

Simulation Research Table 9/09

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Author/Date	Setting	Research Design	Subjects	Methodology	Results
Satisfaction					
Feingold et al. (2004) <i>Journal of Nursing Education</i> 43(4)	BSN program	Students exposed to 2 acute care patient scenarios in a semester	65 senior students in Advanced Acute Care of the Adult Course	Researcher-developed 20-item Likert scale satisfaction tool	50.4% transferability 84.6% realism 92.3% value
Abdo & Ravert (2006) <i>Clinical Simulation in Nursing</i> 2(1)	BSN program	Students exposed to 5 scenarios--congestive heart failure, myocardial infarction, traumatic brain injury, diabetic ketoacidosis, and gastro-intestinal bleeding.	17 students in first med/surg course	Feingold et al. satisfaction tool	100% transferability 96% realism 95% value
McCausland et al. (2004) <i>International Journal of Nursing Education Scholarship</i> 1(1)	BSN program	Students exposed to CHF scenario during post-conference	72 students—no other info	Researcher-developed 10 item Likert scale satisfaction tool	97% transferability 88% realism 90% value
Bearnson & Wiker (2005) <i>Journal of Nursing Education</i> 44(9)	BSN program	Students exposed to 3 post-op scenarios to determine value of using HFS to replace clinical	Unknown	Researcher-developed satisfaction tool with 4 Likert items and 3 open items	Satisfaction scores ranged from 3.00-3.31 on scale of 1-4. Students did not feel HFS should take place of clinical

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Henneman & Cunningham (2005) <i>Nurse Educator 30(4)</i>	BSN program	Students exposed to 3 critical care scenarios	5 senior students in a critical care elective course	Researcher-developed satisfaction tool with 4 Likert items and 2 open questions	Student satisfaction scores increased with each scenario Students most satisfied with interdisciplinary scenario
Robertson (2006) <i>Nurse Educator 31(2)</i>	BSN program	Students exposed to PIH, abruption, C-section, and DIC	20 senior nursing students in an obstetrical course	Researcher-developed satisfaction tool with 8 Likert items and 2 open questions	Students enjoyed the activity and felt learning would transfer
Rhodes & Curran (2005) <i>CIN: Computers, Informatics, Nursing 23(5)</i>	BSN program	Students exposed to HFS scenario of patient with hemorrhagic shock	Senior students in an acute medical/surgical care course	Researcher-developed 13-item satisfaction survey	Positive and useful Scenario was realistic HFS should be used in nursing education
Norris (2008) <i>British Journal of Midwifery 16(4)</i>	Midwifery program in Great Britain	Students in a midwifery program exposed to 4 high-fidelity simulation experiences (shoulder dystocia, postpartum hemorrhage, breech birth, and adult resuscitation)	23 midwifery students	No information regarding survey used to assess satisfaction of students	Students felt the simulation experiences were valuable in applying theory to practice in a safe environment; students felt the timing and level of difficulty was appropriate. Subjective

					comments were positive.
Fountain and Alfred (2009) <i>Nursing Education Perspectives 30(2)</i>	Baccalaureate nursing students	Senior nursing students participating in 3 hour high-fidelity simulation experience related to cardiac diseases	78 senior nursing students in an advanced medical surgical nursing course	NLN Nursing Student Satisfaction and Self-Confidence in Learning Scale; nursing school entrance exams	Positive correlation between both social and solitary learning styles and satisfaction with simulation learning experience
HFS and Self-Efficacy/Confidence					
Henrichs et al. (2002) <i>AANA Journal 70(3)</i>	Graduate nurse anesthesia students	Nurse anesthesia students exposed to 4 anesthesia-related scenarios	12 nurse anesthesia students in first year of training	Qualitative analysis of interviews, journals, and observation forms	Students report a general increase in self-efficacy
Ravert (2004) <i>ProQuest Dissertation AAT 3133131</i>	BSN program	Experimental group--students exposed to 5, 90 minute scenarios over a 5 week period (med surg and OB) Control group—students exposed to five case studies	25 students in 3 rd semester of BSN program	Researcher-developed Self-Efficacy instrument	Students in both groups had significant increases in self-efficacy scores

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Bremner et al. (2006) <i>Nurse Educator</i> , 31(4)	BSN program	Students exposed to one healthy patient and one abnormal patient; asked to conduct assessment of each	41 novice students learning assessment skills	Researcher-developed Likert/open-ended evaluation survey	61% self-reported increase in self-confidence
Schoening et al. (2006) <i>Nurse Educator</i> 31(6)	BSN program	Students exposed to OB patient in pre-term labor	60 junior nursing students	Researcher-developed 10-item Likert item evaluation survey	Mean score of 3.71 on scale of 1-4
Jeffries & Rizzolo (2006) http://www.nln.org/research/LaerdalReport.pdf .	BSN and ADN program	Experimental group—HFS scenario involving care of the post-op client Control groups—post-op care scenarios using static manikins and case studies	403 nursing students	Researcher-developed Satisfaction and Self-Confidence in Learning instrument	Significantly higher levels of self-confidence in caring for post-op clients in students exposed to HFS
Lasater (2007) <i>Journal of Nursing Education</i> 46(6)	BSN program	Experimental group—exposed to 4 weekly HFS scenarios in addition to clinical Control group—given only clinical experiences	39 junior students in the experimental group/44 students in the control group	Researcher-developed 30 item confidence instrument	Increase in confidence in experimental group not significant

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Leflore et al. (2007) <i>Simulation in Healthcare</i> 2(1)	Graduate nurse practitioner students	Experimental groups—HFS group and HFS group with facilitated debriefing Control group—lecture only	16 students enrolled in a pediatric nursing course	No information	Significant difference in self-confidence between students in the two HFS groups and the lecture group
Weller (2004) <i>Medical Education</i> 38	Medical program	Students exposed to a 3-hour HFS simulation workshop on emergency care	34 fourth-year medical students enrolled in a course module on resuscitation	Researcher-developed 5-item Likert scale evaluation survey	Median self-confidence score of 2 on scale of 1-5
Shukla et al. (2007) <i>Simulation in Healthcare</i> 2(1)	Medical program	Pre-test/Post-test design using students exposed to 1 day workshop on lifesaving procedures	240 third-year medical students	Researcher-developed 10 item Likert scale evaluation survey	Statistically significant increase in confidence from pre-test to post-test
Pliego & Rajab (2007) <i>Simulation in Healthcare</i> 2(1)	Medical program	Pre-test/Post-test design using students exposed to day long simulation workshop	66 first-year medical residents	Researcher-developed Likert style Self-confidence instrument	Statistically significant increase in confidence from pre-test to post-test

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<p>Bremner et al. (2008)</p> <p><i>Online Journal of Nursing Informatics 12(1)</i></p>	<p>Nursing program in the southeastern United States</p>	<p>Experimental design over 2 consecutive semesters. Experimental group received high-fidelity simulation session one week prior to clinical; control group received skills lab experience with low-fidelity manikins one week prior to clinical. Pre-test measures as well as post-test measures one week after a clinical experience</p>	<p>149 sophomore nursing students in a baccalaureate program in the southeastern U.S.</p>	<p>Researcher-developed instrument assessing demographic information and evaluation of educational experience. Self-Assessment Inventory used to measure learning style and coping style. State-Train Anxiety Inventory used to measure anxiety</p>	<p>Significantly higher anxiety scores in control group. No significant differences in learning or coping styles and level of anxiety. Subjective responses revealed students felt it increased confidence</p>
<p>Smith (2009)</p> <p><i>Nursing Education Perspectives 30(2)</i></p>	<p>Baccalaureate nursing program in the western United States</p>	<p>Descriptive, correlational study of an HFS respiratory scenario on student satisfaction and self-efficacy and factors correlating with these outcomes</p>	<p>68 junior baccalaureate nursing students in their first medical surgical course following a fundamentals course</p>	<p>Demographic survey, Simulation Design Scale, Student Satisfaction and Self-Confidence in learning Scale</p>	<p>Students generally satisfied with the experience; positively affected self-efficacy in caring for patient with respiratory condition; Five design characteristics</p>

					(objectives, support, problem solving, fidelity, feedback) were all moderately correlated with these outcomes; outcomes did not depend on role (nurse or observer)
Bambini et al. (2009) <i>Nursing Education Perspectives 30(2)</i>	Baccalaureate students	Quasi-experimental, repeated measure design using survey measuring communication, confidence, and clinical judgment	112 students in first clinical course participating in 3 hour post-partum simulation experience	Researcher-developed pre-test, post-test, and survey using 10 point Likert questions and open-ended questions	Significant increase in confidence in performing post-partum exam, including specific skills of an exam. Qualitative comments noted students felt experience was valuable; increased confidence especially in fundal exam

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HFS and Critical Thinking					
Howard (2007) <i>Dissertation ProQuest AAT 3270096</i> <i>In press Computers, Informatics, Nursing</i>	Simulation center	49 nursing students from a baccalaureate and diploma program randomly assigned to either a high-fidelity simulation experience or interactive case study experience. Pre-test/post-test design	Nursing students from a diploma and baccalaureate nursing program	HESI exam and researcher-developed evaluation form to assess student's perception of the teaching strategy used	High-fidelity simulation group scored higher on knowledge gain and critical thinking using the HESI exam. High-fidelity simulation group scores were significantly more positive in terms of stimulation of critical thinking, perceived value, transfer of learning, understanding concepts, nervousness, decreasing anxiety, substitution for clinical.
Ravert (2008) <i>Journal of Nursing Education 47(12)</i>	BSN program	Experimental group--students exposed to 5, 90 minute scenarios over 5 week period (med surg and OB) Control group—students exposed to five case studies	25 students in 3 rd semester of BSN program	California Critical Thinking Disposition Inventory and California Critical Skills Test	Statistically significant gain in score, but not related to learning style or group

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<p>Horan (2009)</p> <p><i>Nursing Education Perspectives 30(1)</i></p>	<p>Baccalaureate nursing program</p>	<p>Evaluation of mini-scenarios using high-fidelity simulation to compliment didactic lecture</p>	<p>57 baccalaureate nursing students</p>	<p>Researcher developed evaluation instrument</p>	<p>91% students report scenarios enhanced critical thinking; other findings include students felt the simulation enhanced didactic content, enhanced confidence, improved ability to care for patients, and improved clinical decision making</p>
<p>Dillard et al. (2009)</p> <p><i>Nursing Education Perspectives 30(2)</i></p>	<p>Faculty and students in baccalaureate nursing programs</p>	<p>Evaluation of project utilizing Lasater Clinical Judgment Rubric</p>	<p>16 faculty participating in workshop; 68 students participating in simulation related to heart failure and clinical with faculty who had completed workshop</p>	<p>Modified tool for evaluating faculty workshop; Likert-style survey for students to evaluate simulation; analysis of student journals to assess transfer of learning in clinical situation</p>	<p>Faculty felt workshop was valuable and learned skills needed to use Clinical Judgment rubric; student's rated each of six objectives of simulation highly; range of clinical judgment levels in student journals. Overall faculty that implementing clinical judgment</p>

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					framework requires ongoing support and reinforcement
Learning/Other Outcomes					
Ravert (2002) <i>CIN: Computer, Informatics, Nursing 20(5)</i>	Healthcare education	Meta-analysis of quantitative studies from 1980-2000	9 research studies	Meta-analysis	75% studies support simulation 12.5% did not support 12.5% neutral
Griggs (2002) <i>ProQuest Dissertation AAT 3100754</i>	BSN program	Pre-test/Post-test design using Experimental group—students exposed to 4-hour medical/surgical simulation experience Control group—traditional clinical only	27 senior nursing students in an advanced medical-surgical nursing course	Researcher-developed multiple choice knowledge exam and 40 item Likert scale assessing anxiety, competency, and decision-making ability	No significant differences between students given HFS experience and those receiving only clinical experiences in terms of knowledge, anxiety, competency, or decision-making
Nehring & Lashley (2004) <i>Nursing Education Perspectives 25(5)</i>	BSN program	Pre-test/Post-test design. Post-test immediately after and one-month post-simulation with students exposed to a pediatric asthma and PIH scenarios	84 baccalaureate nursing students	Researcher-developed knowledge exam	Significant increase in knowledge from pre-test to first post-test, but no significant difference at second post-test

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<p>Schumacher (2004)</p> <p><i>ProQuest Digital Dissertation AAT 3151333</i></p>	BSN program	<p>Pre-test/Post-test design with Experimental groups—HFS group and HFS and case study group Control group—case study group. Three scenarios: MI, DVT, and shock</p>	36 nursing students enrolled in a medical/surgical nursing course	60-item customized HESI Exam for pre-test; 20 item customized HESI for post-test after each scenario	Only the two experimental groups receiving HFS had significant differences in critical thinking and learning outcomes
<p>Issenberg et al. (2005)</p> <p><i>Medical Teacher 27(1)</i></p>	Medical education	Meta-analysis of 109 quantitative studies between 1969-2003	109 studies	Meta-analysis	0 reported unequivocal results with HFS 20% indicated positive effects with HFS
<p>Alinier et al. (2006)</p> <p><i>Journal of Advanced Nursing 54(3)</i></p>	BSN program	<p>Pre-Test/Post-Test design with Experimental group—two HFS pre and post-op care scenarios Control group—traditional clinical course content</p>	133 nursing students	Objective Structured Clinical Exam (OSCE)	Significantly higher increases in post-test OSCE scores in experimental group

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Radhakrishnan et al. (2007) <i>International Journal of Nursing Education Scholarship</i> 4(1)	BSN program	Experimental group—two HFS scenarios involving care of two complex patients Control group—traditional clinical experiences only	12 second-degree, senior baccalaureate students	Researcher-developed observation instrument evaluating safety, basic assessment, focused assessment, interventions, communication, and delegation	HFS group scored significantly higher on safety and basic assessment; no significant differences in other categories
Shepherd et al. (2007) <i>Simulation in Healthcare</i> 2(1)	Graduate nurses	Experimental group—assessment skills taught using medium-fidelity simulation Control groups—assessment skills taught by self learning package and self-learning package with two PowerPoint workshops	74 graduate nurses in a nurse transition program in four hospitals	Researcher-developed performance rating scale	Simulation group had significantly higher performance scores than those in the other two groups
Kardong-Edgren et al. (2007) <i>Clinical Simulation in Nursing</i> 3(1)	Baccalaureate nursing program	Pre-test/Post-test design with 3 groups taught content related to congestive heart	14 pre-nursing students	Researcher-developed cognitive test	No significant differences between pre-test and post-test scores of any group; no

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		failure—lecture, lecture with static manikin, lecture with high-fidelity manikin			significant differences between three groups
Kinney & Henderson (2008) <i>Clinical Simulation in Nursing 4(2)</i>	Associate degree program in the Midwest	Pre-Test/Post-test design. Students randomly assigned to learn medication administration by lecture or by lecture and low-fidelity simulation CD-ROM on medication administration. Both groups also took post-test 4 months after intervention	42 second-quarter nursing students in an ADN nursing program in the Midwest	No information given on test used to assess knowledge of medication administration	No significant differences in test scores between groups immediately after intervention or at 4 months
Lambton et al. (2008) <i>Clinical Simulation in Nursing 4(3)</i>	Baccalaureate Nursing program simulation laboratory replicating a pediatric ward	Descriptive, repeated measures design. Students given opportunity to take part in 4 pediatric scenarios on 4 different days; students surveyed after each experience	47 junior-level BSN students	Researcher-developed survey with 10 question Likert questions, 3 open-ended questions.	Difference in ability to detect medical error was statistically significant; open-ended questions indicated increase in student confidence

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<p>Boley (2008)</p> <p><i>Nurse Educator 33(5)</i></p>	<p>Graduate nursing program</p>	<p>Descriptive study analyzing responses of students to use of mind maps in conjunction with simulation experiences related to care of critically ill patients. Experimental group received mind maps in addition to simulation; control group received only simulation</p>	<p>14 graduate students enrolled in a critical care course of an accelerated graduate program</p>	<p>Researcher-developed survey with 8 item survey (6 Likert and 2 open-ended questions); Course quizzes and exams</p>	<p>Students felt mind maps were easy to read and helped with the simulation; Mind map students had significantly higher test scores on all but one quiz.</p>
<p>Wolf (2008)</p> <p><i>Journal of Emergency Nursing 34(2)</i></p>	<p>Community hospital</p>	<p>Descriptive design with pre-test/post-test measurement of appropriateness of triage level before and after implementation of didactic and high-fidelity simulation experience related to triaging of emergency room patients</p>	<p>6 emergency room nurses in a community hospital setting</p>	<p>Analysis of charts prior to experience and after experience for appropriateness of triage level. Subjective assessment</p>	<p>Improved accuracy in triaging of emergency room patients; highest in nurses with less than 6 months experience. Nurses reported it increased their confidence in triaging emergency patients.</p>

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<p>Palmer et al. (2008)</p> <p><i>Nursing Outlook 56</i></p>	<p>Registered nurses, licensed practical nurses taking part in a continuing education workshop</p>	<p>Pre-test/Post-test design. Participants from 14 workshops experienced didactic content and clinical simulations related to older adults experiencing acute medical event or exacerbation of chronic condition</p>	<p>283 RNs, LPNs, and nurse educators who attended a geriatric nursing workshop</p>	<p>Described as a knowledge quiz related to geriatric nursing</p>	<p>Significant increase in knowledge scores pre and post simulation experience. Positive comments from participants including integration of theory from didactic content and transfer to clinical practice</p>
<p>Brannon et al. (2008)</p> <p><i>Journal of Nursing Education 47(11)</i></p>	<p>Baccalaureate nursing program</p>	<p>Quasi-experimental pre-test/post-test design comparing experimental group (taught care of MI using five stations including high-fidelity simulation) and control group (lecture)</p>	<p>107 BSN students in an adult health nursing course in both fall and spring semesters</p>	<p>Confidence Level Tool developed by researchers with 34 Likert type questions; Researcher-developed Acute Myocardial Infarction Questionnaire: Cognitive Skills Test, a 20 question multiple choice test</p>	<p>Significantly different scores in cognitive test; no differences in levels of confidence</p>

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<p>Laschinger et al. (2008)</p> <p><i>International Journal of Evidence Based Healthcare 6</i></p>	<p>Research studies related to simulation</p>	<p>Review of research studies related to use of simulation in prelicensure programs in healthcare that addressed knowledge, skills, confidence, satisfaction, performance, critical thinking, or role identity</p>	<p>23 studies including simulation task trainers and high-fidelity simulation</p>	<p>Meta-analysis not possible, descriptive narrative review of results of all studies</p>	<p>High learner satisfaction, use of high-fidelity simulation in teaching higher level skills such as airway management are useful, indication of increase in knowledge and performance but no retention over time</p>
<p>Bruce et al. (2009)</p> <p><i>Nursing Education Perspectives 30(1)</i></p>	<p>University Nursing Program</p>	<p>Pre-test/Post-test design of simulation experience involving care of patient in cardiac arrest involving both undergraduate and graduate nursing students</p>	<p>11 Acute and adult health nurse practitioner students enrolled in a clinical practicum course; 107 Second semester Senior undergraduate students enrolled in a clinical practicum course</p>	<p>Graduate students-Demographic instrument, 10 item multiple choice Knowledge Test, 16 Likert scale item Confidence Scale, 26 item Student Competency Scale, Evaluation Instrument with 12 Likert items and 4 open-</p>	<p>Graduate students-significant increase in knowledge scores pre and post experience, no significant differences in confidence, no significant difference in performance scores, overall positive rating Undergraduate students-rated highly by students, significant difference in pre</p>



				ended questions. Undergraduate students- Combined demographic and Evaluation Instrument with Likert items and 4 open-ended questions, 10 question multiple choice Knowledge Test	and post test knowledge scores
Morrison et al. (2009) <i>Clinical Simulation in Nursing, in press</i>	LPN nursing program	Pre-test/Post-test experimental design evaluating surgical and maternal/child simulation scenarios for students in a distance learning program	33 LPN students in their first year from Ontario, Canada	Researcher-developed knowledge test (25 multiple choice questions), evaluation survey with 27 Likert type questions and 6 open-ended questions	Statistically significant increase in knowledge of care of surgical and maternal/child client, All felt it increased their confidence in practicing in a real environment and allowed safe practice of clinical skills. Themes from open-ended questions included

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					advantages of simulation, opportunity to practice skills not available in clinical, confidence, and application of theory to practice
Dillon et al. (2009) <i>Nursing Education Perspectives 30(2)</i>	Baccalaureate nursing students and medical students	Pretest/Posttest design using convenience sample of 4 th year nursing students and 3 rd year medical students at a large urban university taking part in interdisciplinary mock code experience	68 nursing students and 14 medical students participated in mock code experience using high-fidelity simulation	Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration; 4 open-ended questions regarding collaboration; demographic survey	Significant increase in medical students' scores related to collaboration and nursing autonomy. Narrative responses indicated nursing students felt relationships with medical students more collaborative after experience. Both felt experience valuable and worth continuing.

HFS and Performance					
<p>Grady et al. (2008)</p> <p><i>Journal of Nursing Education 47(9)</i></p>	<p>Baccalaureate nursing program</p>	<p>Students randomly assigned to learn skills of urinary catheterization and nasogastric tub insertion by low-fidelity or high-fidelity mannikin</p>	<p>39 First year nursing students</p>	<p>Researcher developed performance checklists for nasogastric tube and urinary catheter insertion; Researcher developed Post-training questionnaire using 8 Likert questions to assess student perception of training; Researcher developed 6-item Likert scale addressing students perceptions of performance and confidence</p>	<p>Significantly higher performance scores by high-fidelity group; Positive comments by high-fidelity group especially in terms of realism.</p>

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<p>Hoadley (2009) <i>Nursing Education Perspectives 30(2)</i></p>	<p>Health care personnel (RNs, MDs, EMTs, RTs)</p>	<p>Experimental two-group design comparing teaching of ACLS using low-fidelity simulation to high-fidelity simulation</p>	<p>53 health care personnel in an ACLS course randomly assigned to learn ACLS by traditional low-fidelity simulation or high-fidelity simulation</p>	<p>ACLS cognitive and Megacode performance tests; NLN Simulation Design Scale and Satisfaction and Self-Confidence Scale; demographic survey</p>	<p>High-fidelity group scored higher on cognitive and performance tests but not statistically different; Increases in both groups in terms of self-confidence in caring for cardiopulmonary arrest victim; greatest difference in satisfaction expressed by high-fidelity group—felt the high-fidelity should be the standard for teaching ACLS</p>
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Instrument Development					
<p>Todd et al. (2008)</p> <p><i>International Journal of Nursing Education Scholarship</i> 5(1) Article 41</p>	Baccalaureate nursing program	Testing of reliability and validity of newly developed instrument to measure student critical thinking, communication, assessment, and technical skills using 16 simulation sessions	72 senior nursing students and 6 faculty in a baccalaureate program in the midwest	Simulation Evaluation Instrument-- Newly developed instrument for assessing student performance during simulation	Content validity established with panel of 7 faculty experienced in simulation. Inter-rater reliability of 81.3%
<p>Arnold et al. (2009)</p> <p><i>Clinical Simulation in Nursing</i> 5(1)</p>	Simulation center at a healthcare institution in the midwest	Pre/Post-Test Design with participants completing Emergency Response Confidence Scale and Knowledge Tool before and after participation in a simulation scenario involving a patient in Ventricular tachycardia	12 registered nurses from a Midwest healthcare institution in 3 groups (1-nurses with > 10 years critical care experience; 2-nurses with less than 13 months critical care experience, 3-nurses with med-surg experience but no critical care experience)	17-item Emergency Response Confidence developed by researchers based on BLS and ACLS 11-item knowledge tool (ERPT) developed by researchers with 8 multiple choice questions and 3 arrhythmia	Support for reliability, validity, and usability of ERPT knowledge tool and confidence tools. Significant differences between 3 groups were expected using these 2 instruments and significant differences were found with Group 1 (experienced critical care nurses) having

				strips requiring identification	significantly higher scores on both instruments
Hanberg (2008) <i>ProQuest Dissertation AAT 3318406, In press Nursing Education Perspectives</i>	Nursing educators across the United States	Survey of Nurse Educators across the U.S. regarding barriers to implementation of simulation and correlations to these barriers	Nursing educators across the United States	Researcher-developed BARRIERS instrument	Significant demonstration of instrument reliability. Identification of characteristics of the adopter and innovation as the most significant barriers.
HFS and Design Characteristics					
Hotchkiss et al. (2002) <i>AANA Journal 70(6)</i>	Graduate nurse anesthesia program	Students exposed to HFS scenario involving an anesthesia patient crisis scenario	42 senior-level graduate nurse anesthesia students	Three observers evaluated video-taped performances using a researcher-developed authenticity instrument	Scenarios did not reflect OR culture, led to unnatural attention to monitors, and unrealistically short
Cleave-Hogg & Morgan (2002) <i>Medical Teacher 24(1)</i>	Medical program	Students exposed to anesthesia scenarios as a participant and as an observer	177 fourth-year medical students	Researcher-developed six item Likert style design feature survey	79% objectives clearly stated 83% realistic 54% comfortable with feedback

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Issenberg et al. (2005) <i>Medical Teacher</i> 27(1)	Medical education	Meta-analysis of 109 quantitative research studies from 1969-2003	109 quantitative studies	Meta-analysis	Most significant factor affecting learning feedback, reported in 51 of reviewed articles
Dobbs et al. (2006) <i>Clinical Simulation in Nursing</i> 2(1)	BSN program	Students exposed to 15-minute role play of care of an IDDM	60 nursing students in an introductory medical/surgical nursing course	Simulation Design Scale	Mean scores for the subscales: Objectives 4.0 Support 4.0 Problem-Solving 4.1 Feedback 4.5 Fidelity 4.3
Jeffries & Rizzolo (2006) http://www.nln.org/research/LeardalReport.pdf	BSN and ADN students	Experimental group—HFS scenario involving care of the post-op client Control groups—post-op care scenarios using static manikins and case studies	403 nursing students	Simulation Design Scale	HFS group rated fidelity, feedback, support, and objectives significantly higher than students in two control groups
Crooks et al. (2006) <i>Nurse Education in Practice</i> 5	BSN program	Students enrolled in a post-diploma baccalaureate program	Unclear—students took part in two focus sessions with 6-10 students each	Qualitative analysis of focus group interviews	Reflection is an important factor promoting confidence

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<p>Salvodelli et al. (2006)</p> <p><i>Simulation in Healthcare 1(2)</i></p>	<p>Anesthesia residents</p>	<p>Pre-test/Post-test design with students given exposure to HFS experience of a crisis resource management scenario and randomly assigned to Experimental groups—verbal feedback from instructor or verbal feedback accompanied by video-recording Experimental group—no feedback</p>	<p>42 anesthesia residents</p>	<p>Unclear</p>	<p>Both groups receiving feedback had significant increases in performance scores after the experience</p>
<p>Welke et al. (2006)</p> <p><i>Simulation in Healthcare 1(2)</i></p>	<p>Anesthesia residents</p>	<p>Students exposed to 3 resuscitation scenarios randomly assigned to Experimental group—personal debriefing OR Control group—computer-based tutorial</p>	<p>Anesthesia residents</p>	<p>Researcher-developed performance instrument</p>	<p>Similar performance immediately and five weeks after the experience in both groups</p>

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<p>Shepherd et al. (2007)</p> <p><i>Simulation in Healthcare 2(1)</i></p>	<p>Registered nurses</p>	<p>Nurses evaluated features of an intermediate-level fidelity simulator</p>	<p>72 nurses from two Australian hospitals</p>	<p>Researcher-developed evaluation instrument</p>	<p>Simulator was realistic Simulator suitable for teaching clinical skills</p>
<p>Cantrell (2008)</p> <p><i>Clinical Simulation in Nursing 4(2)</i></p>	<p>Baccalaureate nursing program</p>	<p>Descriptive study using focus group to assess nursing student perceptions of structured-debriefing using review of video-tape of student performance of three pediatric high-fidelity scenarios (asthma, sickle-cell anemia, well child)</p>	<p>11 senior nursing students enrolled in a pediatric course</p>	<p>Analysis of content from a focus group interview of students during structured debriefing and review of video-tape of simulation performance</p>	<p>Three themes emerged as important from the focus group—adequate preparation of students, demeanor of faculty during simulation, and timing of debriefing. Students indicated that the type of debriefing (oral or accompanied by a video-tape) were not as important as timing—immediately after was suggested as most preferred.</p>

<p>Roberson, et al. (2008)</p> <p><i>Ostomy Wound Management</i> 54(8)</p>	<p>Baccalaureate nursing program</p>	<p>First semester nursing students (n=137) randomly assigned to a wound care high-fidelity simulation experience. Experimental group given scenario that included addition of malodorous smell using cheese. Control group received simulation without addition of odor</p>	<p>First semester nursing students in a baccalaureate program</p>	<p>Laerdal Simulation Experience Evaluation Tool-5 point Likert Scale evaluating participation, realism, identification of patient problems, and incorporation of theory</p>	<p>Significantly different scores between experimental and control group in terms of active participation, realism, and ability to identify patient problems. Experimental group reported that addition of odor did add to realism and added to their ability to care for patients with malodorous wounds</p>
<p>Kuiper et al. (2008)</p> <p><i>International Journal of Nursing Education Scholarship</i> 5(1)</p>	<p>Baccalaureate nursing program</p>	<p>Students exposed to both patients in clinical setting and simulation experiences; Debriefing with Outcome Present State –Test (OPT) Model used to format debriefing after clinical and simulation;</p>	<p>44 undergraduate nursing students in an adult health medical surgical nursing course</p>	<p>Researcher-developed OPT Model Rating Tool</p>	<p>Similar OPT Model Rating Score for both clinical and simulation experiences</p>

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		Student Scores on OPT Model Rating Tool compared			
Elfrink et al. (2009) <i>Nursing Education Perspectives 30(2)</i>	Baccalaureate Nursing Students	Evaluation Research design with initial paper and pen formative evaluation followed by secondary focus group formative evaluation and a summative evaluation	114 Senior prelicensure students in a high-acuity nursing course	Summative evaluation of entire course using paper and pen survey including questions related to simulation; secondary focus group with 3 open ended questions; summative evaluation using 2 researcher-developed questions. Analysis of themes using domain analysis	Students felt 'singled out' during simulation and that collaborative learning could ease anxiety of feeling singled out. Final evaluation students reported that group planning eased anxiety during simulation experiences

Faculty/Nursing Program Related Research					
Jones & Hegge (2008) <i>Clinical Simulation in Nursing 4(2)</i>	Midwestern college of nursing	Descriptive survey of faculty in a baccalaureate nursing program in the midwest	29 full and part-time faculty in a Midwestern baccalaureate nursing program	Researcher-developed survey assessing demographic information, open-ended questions to identify courses applicable to use of simulation, and quantitative responses to questions regarding time requirements for use of simulation in nursing education	Majority of faculty felt that at least 0.50 FTE required to plan and implement simulation and 0.25 to evaluate use of simulation
Kardong-Edgren et al. (2008) <i>International Journal of Nursing Education Scholarship 5(1)</i>	Baccalaureate nursing program	Prospective, descriptive repeated measures design involving evaluation of 3 faculty-developed high-fidelity simulation	8 Faculty in a baccalaureate nursing program; 100 undergraduate nursing students enrolled in their first clinical course	Feedback form for faculty; Educational Practices Questionnaire, Simulation Design Scale, Student	Three themes from qualitative analysis of faculty responses—simulation lead to creative, interactive learning environment,

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		scenarios		Satisfaction and Self-Confidence in Learning Scale all Likert scale questionnaires	required time, and allowed for repetition to enhance learning. Students perceived that best practices were used in the simulations, rated design features highly, and felt positively about the experience.
King et al. (2008) <i>International Journal of Nursing Education Scholarship</i> 5(1)	Associate Degree nursing program	Two Phased study to assess barriers to use of simulation and evaluation of an intervention based on Theory of Planned Behavior	15 Faculty in a large ADN program in the southeastern U.S.	Researcher-developed instrument using Likert Scale	Use of an educational intervention related to simulation resulted in significantly higher scores related to attitude, subjective norms, perceived behavioral control, and intent to use simulation.

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<p>Nehring (2008)</p> <p><i>Journal of Professional Nursing 24(2)</i></p>	<p>Boards of Nursing</p>	<p>Survey of state boards of nursing to assess substitution of high-fidelity simulation for clinical time</p>	<p>50 state boards of nursing as well as Puerto Rico and Washington, D.C.</p>	<p>Researcher-developed survey</p>	<p>Five states plus Puerto Rico have substitution regulations but only Florida describes a percentage. 16 states give approval for substitution with another 17 considering policies</p>
<p>Jansen et al. (2009).</p> <p><i>Clinical Simulation in Nursing 5(1)</i></p>	<p>Faculty from state University system</p>	<p>Qualitative descriptive design using on-line survey</p>	<p>Faculty from state of Wisconsin baccalaureate and ADN nursing programs</p>	<p>Researcher-developed online survey with 8 closed-ended and 1 open-ended question (The biggest obstacle to using simulation in teaching my courses is...)</p>	<p>Identification of 7 obstacles of: Time, training, attitude, lack of space/equipment, funding, staffing, engaging all students appropriately. Discussion includes list of several solutions for each obstacle</p>

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<p>Akhtar-Dannesh et al. (2009)</p> <p><i>Western Journal of Nursing Research</i> 31(3)</p>	<p>Programs of nursing in Ontario Canada</p>	<p>Perceptions of faculty regarding implementation of simulation using Q-methodology</p>	<p>28 faculty from 17 nursing programs in Ontario Canada</p>	<p>Unknown</p>	<p>Four major viewpoints of faculty identified: positive enthusiasts, traditionalists, help seekers, and supporters. Identified that simulation requires time, additional human resources, and other resources such as a database of scenarios</p>
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