Appendix A
Article Review matrix

Citation (APA)	Purpose	Sample	Design	Measurement	Results/Findings	LOE
Boling, B., & Hardin-Pierce, M. (2016). The effect of high-fidelity simulation on knowledge and confidence in critical care training: An integrative review. *Nurse Education in Practice, 16*(1), 287-293. doi:http://dx.doi.org/10.1016/j.nepr.2015.10.004	To examine the effect of high-fidelity simulation training on knowledge and confidence among critical care providers.	17 studies included 13 of the included studies examined the effect on provider confidence	Integrative literature review	IV: Repeated simulation experience DV: Knowledge was assessed through self-assessment and confidence which was measured through validated self-efficacy assessment tools	The largest group of studies (n = 7) measured the effect of the simulation. In all seven studies, participants rated their own perception of their knowledge as greater following the simulation intervention. Six studies were conducted using control group for comparison of scores with the intervention groups. The result of knowledge and confidence were consistently higher than those in the control groups who did not participate in the simulation exercise.	Level II
Bowling, A., & Underwood, P. (2016). Effect of simulation on knowledge, self-confidence, and skill performance in the USA: A quasi-experimental study. *Nursing & Health Sciences, 18*(3), 292-298. doi:10.1111/nhs.12267	To examine the effect of midlevel-fidelity simulation versus low-fidelity simulation on Bachelor of Science in Nursing students' knowledge, self-confidence, and skill performance.	(N= 77) junior BSN students (3rd year in college, 2nd year in nursing. convenience sample pediatric nursing course Wright State University and Case Western Reserve University	A quasi-experimental non-equivalent control group pretest–post-test design	IV: Mid-level-fidelity simulation (n=37), simulation experience lasted for 30 minutes, followed by a 20-min group debriefing experience versus low-fidelity simulation (paper and pencil case study) (n=37) DV: Skill performance measured with a mini Objective Structured Clinical Examination; Self-confidence was measured by (self-reported) knowledge which was measured by 15 items knowledge test	Significant difference for both groups in knowledge and skill performance, ANOVA test (p = 0.003) but no difference between group was found (p = 0.196) case-study group had a higher level of self-confidence. (t=2.213, d.f.=71, P=0.03). The results of the study indicated a significant increase in students' skill performance between the pretest and post-test for both groups (p < 0.0001), but not between the groups. (p = 0.123)	Level II

Lubbers, J., & Rossman, C. (2016). The effects of pediatric community simulation experience on the self-confidence and satisfaction of baccalaureate nursing students: A quasi-experimental study. *Nurse Education Today*, *39*93-98. doi: 10.1016/j.nedt.2016.01.013	To determine the effects of a pediatric community simulation experience on the self-confidence of nursing students	Convenience sample of baccalaureate nursing students in their second of four semesters in the upper division nursing major course (N= 54) Private institution in the Midwestern United States	Quasi-experimental study, pre-test and posttest.	IV: Simulation sessions happened once a week for approximately 3 1/2 hours each week. Approximately one hour was spent in simulation and debriefing and followed up with pre-simulation and post-simulation exercises included within the Simulation Learning System (SLS) DV: 16-item self-confidence instrument developed for this study which measured students' self-confidence knowledge, skill, communication, and documentation. Student satisfaction with the learning experience was measured by 1–5 Likert scale with 5 indicating very satisfied.	Study showed statistically significant results on the self-confidence ($t = 20.70$, $p < 0.001$) and statistically significant results within each of the eight 4-item sub-scales ($p < 0.001$). Students also reported a high level of satisfaction with their simulation experience ($M = 4.36$, $SD = 0.50$)	Level III
Cummings, C. L., & Connelly, L. K. (2016). Can nursing students' confidence levels increase with repeated simulation activities? Nurse Education Today, 36, 419-421. doi: 10.1016/j.nedt.2015.11.004	To explore the student satisfaction with learning, self-confidence, and education practice and to evaluate the effectiveness of simulation in order to adopt simulation in the university curriculum	Convenience sample of 54 students (34 from the third semester (junior) and 20 from fifth semester (senior) at University of North Florida	Survey	IV: Repeated simulation activity over one semester for junior and senior students using different simulation scenario from their courses. 8 hours Clinical was replaced by 8 hours Simulation. Students were given 15 minutes' simulation scenario and followed by 15 minutes debriefing DV: Student satisfaction and self-confidence in learning and	8 of the items had 95% confidence level and when combined the items were significant at ($p < .001$) Students reported that they had active learning and active participation in learning. The curriculum of simulation was adopted in their nursing curriculum	Level VII

				Educational practice levels in relation to incorporation of simulation in nursing curriculum was measured by a 30 items survey scored on a Likert scale from 1–5, with 5 being the highest. The Student Satisfaction with Learning Scale consisted of 5 items; Self-Confidence in Learning using Simulation scale consisted of 8 items; Educational Practices in Simulation Scale had 16 items		
Kaddoura, M., Vandyke, O., Smallwood, C., & Gonzalez, K. M. (2016). Perceived benefits and challenges of repeated exposure to high fidelity simulation experiences of first degree accelerated bachelor nursing students. *Nurse Education Today, 36*, 298-303.	To explore the perception of first degree BSN students about perceived benefits and challenges of repeated exposure to HFS in the first medical-surgical nursing course	Convenience sample of 107 first –degree entry level accelerated bachelor nursing students in their first semester in 3rd year at the beginning of medical surgical course.	Exploratory qualitative research design.	IV: Exposure of the students to 7 different health scenarios evaluated consecutively in single experimental session DV: Perceived benefits and challenges of exposing to multiple scenario all at once Measured Using open-ended survey.	The finding indicates that most of the participating students perceived HFS to be an effective teaching tool that contributes to the critical thinking, clinical competence, self-confidence, integration of knowledge by bridging the theory practice gap. Few participants perceived that repeated experience with HFS were challenging and overwhelming and revealed that students lack of knowledge led to be overwhelmed.	Level VI
Shin, H., Ma, H., Park, J., Ji, E. S., & Kim, D. H. (2015). The effect of simulation courseware on critical thinking in undergraduate nursing students: Multi-site pre-post study. Retrieved from: http://www.sciencedirect.c	To evaluate the effect of exposure to differing numbers of simulation experience on students' critical thinking in a	237 nursing students at three universities were enrolled in a pediatric practicum. One school was used as control group who were exposed to one	Quasi-experimental Pre-test, post-test design	All three schools used the same simulation courseware, including the same simulation scenarios, evaluation tools and simulation equipment. The courseware incorporated high-fidelity simulators and standardized patients.	CT scores varied according to their numbers of exposures to the simulation experience. Group A: there were no statistically significant gains in CT. Groups B, C: there was a significant gain in CT Three exposures to the	Level II

om/science/article/pii/S026069171400399	multi-site environment among integrated pediatric nursing students.	simulation scenario and two sites were kept as experimental group who had been exposed two or more simulation scenarios		IV: Repeated simulation experience. Control group (site A): one scenario Experimental group (site B, C) exposed to multiple scenarios. Completed two and three simulation sessions respectively. DV: Critical thinking which was measured by Yoon's Critical Thinking scale.	Simulation courseware produced CT gains in the prudence and intellectual eagerness subcategories.	
Ko, E., & Kim, H. Y. (2014). Effects of multi-mode simulation learning on nursing students' critical thinking disposition, problem solving process, and clinical competence. Korean journal of adult nursing, 26(1), 107-116.	To identify the effects of multi-mode simulation learning on critical thinking disposition, on the problem solving process and on clinical competence of nursing students.	65 students who were enrolled in an emergency and critical nursing course at a university. The treatment group consisted of 33 juniors in 2010 and the control group had 32 juniors in 2011	A quasi-experimental Study using nonequivalent control group with pre-posttest design	IV: Multi-mode simulation learning DV: Critical thinking Disposition, Problem Solving process and clinical competence Critical thinking disposition was measured using a tool that contained 27 items with a 5-point scale. The higher the score, the higher the level of critical thinking disposition. Problem solving process was measured using a tool having 25 items with a 5-point scale. The higher the score, the higher the level of Problem solving process. Clinical competence was measured with the tool having a total of 19 questions. Higher score	Multi-mode simulation Learning was effective in improving the clinical competence and problem solving process of nursing students, but there was no significant effect on critical thinking disposition.	Level II

				signifies higher clinical competence.		
Abe, Y., Kawahara, C., Yamashina, A., & Tsuboi, R. (2013). Repeated scenario simulation to improve competency in critical care: A new approach for nursing education. *American Journal of Critical Care: An Official Publication, American Association of Critical-Care Nurses, 22*(1), 33.	To measure the effectiveness of simulation based scenario on knowledge and skills of cardiovascular critical care nurses	-Japanese nurses -(N = 24) -7 observations -Tokyo medical hospital -Convenience sampling	Open label study	IV: Repeated four simulation scenarios measured by 6-month training program DV: Competence level measured by feedback provided by observer based on rubric scoring	Base line: after first simulation, it showed low main rubric score 16.0 -18.7. After intervention: mean rubric score showed significant increases in post simulation scores ($p < .01$, $p < .01$, and $p < .05$, respectively; Wilcoxon rank-sum test). Main rubric score of competency increased as the number of simulation scenario increased *All the changes are statically significant.	Level VII
Mould, J., White, H., & Gallagher, R. (2011). Evaluation of a critical care simulation series for undergraduate nursing students. *Contemporary Nurse, 38*(1), 180-190. doi:10.5172/conu.2011.38. 1-2.180	To analyze the self- confidence and competence after series of simulation scenario	-BSN students 252 -9 observations at a metropolitan tertiary institution in Perth, Australia -convenience sampling	One group Pre-test, post-test design	IV: Series of simulation scenario, measured by delivery of 27 scenarios over 9 weeks. 1 simulation per week. The duration of simulation was 5-7 with a simulation total of 17-18 sim for each student DV: Confidence and competence, which was measured by self-report and survey using Likert scale designed by the researchers	Base line of confidence was 2.30 which increased by 1.45 points (63%). Competence based line was2.51 Pre-simulation:(r= 0.68) After series of simulation, competence increased by 1.2 points (48%), r =0.78 It is statistically significant.	Level II
Brewer, E. P. (2011). Successful Techniques for Using Human Patient Simulation in Nursing Education. *Journal of Nursing Scholarship, 43*(3), 311-317. doi:10.1111/j.1547-5069.2011. 01405.x	To explore the techniques used successfully for human simulation exercises in nursing education.	37 studies were reviewed in Cumulative Index to Nursing and Allied Health Literature (CINAHL) with Full Text and PubMed databases.	Integrated review of literature	The use of human patient simulators simulation in nursing education as instructional methods	Human patient simulation can be used successfully as an instructional method in nursing education. No single process was proven to be superior. Human patient simulation can be a valuable tool in clinical teaching	Level III

		The limiters: English study within the past 5 years				
Guhde, J. (2011). Nursing students' perceptions of the effect on critical thinking, assessment, and learner satisfaction in simple versus complex high-fidelity simulation scenarios. *Journal of Nursing Education, 50*(2), 73-78. doi:http://dx.doi.org/10.3928/01484834-20101130-03	To compare student perceptions on the effect of complex versus simple human patient simulation scenarios on critical thinking, assessment, and satisfaction with teaching	Junior nursing students *(N* = 134) Convenience sample University of Akron, Akron, Ohio.	Quasi-experimental, quantitative design.	IV: Simulation scenario for 6 weeks; Measured by the following: During the first 4 weeks-- simple one-event scenario Last two weeks -- complex role playing scenario DV: Learner satisfaction, critical thinking Assessment measures by three separate survey for each variable survey a 5-point Likert scale (5 = *strongly agree* and 1 = *strongly disagree*).	The students' responses showed a high mean for all of the assignments on all of the variables, with no mean <4.63 on the 5-point scale. The means were slightly higher on the complex scenarios across all three of the variables compared to the simple vignettes No significant difference among the means of the three variables was found ($p > 0.05$)	Level II