



PROGRESS REPORT

Project Title:

Designing and Implementing Models
for the Innovative Use of Simulation
to Teach Nursing Care of Ill Adults and Children:
A National, Multi-Site, Multi-Method Study

Project Sponsors

National League for Nursing and Laerdal

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Project Period: June 1, 2003 to May 31, 2006

Purposes of the Project

The purposes for this project, as stated in the Agreement between the National League for Nursing (NLN) and Laerdal, are re-stated below.

The purposes of this national, multi-site, multi-method project are fourfold:

- (1) To develop and test models that nursing faculty can implement when using simulation to promote student learning
- (2) To develop a cadre of nursing faculty who can use simulation in innovative ways to enhance student learning
- (3) To contribute to the refinement of the body of knowledge related to the use of simulation in nursing education
- (4) To demonstrate the value of collaboration between the corporate and not-for-profit worlds.

Goals of the Research

The goals of this research are directly related to purpose 1 of the overall project. The research goals are to explore how to design simulations, implement simulations as a teaching strategy, and evaluate selected learning outcomes using simulations. Specifically, the study is designed to:

1. Develop a teaching-learning framework incorporating simulations that nurse educators can use to help guide the development, implementation, and evaluation of the simulations in nursing education.
2. Describe and test a design that is theoretically based that can be used to develop nursing simulations that promote good learning outcomes.
3. Explore relationships among the theoretical concepts of the simulation framework to assess the existence and importance of these concepts.
4. Test and analyze selected outcomes when implementing a nursing simulation based on the proposed theoretical concepts using an experimental design.

Introduction and Summary of Year One Accomplishments

It has been an extremely busy and productive eighteen months of this project. Previous activities and accomplishments were detailed in the Six-Month and End of Year One Project Reports, previously submitted. The accomplishments detailed in the Six-Month Report included the selection of the Project Director, the selection of the eight project sites, and a kickoff meeting to clarify goals and responsibilities, explore the theoretical framework for the research design, and explain the process for implementing the research over the 3 years of the project. During those first six months, the Project Director and Project Coordinators collaborated on conducting a literature review to identifying gaps in the simulation literature. Following that task, the Project Director finalized the model for the simulation framework (see Appendix A), and completed the 4-phase research design (see Appendix B). A significant amount of time was spent in reviewing existing measurement tools, which the Project Director determined were inadequate for the purposes of this study. Therefore, new research instruments had to be developed and tested. During the first six months of the project, the objectives of Phase I, as stated below, were accomplished.

Phase I: June 2003—December 2003

Aim: To meet and organize the group of eight Project Coordinators and one Project Director to discuss the national simulation project and the direction of the study.

Objectives:

1. Describe the purpose of the national, multi-site study.
2. Conduct a literature review of the simulation literature on general simulations, use, and type of simulations.
3. Apply for IRB approval at the respective institutions to conduct the NLN/Laerdal research study proposed.
4. Develop a research design for their own specific simulation study using the research design, parameters, and essential elements defined by the NLN/Laerdal group.
5. Discuss the specific and overall project, goals, and research with the Project Director during individual site visits.

During the second 6 months of Year One, all eight Project Coordinators designed a small simulation study that was implemented at their respective sites in a selected course. All sites used with the Educational Practices Questionnaire and the Simulation Design Scale instruments, which were designed during Phase I. Six sites used SimMan, one site used an IV simulator (Case Western Reserve), and one site (Washington Hospital) used a low fidelity mannequin when conducting the study. Data analyses for each site, with a specific focus on important design features and educational practices, were reported in the Year One Progress Report. The reliability and validity of the two instruments was established. The prominent **educational practice** that was embedded in the simulations is that of collaboration. Additionally, the most important **simulation design feature** was found to be feedback/debriefing.

During the second half of Year One, the Project Director and Project Coordinators also created a case study that formed the simulation that will be used in Phase III of the study, across all eight project sites. All of the objectives for Phase II, as stated below, were accomplished.

Phase II: January 2004—June 2004

Aims:

1. Describe current best practices of teaching medical-surgical content, defining what concepts are present and which practices are important to the teaching-learning process from the teacher and student perspectives.
2. Experience the design and implementation phase of using simulations as a teaching strategy and assess what worked.
3. Develop an ideal medical-surgical simulation that can be implemented across eight sites for experimental testing in Phase III.
4. Obtain reliability and validity data on the instruments constructed measuring the concepts in the teaching-learning framework using simulations.

Objectives:

1. Conduct a process evaluation of the current teaching-learning practice that exists in specific medical/surgical content areas in their own institutions using the educational practices instrument of the study.
2. Contribute data to measuring reliability and validity of the tool developed to measure educational practices in teaching-learning of nursing content.
3. Implement one pilot simulation in the Project Coordinator's course in order to measure the existence of educational practices and the importance of these to teachers and students.
4. Contribute ideas, based from the individual simulation experience at the respective sites, to the development of one 'ideal' medical-surgical simulation that will be implemented across eight sites.

The remainder of this report details the accomplishments in the first six months of Year Two, which focused on accomplishing the aims and objectives of Phase III, Part 1. Expenditures are detailed in the Budget portion of the report.

Summary of Accomplishment in First Six Months of Year Two Phase III, Part 1: July 2004-December 2004

Following the successful implementation of Phase II, the Project Director refined the plans for the implementation of Phase III of the project. The first six months of Year Two have been busy and productive as we are nearing the launch of the simulation study at eight sites. During this past six months, activities included: 1) refining the research design, 2) pilot testing the proposed simulation intervention, and 3) obtaining baseline data on current practices and learning outcomes in medical/surgical courses where the post-operative content is taught before a teaching-learning intervention, the simulations, are embedded.

Refining the Research Design

The design was refined following a group meeting which took place during the NLN Summit in Orlando, Florida. The three simulations (paper/pencil case study, traditional mannequin, and human patient simulator) were reviewed, along with process criteria, props, and other details. Jay Ober programmed the SimMan scenario so that it was standardized for all groups. Project Coordinators practiced the simulation and discussed details and expectations. Following this meeting, the three simulation design details were outlined as seen in Appendix C. Additionally, the Project Director developed an IRB prototype for Phase III, Part I and Part II that Project Coordinators could use at their specific institutions for their own data collections.

Pilot Test

Project Coordinator Kristen Rogers from Washington Hospital conducted a pilot study, which included implementing all three of the simulations that will be used in the research design for Phase III, Part 2 of the national study. She conducted the pilot during November and early December 2004. Her report of the experience (Appendix D) was invaluable. It uncovered several areas that needed further discussion, clarification, or refinement, such as how to handle student absences, additional responses that needed to be programmed for SimMan, and some differences among the three simulations. After the pilot was conducted, all 8 Project Coordinators had a 2 hour phone conference on December 17, 2005 to discuss the pilot findings, make adjustments to the simulations, and answer questions and concerns about the upcoming simulation studies that were going to be launched in January 2005.

Baseline Data Collection

Background:

Five sites were able to participate in the Phase III, Part I section of the national study. Barriers such as no course offering in the fall and more time needed for IRB approvals kept some of the sites from participating in this round of data collection.

Procedure: Phase III, Part I

At the five sites, data were collected from students enrolled in required medical-surgical courses where care of post-operative patients was taught. The purpose was to assess selected educational practices and learning outcomes in a traditional classroom instructional environment when teaching nursing students about care of post-operative patients. In the spring of 2005, a study will follow which will incorporate a simulation intervention into the teaching learning process, with learning outcomes measured after the simulation, to assess for improved learning outcomes. This portion of the study serves to collect baseline data regarding student satisfaction with the traditional instruction method, the educational practices used in the traditional classroom setting, and selected learning outcomes. The outcomes for the study include: 1) self-confidence when caring for a post-operative patient; 2) performance abilities when caring for a post-operative patient; and 3) cognitive gains and problem solving based on the nursing process when caring for a post-op patient.

Research Questions:

1. Are the educational practices as defined in the Educational Practices Questionnaire incorporated into instruction on care of the post-op patient as delivered in the traditional classroom setting?
2. How satisfied are nursing students with their current instructional approach when learning about post-operative care in a classroom setting?
3. How confident are the students to care for a post-operative patient after learning the content in a traditional setting?
4. What are the students' perceptions of their performance abilities in caring for a post-operative patient after having traditional instruction on post-operative content?
5. Are there cognitive gains and are problem/solving skills acquired after content on post-op care is presented in a traditional classroom setting?

Instruments:

In addition to a demographic instrument, five other instruments were administered.

- A 12-item pretest on post-operative care content
- A 12-item parallel form posttest on post-operative care content
- A 16 item Educational Practices Scale (EPS) designed to measure the presence of the educational practices and the importance of those concepts in the instructional format
- A 5-item Satisfaction Scale measuring the participants' satisfaction with the instructional method
- An 8-item Self-Confidence Scale measuring the participant's perception of his/her confidence in caring for a post-operative patient.

The content validity of all instruments was established by a panel of ten experts in medical/surgical nursing. Reliability was based on Cronbach alphas.

Data Findings:

Sample:

A sample of 395 nursing students from five sites participated in the baseline data collection between August and December of 2004.

Pre/Post Testing:

Two 12-item multiple-choice tests were created. These were parallel forms, and were designed to test knowledge of content related to care of a postoperative patient. One form was administered before the classroom lecture on post-operative content; the other was given immediately after the lecture.

Knowledge was gained by the students in the traditional learning environment. Using a paired t-test, there was a significant difference ($p < .0001$) between the pre and posttest scores indicating learning took place across all 5 sites.

Results of Educational Practices, Satisfaction and Self Confidence Scales:

The identified educational practices were found to be embedded in the traditional instruction, and high expectations was the educational practice that received the highest rating by students. Overall, students were satisfied with the traditional instructional delivery of post-operative content, and indicated that after the lecture they had confidence in their ability to care for a post-operative patient

Work Plan for Remainder of Year Two Phase III, Part 2, January-July 2005

The following describes the plans for the rest of Year Two, when Phase III, Part 2 of the national study will be conducted.

Procedure and Methodology

During the spring semester 2005, students enrolled in their first medical-surgical nursing course at the eight project sites will view a 45 minute videotape that includes a lecture by an experienced master teacher on the care of the post-operative client, and a simulation demonstrating care of a post-operative client.

Next, three groups of students will participate in three different simulation teaching strategies to learn more about post-op care.

- The control group will be provided a paper/pencil case scenario regarding a post-operative client. Students will work in groups with assigned roles to answer the problem-solving questions provided to them on paper/pencil.
- A second group of students will participate in a simulation using a human patient simulator with hands-on experience in caring for the simulated, post-operative client.

- A third group of students will also have hands-on experience in caring for a post-operative patient, but with a traditional mannequin.

All three groups will be provided the same simulation, will work in groups of four, and each group's simulation will be conducted for 20 minutes, followed by a 20-minute reflective thinking session. Data collection will be done for all groups prior to viewing the videotape and following the simulation experience. Data collection will take no longer than 30 minutes.

Students in all groups will have an opportunity to participate in the other two types of simulations, at appropriate times prior to the completion of the medical-surgical unit or module that includes post-op care of the surgical client.

Aims of the Project

1. Create a simulation on the topic of care of a post-operative client and assess the design characteristics, educational practices, and student outcomes as the simulation is implemented as a teaching strategy in a medical-surgical nursing course at eight project sites.
2. Implement the simulation in a medical-surgical course across all eight sites in order to measure learning outcomes of knowledge, skill performance, learner satisfaction, and self-confidence in caring for a post-operative client.
3. Obtain reliability and validity data on the instruments constructed to measure the concepts in the teaching-learning framework using the simulations.

Research Questions

1. What design features are important to include in the creation of a simulation on the care of post-op clients?
2. What educational practices incorporated in the post-op care simulation activity are important to both students and teachers?
3. Is there a positive correlation between students and teachers regarding the most important educational practices and design features in the simulation activity?
4. What are the differences in learning outcomes among the control group and two simulation groups when using simulation on care of a post-operative client as a teaching-learning activity?
5. What factors of the Simulation Model contribute most to positive learning outcomes?
6. What is the added value of integrating simulations into the teaching-learning environment? What do students describe as strengths?
7. What patterns/clusters of information/questions are we seeing in the guided reflection process? Are there curriculum/instructional gaps?

Proposed Outcomes for Phase III Simulation Study

The learning outcomes selected for assessment in this phase include:

1. Improvement in problem-solving skills and knowledge gains

2. Support and acceptance of the educational practices which are important in designing and implementing simulations in nursing education
3. Learner satisfaction with simulation instructional method
4. Self-confidence in caring for a post-operative patient
5. Students' perception of their performance in caring for a post-op client.

Sample

The convenience sample will consist of diverse nursing students in one diploma, two ASN, and five BSN programs who are enrolled in their first medical-surgical course where post-operative content is taught. The study will have 90% power to detect an effect size of 0.5 (difference in means/pooled within-group standard deviation) between any two groups with an overall significance level of 5% using two-sided tests with a sample size of 111 per group (total sample size of 333). All students will participate in the simulation experience as a regular course activity. The simulation will not be an out-of-class experience or an experience for extra credit.

Instruments

Instructor-made and previously developed instruments will be used to measure the design characteristics, educational practices, learner satisfaction, self-confidence in caring for a post-operative patient, performance rating, and problem-solving/knowledge gains.

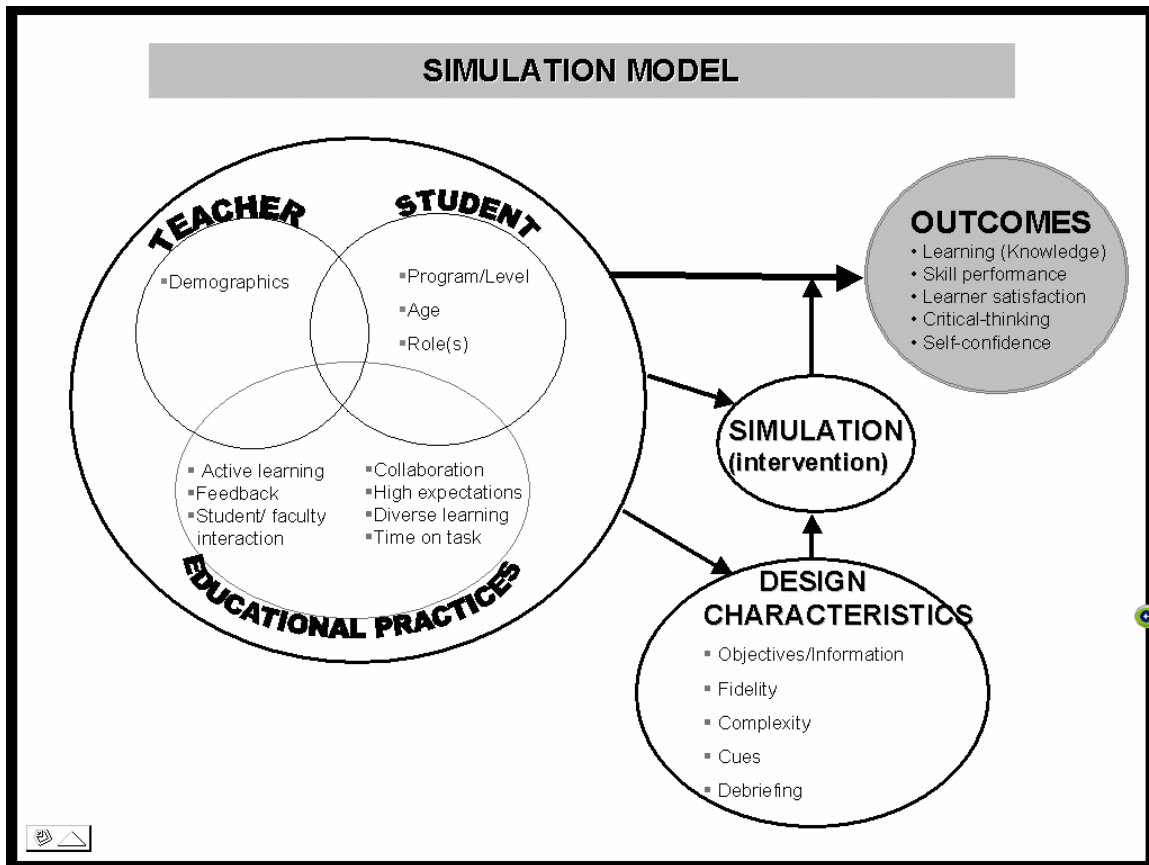
Data Analysis

A descriptive summary of items and scales will be done overall for each group. Pearson correlations and a 3-way ANOVA will be used to evaluate relationships and group differences between the teaching strategies. A statistician from the Biostatistics Division of Indiana University will oversee the data management and statistical analyses.

Appendices

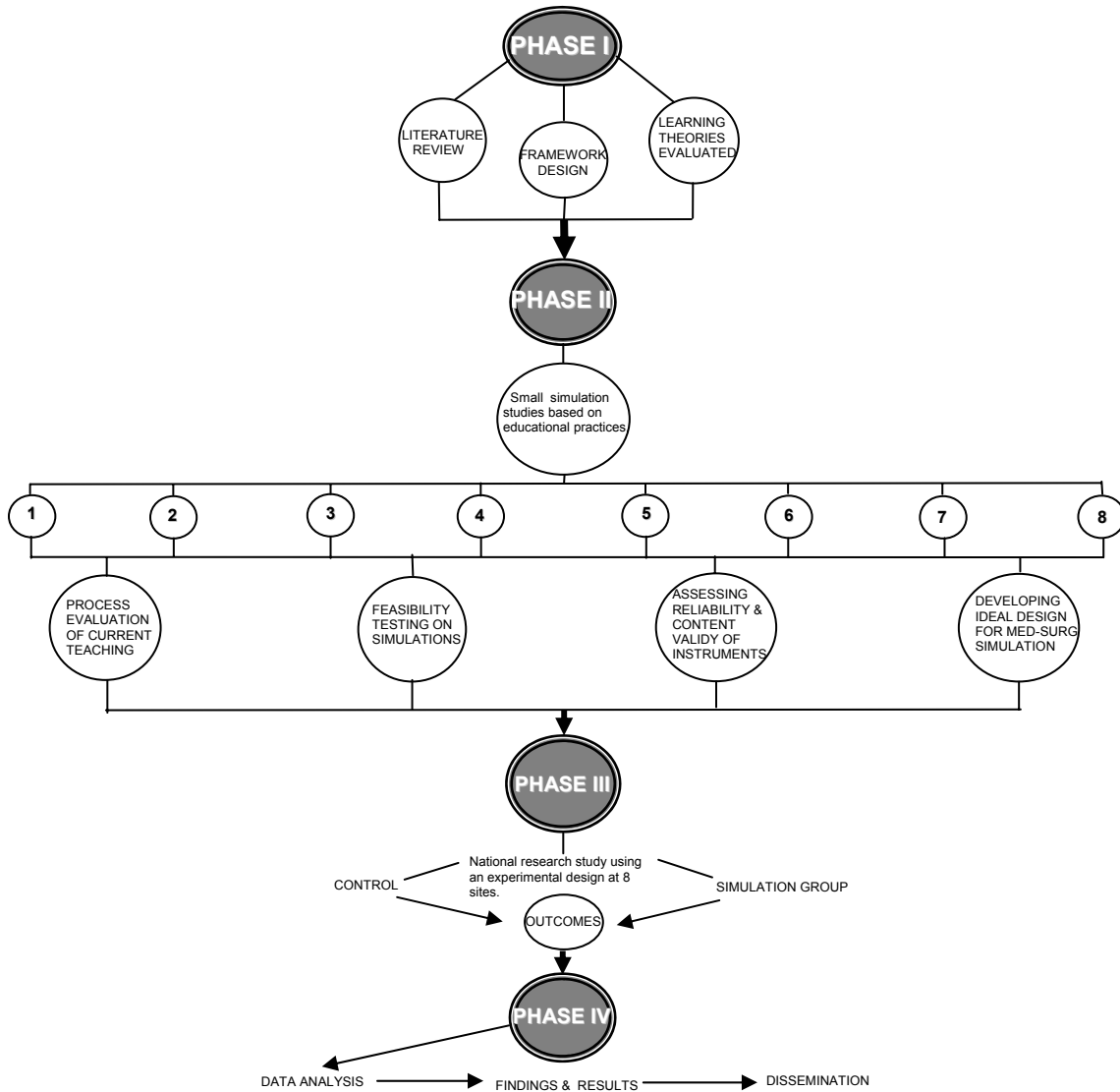
Appendix A	Simulation Model
Appendix B.....	Schematic of 4 Phases of Research Study
Appendix C	List of 8 Project Sites and Project Coordinators
Appendix D	Bibliography

Appendix A



Appendix B

Schematic of the 4 Phases of the Multi-Site, Simulation Research Study



1.

Appendix C

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Appendix D

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