CHAPTER 1
INTRODUCTION

Context of the Problem

Nursing students need an extensive knowledge of biological and physical science concepts for safe, competent clinical practice (Casey, 1996). However, nursing students frequently have difficulties with content in science courses (Clancy, McVicar, & Bird, 2000). The difficulties have been attributed to several factors in nursing education.

Nursing curriculum changes in the past few decades has led to a decline in emphasis in science content (Wynne, Brand, & Smith, 1997). Science course content generates a great deal of anxiety for nursing students (Nicoll & Butler, 1996). Nurses traditionally have not perceived a need for an in-depth scientific knowledge base (Trnobranski, 1993). These problems with science courses decrease motivation and the ability to effectively use learning strategies in science courses (Andrew & Vialle, 1998).

Several external factors have amplified the difficulties for nursing students in science course content. Lack of science background in nursing instructors has contributed to the perception that science content is not important in their practice (Courtenay, 1991). Conversely, lack of nursing background from science instructors has been attributed to student perceptions that content was more in-depth than needed for their clinical performance (Clarke, 1995; Nicoll & Butler, 1996). Performance in science courses at the graduate level is further complicated by nursing students having time management difficulties when entering graduate school due to responsibilities with balancing work, family (often including children living at home) and school demands (Spratley, Johnson, Sochalski, Fritz, & Spencer, 2000).
Studies have demonstrated that nursing students do not have a wide repertoire of self-regulated learning strategies for science courses to assist them in goal setting and positive outcomes with regard to taking science courses. The motivation declines due to a perceived decrease in value of the scientific knowledge (Andrew & Vialle, 1998). Studies have suggested that improved teaching techniques are needed to improve nursing student outcomes in science courses, including techniques used in self-regulation (Andrew, 1998).

Self-regulation includes effective strategies for improving learning outcomes in other disciplines (Pekrun, Goetz, Titz, & Perry, 2002; Zimmerman, 2002). Schunk and Zimmerman (1998) describe a model with three phases that include: forethought, performance/volition, and self-reflection. A method encompassing these three phases may be an appropriate model for application in a graduate science course for nursing students.

**Purpose of study**

The purpose of this study was to determine if computer-assisted self-regulated learning strategies are effective tools to improve nursing student performance in science courses. This improved performance may lead to decreased anxiety and increased self-efficacy. The study accommodated all three phases of self-regulation according to Schunk and Zimmerman (1998) using survey techniques and a computer-assisted environment to improve the efficiency of the modeling/performance phase.

The initial survey assessed 1) student beliefs about the importance of course objectives and perceived relevance of content to their clinical nursing skills; 2) time constraints encountered by students; and 3) perceived self-efficacy in an advanced
science course. The modeling/performance phase compared computer-assisted feedback to outcomes in a lecture/worksheet format. Feedback performance of elaborate explanations of answers was compared to simple verification feedback of correct/incorrect. In the final phase, students had the opportunity to self-reflect and make adjustments in both the computer tutorials and the non-computer worksheets to determine potential effects that the feedback has on retention of concepts.

**Research Questions**

**Grand Tour Question**

Can instruction in computer-assisted self-regulated learning techniques be used to improve student outcomes in a science course?

**Minor Questions**

1. What are the time budget demands on a graduate nursing student? Do time budget demands have an effect on exam grades in a science course?

2. What importance to practice do nursing graduate students place on science course objectives both knowledge level (undergraduate) and application level (graduate)?

3. How does providing computer-assisted tutorials change student performance on exams as compared to pencil/paper worksheets?

4. Do elaborate feedback answers affect student performance on exams as compared to verification (correct/incorrect) type feedback?

5. Do students retain concepts taught through use of computer tutorials differently than concepts taught using paper and pencil worksheets as measured through a comprehensive final exam?

**Significance of the Study**
Nursing students have been documented as having difficulty with science course content for the past several decades (Clancy et al., 2000). Current research data surveys undergraduate nursing students to attempt to resolve the problems with relevance and difficulty of the course content. This study assesses the belief system of nurses who have clinical experience and should provide a better assessment of how the course content can be used in clinical practice than previous surveys of nursing students without clinical expertise. This study is also significant in that it was designed to assess specific course content and not overall views of the course as provided in other surveys of nursing student attitudes towards science course content.

The use of self-regulation learning techniques has been successful in other disciplines in improving course outcomes (Pekrun et al., 2002). Self-regulation techniques have been suggested to improve nursing student outcomes in science courses (Andrew & Vialle, 1998). No studies have been completed to test the outcomes of self-regulated learning techniques for nursing students in science courses.

Use of computer assisted instructional techniques in assisting with self-regulated learning strategies has been helpful in overcoming difficulties students are having with science course content (Hargis, 2001). The use of computer tutorials and computer exams were examined as a study tool during the performance/modeling phase. The final self-reflection phase offered students an additional chance to study course content and improve performance from the unit exams.

This study provided an exploration into teaching methods to develop techniques that meet the needs of the students for critical course content while reducing the cognitive load, personal stress and time-budget restraints these students experience.