Program and Review and Assessment Committee
Grant Proposal

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**Project Title:**
*"The Use of Simulations to Provide Experiential Learning in Nursing Education."*

**Project Dates:**
July 2004 – May 2005

**Project Checklist:**
Statement of support from the Department Chair (attachment, Keck_support.doc)
Simple Budget (in the proposal)
IRB approval (attachment, Approval_RSP_Jeffries.pdf)

PRAC Grant Proposal

**Abstract:**

*The creation, implementation, and evaluation of an insulin management simulation is being proposed as a prototype for testing a theoretical framework for designing simulations for the assessment of student learning. This simulation will be piloted on 100 baccalaureate nursing students to determine the degree to which the theoretical framework is adequate for the development of additional simulations to assess student learning.*

**Purpose of the Project:**

1. To test a national theoretical framework for the development of teaching simulations to assess student learning in clinical laboratory settings.
2. To create and pilot a prototype clinical simulation for the management of insulin for junior students.
3. Evaluate the effectiveness of the simulation for teaching as assessed by faculty.
4. Evaluate the effectiveness of the simulation for learning as assessed by junior students.

Simulations provide for safer learning experiences that allow students opportunities to explore and experiment with potential solutions to problems that arise in a patient care setting. Simulations should be designed to facilitate critical thinking, diagnostic reasoning, and prioritizing skills that are essential to the educational process for nursing students. Clinical simulations in combination with other teaching methods are a powerful tool in preparing students for the complexities of clinical nursing practice (Morton, 1997). As the use of clinical simulation increase among nursing educators, little evaluation research has been done to identify

the hallmarks of a good simulation, the teacher role in the development and implementation of simulations, and the effect of simulations on student learning.

**Project Outcomes:**

1. Evaluation of the effectiveness of the insulin management simulation by students and instructors.
2. Assess the utility of this prototype in developing further simulations.
3. Facilitate the national research effort to test the reliability and validity of the assessment instruments used in measuring student learning.

**Research Methodology:**

Sharon McAdams, a full time faculty with expertise in managing insulin for diabetic patients, will develop an insulin management simulation for junior students during the summer of 2004. This simulation will incorporate a national theoretical model developed for the creation of simulations (see Appendix A). This model is currently being tested nationally with favorable initial outcomes. The simulation model was derived from Chickering and Gamson's principles of best practices in undergraduate education (1987). Included in the development of the insulin management simulation are learning objectives, requisite knowledge, fidelity to clinical practice, learning cues, debriefing of the learning experience, and assessment of teaching and learning from the perspective of students and instructors.

**Research Questions:**

1. To what degree is the proposed NLN/Laerdal simulation model helpful in designing an insulin management simulation that enhances student learning?
2. Does the insulin management simulation promote student satisfaction and self-confidence in student ability?

3. Does the incorporation of a simulation designed on a theoretically conceived model improve student learning outcomes?
4. Are there differences in student learning outcomes between students taught through simulation versus students taught without the use of simulation?

**Instruments:**

- *Satisfaction with the Teaching methodology*---This five point scale measures student satisfaction (see Appendix B).
- *Self-Confidence in Learning*---This tool measures perceived student competence with learning knowledge and skills included in the simulation (see Appendix B).
- *Design Characteristics in the Simulation Framework*---This tool was developed to measure the variables of the NLN/Laerdal simulation model (see Appendix C).
- *Educational Practices in the Design and Implementation of the Simulation*---This tool measures the best practices in undergraduate education based on Chickering and Gamson's 1987 work (see Appendix D).
- *Cognitive Gains*---This is a 12-item tool used to determine knowledge gained in learning how to manage insulin for diabetic patients (to be developed).

**Timeline for Project**:

1. Insulin management simulation will be developed in summer
2. In the fall 2004 the simulation will be piloted with volunteer nursing students, then refined as recommendations are made.
3. Simulation will be introduced in week 3 of H353, *Alterations in Health I* spring 2005.
4. Identified prerequisite knowledge for insulin management will be introduced through the traditional lecture format for all students in week three of the class.
5. In week four one group of 50 students will be taught insulin management in the clinical laboratory through the designed simulation. Group two (control group) of 50 will be taught insulin management through the traditional demonstration/return demonstration method.
6. In week five of the H353 course instruments will be distributed and responses collected.
7. Data collected will be analyzed during weeks six through ten.

**Data Analysis:**

*Research Question 1:* Descriptive summary of data collected from instructors

*Research Question 2:* Descriptive summary of items by control and experimental groups

*Research Question 3:* Summary of scores on cognitive gains tool for control and experimental group

*Research Question 4*: Comparison of knowledge of control and experimental groups using a t-test

Assistance from a statistician from the Biostatistics Department on the IUPUI campus will be sought to ensure that the analysis process is consistent with the research questions being posed.

**Evaluation and Dissemination of Study Results**:

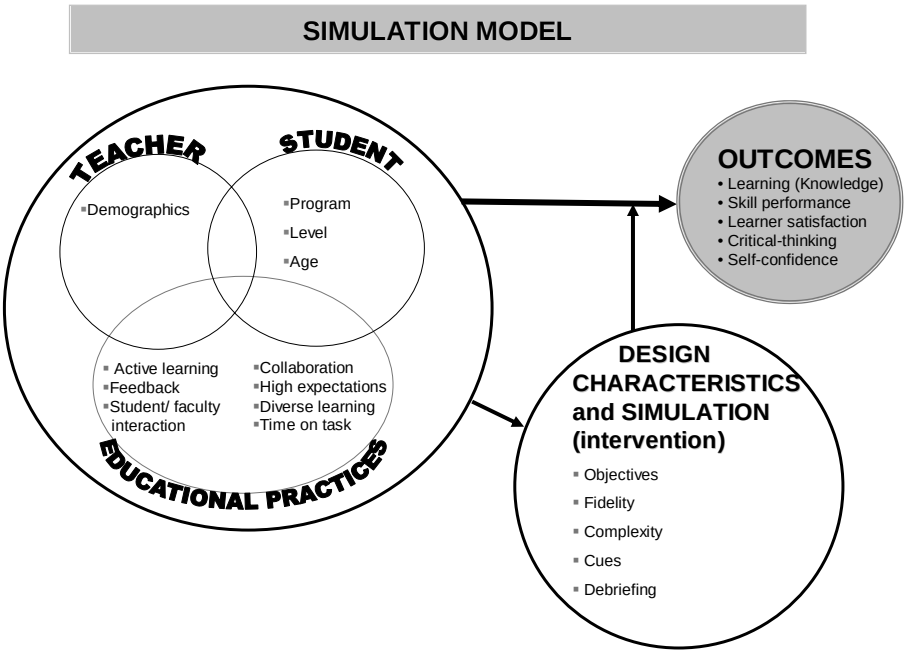
Results of this pilot project will be compared with the data being collected from the national NLN/Laerdal simulation project as a way of validating outcomes. The data collected will also become part of the reliability and validity being conducted as part of the national NLN/Laerdal simulation project. As there is such a critical need for developing cost effective simulations that facilitate student learning the investigators are committed to broad distribution of the outcomes of this study project through presentations and publications at the local, state, and national levels.

**Project Budget:**

| | |
|---|---|
| Data Manager (10 ($50/hr) | $500 |
| Database Technician ($32/hr – 10 hrs.) | $320 |
| Data Entry ( 20 hours - $18/hr) | $320 |
| Statistical consultation ($64.00 x 5hr) | $320 |
| Printing of materials | $86.40 |
| Consultation Coordinator Stipend | $500.00 |
| Simulation Developer Stipend | $500.00 |
| **TOTAL:** | $2,546.40 |

# Appendix A

# Simulation Model



# Appendix B

## Appendix B: Satisfaction and Self-Confidence Scales

### Attitude towards Current Instructional Methods Using Simulations

**Instructions:** This questionnaire is a series of statements about your personal attitudes about your instruction using simulations. Each item represents a statement about your attitude toward your satisfaction with learning and self-confidence in obtaining the instruction you need. There are no right or wrong answers. You will probably agree with some of the statements and disagree with others. Please indicate your own personal feelings about each statement below by marking the numbers that best describes your attitude or beliefs. Please be truthful and describe your attitude as it really it, not what you would like for it to be. This is anonymous with the results being compiled as a group, not individually. If you have any questions or concerns, please contact Sharon McAdams at 317-274-4430.

Mark:

1 = STRONGLY DISAGREE with the statement
2 = DISAGREE with the statement
3 = UNDECIDED – you neither agree or disagree with the statement
4 = AGREE with the statement
5 = STRONGLY AGREE with the statement

**Satisfaction with Current Teaching Methods Using Simulations**

| | **Satisfaction with Current Learning** | | | | | |
|---|---|---|---|---|---|---|
| 1. | The teaching methods used in this simulation are helpful and effective. | 1 | 2 | 3 | 4 | 5 |
| 2. | The simulation provides me with a variety of learning materials and activities to promote my learning. | 1 | 2 | 3 | 4 | 5 |
| 3. | I enjoy how my teachers currently teach using the simulations. | 1 | 2 | 3 | 4 | 5 |
| 4. | The teaching materials used in this simulations are motivating and help me to learn. | 1 | 2 | 3 | 4 | 5 |
| 5. | The way my teachers teach the simulation is suitable to the way I learn. | 1 | 2 | 3 | 4 | 5 |
| | **Self-confidence in Learning** | | | | | |
| 6. | I am confident that I am mastering the content my teachers present to me in this simulation. | 1 | 2 | 3 | 4 | 5 |
| 7. | I am confident that I am obtaining the knowledge needed to progress through course using the simulations. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 8. | I am confident that I am developing the skills and obtaining the knowledge needed using these simulations to pass the course. | 1 | 2 | 3 | 4 | 5 |
| 9. | I perform well on my course exams and laboratory skills check-lists. | 1 | 2 | 3 | 4 | 5 |
| 10. | My teachers use helpful resources in addition to the simulations to teach the course/ | 1 | 2 | 3 | 4 | 5 |
| 11. | It is my responsibility as the student to learn what I need to know in these simulations. | 1 | 2 | 3 | 4 | 5 |
| 12. | I know how to get help when I do not understand the class material or simulation experience. | 1 | 2 | 3 | 4 | 5 |
| 13. | I know how to use my class materials and simulations effectively to learn in my course. | 1 | 2 | 3 | 4 | 5 |
| 14. | It is the teacher’s responsibility to tell me what I need to learn in the simulation(s). | 1 | 2 | 3 | 4 | 5 |

# Appendix C

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**Simulation Design Scale (Student Version)**

In order to measure if the best simulation design elements were implemented in your simulation , please complete the survey below as you perceive it. There are no right or wrong answers, only your perceived amount of agreement or disagreement. Please use the following code to answer the questions.

Use the following rating system when assessing the simulation design elements:

1 - Strongly Disagree with the statement
2 - Disagree with the statement
3 - Undecided - you neither agree or disagree with the statement
4 - Agree with the statement
5 - Strongly Agree with the statement
NA - Not Applicable; the statement does not pertain to the simulation activity performed.

Rate each item based upon how important that item is **to you.**

1 - Very Important
2 - Important
3 - Neutral
4 - Somewhat Important
5 - Not Important

| Item | 1 | 2 | 3 | 4 | 5 | NA | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Objectives and Information** | | | | | | | | | | | |
| 1. There is enough information provided at the begining of the simulation to provide direction and encouragement. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 2. Support was offered in a timely manner. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 3. My need for help was recognized. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 4. I felt supported by the teacher's assistance during the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 5. Independent problem-solving was facilitated. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 6. I was supported in the learning process. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 7. I was encouraged to explore all possibilities of the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 8. I clearly understood the purpose and objectives of the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| **Fidelity (Realism)** | | | | | | | | | | | |
| 9. The simulation suspended disbelief. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 10. The scenario resembled a real-life situation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 11. Real life factors, situations, and variables were built into the simulation scenario. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |

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**Simulation Design Scale (Student Version)**

| Item | 1 | 2 | 3 | 4 | 5 | NA | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Complexity** | | | | | | | | | | | |
| 12. The simulation was designed for my specific level of knowledge and skills. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 13. The simulation provided enough information in a clear matter for me to problem-solve the situation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 14. The simulation allowed me the opportunity to prioritize nursing assessments and care. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 15. The simulation provided me an opportunity to goal set for my patient. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| **Cues** | | | | | | | | | | | |
| 16. There is enough information provided to me during the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 17. The cues are appropriate and geared to promote my understanding.. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 18. Enough cues need to be provided to me so I can progress with the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| **Feedback/Debriefing** | | | | | | | | | | | |
| 19. Feedback provided was constructive. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 20. Feedback was provided in a timely manner. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 21. The simulation allowed me to analyze my own behavior and actions. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 22. There was an opportunity after the simulation to obtain guidance/feedback from the teacher in order to build knowledge to another level. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |

# Appendix D

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**Educational Practices Questionaire (Student Version)**

In order to measure if the best practices are being used in your simulation, please complete the survey below as you perceive it. There are no right or wrong answers, only your perceived amount of agreement or disagreement. Please use the following code to answer the questions.

Use the following rating system when assessing the educational practices:

1 - Strongly Disagree with the statement
2 - Disagree with the statement
3 - Undecided - you neither agree or disagree with the statement
4 - Agree with the statement
5 - Strongly Agree with the statement
NA - Not Applicable; the statement does not pertain to the simulation activity performed.

Rate each item based upon how important that item is **to you.**

1 - Very Important
2 - Important
3 - Neutral
4 - Somewhat Important
5 - Not Important

| Item | 1 | 2 | 3 | 4 | 5 | NA | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Active learning** | | | | | | | | | | | |
| 1. I had the opportunity during the simulation activity to discuss the ideas and concepts taught in the course with the teacher and other | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 2. I actively participated in the debriefing session after the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 3. I had the opportunity to put more thought into my comments during the debriefing session. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| **Feedback** | | | | | | | | | | | |
| 4. There are enough opportunities in the simulation to find out if I clearly understand the material. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 5. I learn from the comments made by the teacher before , during, or after the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 6. I received cues during the simulation in a timely manner. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| **Student Faculty Interaction** | | | | | | | | | | | |
| 7. I had the chance to discuss the simulation objectives with my teacher. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 8. I had the opportunity to discuss ideas and concepts taught in the simulation with my instructor. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |

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**Educational Practices Questionaire (Student Version)**

| Item | 1 | 2 | 3 | 4 | 5 | NA | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Collaboration** | | | | | | | | | | | |
| 9. I had the chance to work with my peers during the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 10. During the simulation, my peers and I had to work on the clinical situation together. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| **High Expectations** | | | | | | | | | | | |
| 11. My instructor expected me to perform well during the simulation experience. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 12. The objectives for the simulation experience were clear and easy to understand. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 13. My instructor communicated the goals and expectations to accomplish during the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| **Diverse Ways of Learning :** | | | | | | | | | | | |
| 14. The instructor was able to respond to the individual needs of learners during the simulation. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 15. The simulation offered a variety of ways in which to learn the material. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 16. This simulation offered a variety ways of assessing my learning. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| **Time on Task** | | | | | | | | | | | |
| 17. I spend more time preparing for this simulation than for other course activities. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |
| 18. Using simulation activities make my learning time more productive. | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 | ○ NA | ○ 1 | ○ 2 | ○ 3 | ○ 4 | ○ 5 |