60	37.3
Control (Written Case Study)	54	33.5	N400: Medical-Surgical Nursing II	14	8.7
TOTAL	161	100	N320: RN-BS Health Assessment	22	13.7



NLN Satisfaction: Between Group Comparisons

Video	HoloLens	-.43*
	Written Case Study	1.16*
HoloLens	Video	.43*
	Written Case Study	1.58*
Written Case Study	Video	-1.16*
	HoloLens	-1.58*

* = p < 0.05

NLN Confidence: Between Group Comparisons

Video	HoloLens	-.11*
	Written Case Study	.52*
HoloLens	Video	.11
	Written Case Study	.63*
Written Case Study	Video	-.52*
	HoloLens	-.63*

* = p < 0.05

FUTURE RESEARCH

- Quantitative methods will determine whether differences in outcomes occur in knowledge, skill, confidence, and motivation after a VSP experience.
- Differences among and between research groups will be explored.

IMPLICATIONS FOR PRACTICE

According to the NLN (2015), nursing faculty should become experts in simulation. The NLN further denotes that nurse educators should strategically integrate simulation into curriculum with concrete connections to student learning outcomes. The debate exists regarding what technology is best, how the technology can be fully integrated to produce measurable student learning outcomes, and what is the right combination of simulation versus real-life clinical experience.

This study helps bridge the gaps identified by the NLN. Newer technologies such as augmented reality (i.e., Microsoft HoloLens ®) have the potential to transform nursing education. The technologies are less expensive than previous modalities, are mobile, and can provide a safe environment for students to improve knowledge, skill, confidence and motivation with nursing assessment and proactive intervention in a low-frequency, high-stakes scenario.

This study will provide quantitative data not currently found in the literature regarding the reliability and validity of using an augmented reality virtual standardized patient simulation experience in nursing education. This data can be used by policy makers, educators, students, and clinical partners to better provide evidence-based teaching methodologies that prepare student nurses and licensed nurses to have the knowledge, skill, confidence and motivation in caring for low-frequency, high-stakes scenarios that can't otherwise be practiced in real life.

