

2004

## Application of case study methodology in the context of undergraduate critical care nursing education

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APPLICATION OF CASE STUDY METHODOLOGY  
IN THE CONTEXT OF UNDERGRADUATE  
CRITICAL CARE NURSING EDUCATION

An Abstract of a Dissertation

Submitted

in Partial Fulfillment

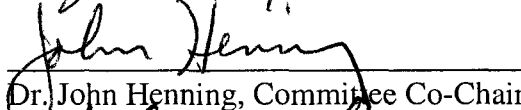
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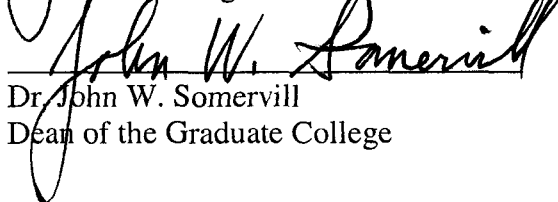
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A Dissertation

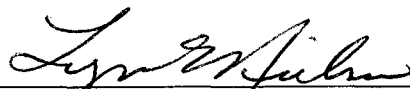
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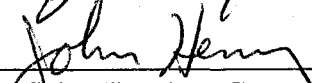
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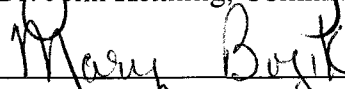
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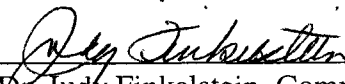
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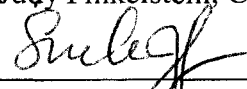
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## ABSTRACT

This study represented an initial effort to investigate how a case study methodology could be used in the context of critical care nursing education. The study hoped to improve students' content specific knowledge of critical care nursing and facilitate critical thinking processes vital to clinical decision making. The study describes the transformation of a critical care-nursing course from a traditional lecture-based approach to a case study approach.

The traditional approach addressed the content through abundant teacher centered lecture, but did not require students to actively engage in discourse or apply critical thinking skills to real nursing problems. The case study approach provided students with opportunities to apply critical thinking processes in the context of actual critical care nursing situations. A descriptive approach was selected in order to describe how case study methodology, premised on higher order thinking skills and application of content knowledge, more specifically matched the goals of the nursing education program and the skills nursing professionals required in their own practice. This study additionally sought to describe how students' application of content knowledge and higher order thinking skills were reflected in student writing.

Academic nursing faculty that employ case study methodology can expect (a) students to demonstrate knowledge of critical care nursing content through performance on multiple-choice and essay examinations, (b) students to demonstrate critical thinking as reflected in essay examination responses, and (c) that classroom discourse that is increasingly open and student-centered.

## DEDICATION

To Lauren and Andrew. They bring love and laughter, and remind me of the most important things in life. To Kianna. My wife provides steadfast love and support through all of the early mornings and late nights. To Matthew and David. My big brothers who have given guidance and encouragement. To Mike. His spirit moves me to accomplish what I couldn't have done alone. To my loving Moms and Dads. They have guided me from the time I was small and I love them more than words can say.

## ACKNOWLEDGMENTS

I would like to thank God for His grace and for the strength to persist, to learn and to grow. I thank Dr. Lynn Nielsen, my committee co-chair, for his friendship, guidance and support week by week. I also thank co-chair, Dr. John Henning, for his support, direction and sacrifice for this study. I thank Dr. Mary Bozik, Dr. Sue Joslyn, Dr. Judith Finkelstein and Dr. Sharon Smaldino for serving on my committee and for their commitment and guidance in this study.



## TABLE OF CONTENTS

	PAGE
LIST OF TABLES.....	ix
CHAPTER 1: INTRODUCTION.....	1
Purpose.....	4
Significance of the Study.....	5
Limitations of the Study.....	6
Definition of Terms.....	7
CHAPTER 2: REVIEW OF THE LITERATURE.....	9
Recent History of Nursing and Nursing Education.....	9
Contemporary Nursing Education.....	12
Critical Care Nursing Education.....	13
The Need for Change in Nursing Education.....	15
Instructor-and-Student-Centered Models of Academic Classroom Discourse.....	16
Critical Thinking.....	21
Rationale for Case Study Methodology.....	26
Advancement of Nursing Education.....	29
CHAPTER 3: RESEARCH METHODOLOGY AND PROCEDURES.....	32
Introduction to the Exploratory Study.....	32
Exploratory Study Design.....	33
Setting.....	33
Participants.....	34
Exploratory Study Methodology.....	34

	PAGE
Exploratory Study Instruments .....	36
Course Examinations .....	37
Traditional Approach.....	39
Case Study Approach.....	39
Exploratory Study Data Analysis.....	41
Exploratory Study Results .....	43
Exploratory Study Summary and Conclusions .....	45
Exploratory Study Implications .....	47
Purpose of the Study .....	48
Design of the Study.....	48
Case Method Classroom Setting.....	48
Participants.....	52
Case Study Methodology.....	53
Measures .....	54
Multiple Choice Course Examinations .....	54
Essay Examination Component.....	55
Videotape of Class Sessions .....	56
Procedure .....	56
Analysis .....	57
Multiple Choice Course Examination Items.....	57
Essay Course Examination Items.....	58

	PAGE
Videotaped Class Sessions.....	58
CHAPTER 4: RESULTS.....	61
Introduction.....	61
Summary of Results.....	61
Analysis of Multiple Choice Test Data.....	61
Analysis of Essay Examination Responses.....	62
Analysis of Discourse.....	72
Large Group Session 1A.....	75
Small Group Session 1B.....	77
Large Group Session 2.....	78
Large Group Session 3A.....	80
Small Group Session 3B.....	82
Large Group Session 4.....	84
Large Group Session 5A.....	85
Small Group Session 5B.....	87
Large Group Session 6.....	88
Summary.....	91
CHAPTER 5: DISCUSSION.....	93
Introduction.....	93
Summary and Conclusions of Study.....	93
Recommendations for Student Assessment.....	95

	PAGE
Recommendations for Classroom Discourse.....	96
Large Group Sessions .....	96
Small Group Sessions .....	97
Recommendations for Nursing Education.....	98
Recommendations for Further Research.....	100
REFERENCES .....	102
APPENDIX A: CASE STUDY UNIT 1: BODY DEFENSES AND BURNS .....	108
APPENDIX B: CASE STUDY UNIT 2: ACUTE NEUROLOGICAL ELECTRICAL ALTERATIONS, ACUTE BRAIN AND SPINAL CORD INJURY .....	110
APPENDIX C: CASE STUDY UNIT 3: DIGESTION, ELIMINATION AND ENDOCRINE.....	114
APPENDIX D: EXAM I.....	116
APPENDIX E: EXAM III .....	129
APPENDIX F: MAJOR CATEGORIES IN THE TAXONOMY OF EDUCATIONAL OBJECTIVES .....	144
APPENDIX G: MASTER’S ET AL. (2001) ASSESSMENT OF MULTIPLE CHOICE QUESTIONS.....	146
APPENDIX H: HOLISTIC CRITICAL THINKING SCORING RUBRIC WITH NURSING PROCESS FOR ESSAY EXAMINATION QUESTIONS 1 AND 2.....	147
APPENDIX I: COURSE CONTENT: BURNS.....	148
APPENDIX J: TRANSCRIPTS .....	164
APPENDIX K: PROFESSOR CODING RESULTS BY TOPIC AND SESSION.....	192

	PAGE
APPENDIX L: HENNING AND LOCKHART'S (2003) DISCOURSE RESPONSE CLASSIFICATION.....	193
APPENDIX M: HENNING'S (IN PRESS) BOW TIE MODEL.....	194
APPENDIX N: LARGE AND SMALL GROUP SEQUENCE WITH ASSOCIATED PROCESSES AND DISCOURSE.....	195

## LIST OF TABLES

TABLE		PAGE
1	Bloom's (1956) Taxonomy of Learning Objectives.....	23
2	Bloom's Taxonomic Classification of Examination Items.....	42
3	Comparison of Fall and Spring Groups' GPA and ACT Scores .....	43
4	Comparison of Fall and Spring Groups' Examination Scores.....	44
5	Disaggregated Comparison of Examination Results for Intervention and Comparison Groups According to Bloom's Taxonomic Levels.....	45
6	Procedure Order and Setting for Case Presentations .....	50
7	Semester Timetable for Instruction.....	51
8	Six-Step Framework, Nursing Process and Bloom's Taxonomy .....	58
9	Comparison of Multiple-Choice Examination Results .....	62
10	Essay Examination Scores .....	63
11	Exam One, Question One (Synthesis Cognitive Level): "Use the Nursing Process to Devise a Plan of Care for the Patient in the Case Study, Identifying Specific Nursing Interventions.".....	65
12	Exam One, Question Two (Evaluation Cognitive Level): "Provide Rationale to Justify Why Your Plan of Care is Warranted Over Alternative Points of View.".....	68
13	Exam Three, Question One (Synthesis Cognitive Level): "Use the Nursing Process to Devise a Plan of Care for the Patient in the Case Study, Identifying Specific Nursing Interventions.".....	70
14	Exam Three, Question Two (Evaluation Cognitive Level): "Provide Rationale to Justify Why Your Plan of Care is Warranted Over Alternative Points of View.".....	72
15	Topic 1, Session 1A (September 8, 2003) .....	77

TABLE	PAGE
16	Topic 1, Session 1B (September 8, 2003).....78
17	Topic 1, Session 2 (September 15, 2003) .....80
18	Topic 2, Session 3A (November 3, 2003).....82
19	Topic 2, Session 3B (November 3, 2003).....84
20	Topic 2, Session 4 (November 10, 2003) .....85
21	Topic 3, Session 5A (November 17, 2003).....87
22	Topic 3, Session 5B (November 17, 2003).....88
23	Topic 3, Session 6 (November 24, 2003) .....91

## CHAPTER 1

### INTRODUCTION

The role of interaction in the classroom is the subject of intense study. There is a distinct contrast between teacher-centered and student-centered approaches. The conventional teacher-centered approach de-emphasizes the discourse between teacher and students where teachers have absolute authority in the classroom (Driver, Asoko, Leach, Mortimer, & Scott, 1994). The National Center for Research on Teacher Learning [NCRTL], (1993) supports classroom interaction where research has focused on "classroom discourse that promotes the active engagement with ideas that can lead students to make knowledge their own" (NCRTL, 1993, p. 2). Driver et al. (1994) also support the intrinsic nature of science knowledge constructed through the social communication and state that learning occurs within a social context and the interaction of teacher and students, or students and students, plays an important role in learning.

Moffett and Wagner (1992) describe student-centered classrooms like this:

Thus a student-centered curriculum teaches each learner to select and sequence his own activities and materials (individualization); arranges for students to center on and teach each other (interaction); and interweaves all symbolized and symbolizing subjects so that the student can effectively synthesize knowledge structures in his own mind (integration). (p. 21)

They found that for learning to occur, learners must be provided the three basic classroom characteristics: individualization, interaction, and integration. Moffett and Wagner's (1992) describe: (a) individualization as inherent abilities and talents of each student, (b) interaction as students and instructors using a problem-solving classroom



instructional methodology, and (c) integration as professional attitudes and adaptability to real clinical problems as the core of goals for student success in nursing education.

Wiske (1998) supports student-centered discourse through “pedagogical content knowledge,” described as the “understanding of how students think about the subject matter to be understood, including the ways they tend to misunderstand and forget it” (p. 50). The value of discourse methods varies depending upon the context. Some types of knowledge, such as clinical scenarios that require judgment and decision-making, encourage discussion and discourse. Case studies are an excellent way to introduce topics, and facilitate interaction between the students and the instructor. The benefits of classroom dialogue itself can be instrumental in developing and refining students’ conceptual thinking, assisting them in development of conceptual abilities through thinking experiences that promote attention to concepts, as well as social interaction experiences (Dantonio & Beisenherz, 2001).

Other kinds of knowledge must be learned directly and do not facilitate interaction. For example, students often must understand laboratory sample values in the context of disease process in order to begin formulation of plans of care for their clients. Lab values have set limits and the student must understand principles of these values in relation to patient care planning to gain a conceptual understanding of the content. Therefore, the presentation of these facts is often the easiest and most direct manner of providing the student with knowledge of a disease or condition.

The practice of nursing requires that the health care professional demonstrates skill in critical thinking and decision making, as well as have a factual knowledge base

from which plans of care can be implemented. Application of knowledge to practice is essential for skilled care.

Van Boxtel and Roelofs (2001) support the idea of learning as a mediated process, and they suggest that allowing student discourse shapes the co-construction of meaning. This applies to nursing care for the critically ill patient through instructor and student analysis of a hypothetical case scenario. They suggest that there is more to be learned than strictly what can be found in a textbook. Their research further elaborates the following:

Textbooks may function as an extra tool to support the articulation, elaboration and co-construction of meanings when certain conditions are met. These conditions include that the students find useful information, share and compare it with hypotheses and answers that they tried to formulate before they consulted the textbook. Furthermore, it is important that students do not attribute too much authority to textbooks and change their idea that a textbook presents “finished” and “true” knowledge. (p. 60-61)

This study describes the results of a change in instructional approach from a traditional (teacher-centered) classroom to use of a case study methodology (student-centered) classroom as applied in an undergraduate critical-care nursing course. According to Berliner and Benard (1995), students need to develop a sense of their individual identity, to acquire the skills to act independently, and to have some control over their environment if they are to be independent learners at the center of their own learning. This principle is applicable within the context of critical care nursing as well. The goals of Allen College are “to encourage individuals to develop their inherent abilities to full potential, and facilitate lifelong learning, a problem-solving approach, professional adaptability and a humanistic approach to new technology” (Allen College

Philosophy Statement, 2003). In order for the college faculty to fulfill these goals, a program of nursing instruction that encourages independent thinking and use of a student-centered classroom approach was used.

This chapter provides an introduction to this study which includes a description of the focus for this study, the purpose of the study, a general discussion of concepts related to the study, a definition of terms used in the study, as well as significance and limitations of the study in the context of critical care nursing education.

### Purpose

This study describes the transformation of a critical-care nursing course from a traditional lecture-based approach to a case study approach. The traditional approach addressed the course content through teacher-centered lectures, but did not require students to actively engage in classroom discourse or apply critical thinking skills to real nursing problems. The case study approach provided students with opportunities to apply critical thinking processes in the context of simulated critical care nursing situations. A descriptive approach to this study was selected in order to describe how case study methodology, premised on higher order thinking skills and application of content knowledge, more specifically matched the goals of the nursing education program and the skills nursing professionals will be required to apply in their own practice. This study seeks to explore how students' application of content knowledge and higher order thinking skills are reflected in student speaking and writing through class discussions and written assignments. In the practice of nursing, verbal communication aids in the provision of continuous, effective care, while written documentation of appropriate

assessment and interventions are required legal parts of the patient's record of care. For this reason, the written responses of students obtained through essay examinations, as well as the verbal responses of students to specific nursing cases obtained through transcription of videotaped class discussions, were analyzed for this study.

The purpose of this study is to describe case study methodology in the context of critical care nursing education. The study is introduced with a description of an exploratory study conducted during the 2002 academic year. First, student achievement on four multiple choice tests was used in a critical care nursing course as the basis for comparison of a traditional lecture-oriented teaching approach to a case study methodology. Second, using Bloom's (1956) cognitive levels as a basis for evaluating critical thinking, two groups were compared for their performance on examinations on multiple choice items that contained critical thinking components.

Using the context provided by the exploratory study, this study describes how knowledge and critical thinking processes are influenced with the use of case study methodology. Specifically, this study seeks to describe the impact of case study methodology on nursing students' ability to apply critical thinking processes, as reflected in their writing performance on course examinations and speaking in class discussions.

#### Significance of the Study

This study represents an initial effort to investigate how a case study methodology can be used in the context of critical care nursing education, to improve students' knowledge of content specific to critical care nursing and facilitate critical thinking processes vital to clinical decision making. Improved judgment and decision making in

nursing practice are anticipated benefits to the student during their course of education and beyond. This study will contribute to a better understanding of how case study methodology can be utilized in the context of critical care nursing education through its implications to student learning as well as its use as a methodological approach to teaching. The benefit to critical care nursing education will be an alignment of a student-centered approach to content and application of clinical decision-making skills through hypothetical case scenarios in a classroom setting, though results can be generalized outside of the study only upon careful consideration of all factors surrounding the study.

#### Limitations of the Study

The limitations of this study included the relatively small sampling of students in the context of the course and the lack of applicable results to areas outside of this college or this course. Additionally, since the college is racially homogenous, it offers little ethnic or cultural diversity for the student population. The two groups represented in the pilot study may not be representative of other groups of students, within the college, or externally. Another limitation was the relatively short period of contact between instructor and student. The class met only for two hours, once weekly over the duration of a semester. The short duration limited the classroom interaction of the student and instructor, where effective group and interpersonal communication in discussions is so vital. The measurement instruments selected were most appropriate for use in describing a case study teaching methodology, however, other instruments are available.

### Definition of Terms

**Direct instruction:** Explicitly taught academic tasks in a step-by-step fashion where learning strategy interventions...provide students with appropriate modeling, practice, and feedback to master skills and cognitive strategies for independent use in a variety of situations (Adams, G. L., & Engelmann, S., 1997).

**Case study methodology:** This model is a method that promotes strategies of inquiry and the values and attitudes that are essential to an inquiring mind including: process skills (e.g., observing, collecting and organizing data), active learning, verbal expression, tolerance of ambiguity, and logical thinking (Joyce, Weil, & Showers, 1992).

**Critical thinking:** Critical thinking is the process of purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based (Facione, 1997).

**Critical care nursing:** Critical care nursing is concerned with human responses to life-threatening problems, such as trauma or major surgery, as well as the prevention of these problems. The human response can be a physiological or psychological phenomenon. Critical care nurses deal with the total human being and his or her response to actual and potential health problems. The focus of the critical care nurse includes both the patient's and family's response to illness and involves prevention as well as cure (Sole, Lamborn, & Hartshorn, 2001).

**Nursing Process:** A goal-directed series of activities where the practice of nursing is approached in systematically and orderly. The goal of the nursing process is to

alleviate, minimize, or prevent actual or potential health problems. The problems identified in the nursing process are those the nurse is qualified to evaluate and intervene by virtue of education, experience, and commitment to the goals clinical practice. (O'Toole, 2003).

**Transactional communication:** Communication that is simultaneous and multidirectional. Regardless of who is speaking at any given moment, every member is simultaneously sending signals that every other member (including the speaker) could potentially receive and interpret (Adams & Galanes, 2003).

**Transmission (Linear) communication:** The transmission model fixes and separates the roles of sender and receiver. The source is seen as the active decision-maker who determines the meaning of the message; the destination is the passive target. It is a linear, one-way model, ascribing a *secondary* role to the receiver, who is seen as absorbing information (Shannon & Warren, 1949).

**Constructivism:** A philosophical view on how we come to understand or know. Learning occurs and develops through interacting with one's environment, exploring this environment and the construction of knowledge from these experiences (Savery, 1995).

## CHAPTER 2

### REVIEW OF THE LITERATURE

In this chapter, the review of the literature focuses on how nursing practice and nursing education have evolved with parallel discussion of discourse in traditional programs of nursing to that of more contemporary programs. The review that follows includes a review of literature relating to the skills and abilities that are required of nursing faculty and students in contemporary educational programs of nursing, with critical care nursing as a discipline within nursing education. The changes that are needed in the field of critical care nursing education and its application in critical care areas of nursing is also discussed. Current literature describing critical thinking is introduced and its relation to programs of nursing and professional nursing practice. Case study methodology is introduced in the context of an approach useful for its integration of classroom content and utilization of critical thinking processes to critical care nursing education. Finally, limitations of case study methodology are reviewed with discussion of additional study necessary for the advancement of critical care nursing education.

#### Recent History of Nursing and Nursing Education

During the latter portion of the 19th century, nursing practice and nursing education went from unregulated and unpredictable to organized and standardized. At the end of the 19th century and prior to any published nursing theories, a number of visionaries in the field of nursing were engaged in the pursuit of a liberal education for nurses. These special people, rarely considered in contemporary nursing curricula, were



responsible for moving nursing education out of hospitals and into universities. This shift was primarily responsible for the development of nursing professors who never may have been necessary if nursing education remained under the auspices of hospitals (Ruby, 1999).

Many interested reformers such as nursing leaders, physicians, and lay people were concerned with the arbitrary approaches to nursing education (Baer, 1984; Glass, 1985). The efforts of these people were plagued with opposition, and part of this resistance emanated from a social climate that was not conducive to the advancement of women-centered issues. Society expected women to assume private, supportive roles rather than public, authoritative ones (Aisenberg & Harrington, 1988). The perception of nursing was an extension of women's supportive and nurturing role in the home (Ashley, 1978). However, the reformers believed society needed liberally educated nurses. Hanson (1991) explained their beliefs in the following way: "During the early decades of the 20<sup>th</sup> century, nurse educators believed the purposes of a liberal education for nurses to be the development of the individual and the citizen, the acquisition of cultural knowledge, the development of critical thinking, and the possession of a strong science background" (p. 341). The process remained arduous. Hanson adds, "The development of collegiate-level educational programs that incorporated a general education as part of the programs of study for nursing lagged behind the articulation of beliefs" (p. 341).

The first time government allowed women to nurse wounded and sick British soldiers in the Crimean War was in 1854 when Florence Nightingale took 38 women to

Turkey as nurses. Almost all modern nursing systems and techniques we know today can be traced back to her (Goldie, 1998).

As recently as 1905, training requirements for nurses varied widely from state to state. Laws regulating the practice of nursing were almost unheard of. There was no uniformity in educational requirements for nurses and schools of nursing were owned or controlled almost entirely by groups of doctors who did practically all of the teaching. Recognizing that a national emergency like war would require a large number of nurses, the Army and Navy developed and maintained a reserve of well-prepared nurses (American Red Cross, 2003). The Australian Nursing Federation summarized the current need of well-prepared nurses in this way:

As part of a modernizing agenda, across the world nurses are being challenged to review their scope of practice because of the changing context of care, clients' needs and changing approaches to care. There are strong implications arising from an understanding of the determinants of the scope of nursing practice for the education of nurses. They need to be well educated in the working of the human body and mind, but in addition they need to be well educated in attitude and judgment. Recognition of one's own limitations and one's responsibility to exercise initiative are two different skills, and can be harder to learn than the facts of human physiology or psychology. Professional judgment is something that is based on knowledge and instruction but is developed by experience, one's own and the shared experience of others. A nursing course which does not attempt to develop these aspects of professional competence, is not equipping nurses well for practice. (The Australian Nursing Federation, 1998, p. 1)

Today, the goal of undergraduate nursing education is to prepare graduates who are introduced to a variety of patient conditions, disease pathology, and clinical environments. Traditionally nurse educators taught students using various instructional approaches and clinical rotation experiences in order to broaden the depth and understanding of the complex process of nursing. One of these approaches, the use of

clinical scenarios in the classroom, encourages student participation that supports students' understanding of the clinical environment and helps them to make effective clinical decisions that result in positive patient outcomes (White, 2003).

### Contemporary Nursing Education

Contemporary nursing education emanates from a vast and complicated historical background and faces an even more complex future. What are the obligations and aspirations of nursing educators for the 21st century? Mauksch (1984) stated, "The road ahead looks brighter, not only because nurses are more free, but because the past provides achievement which generates hope" (p. 58). The challenge for nurse educators will encompass a sophisticated set of goals and a responsibility to inspire greater intellectual skills and rational thought for a rapidly changing world. Philosophical inquiry and complex technological capability framed in multiple contexts will comprise their direction as educators.

MacAlpine (1996) encouraged nurse educators to lead students in a "critical reflection on ethical stances" (p. 120). Nursing education is developing in response to the unique nature of complex human issues for nurses, and nurse educators will need to contribute to this preparation. The shift of the health care environment back to the community signifies the need for nurses in the 21st century to "be able to challenge traditional health care practices and function as morally accountable agents" (MacAlpine, 1996, p. 124). In the 21st century, the nursing profession will have an opportunity to practice more autonomously in society than ever before. With that in mind, it becomes imperative for nurse educators to move from a focus on what Mahdi (1987) called

"maintenance learning" to "innovative learning" (p. 60). In both content and pedagogy, nurse educators will be challenged to teach students to be self-teachers and to rely on their own guidance.

Effective clinical decision-making is one of the most important contributions made by health professionals in patient care (Lauri et al., 2001). Hughes and Young (1990) stated that decision-making is the clinical function that differentiates nursing professional staff from technical ancillary staff. Therefore, preparation of nurses who gather and process critical patient information to effect on patient outcomes is one goal of nursing education.

#### Critical Care Nursing Education

Critical care nursing education is valuable and necessary, and adds to the quality of preparation of students in colleges and universities of nursing. However, the history of the field is relatively brief. Additionally, leaders in nursing education have had difficulty in gaining a consensus as to the appropriate direction that the field should take. Hanson (1991) explains the historical origins in the following way: "During this period in the early 1900's, nurse educators believed the purposes of a liberal education for nurses to be the development of the individual and the citizen, the acquisition of cultural knowledge, the development of critical thinking, and the possession of a strong science background" (p. 341).

Education in critical care nursing was developed from pioneers in the field who created instructional frameworks from which to base effective classroom methodology. Much of what was used was from the medical community, was tailored to meet the

special function that nurses in providing medical care to the critically ill. Billings and Halstead (1998) write of the importance of this underlying framework from which nursing is based.

The purpose of an organizing framework is to provide for faculty and students a meaningful picture of the knowledge that is important to nursing and how that knowledge is defined, categorized, sequenced, and linked with other knowledge. A curriculum-organizing framework lends vision to a discipline's scope of knowledge. Acting as a blueprint, the framework serves to structure knowledge in a meaningful way for faculty and students, as well as administrators, evaluators, and others. (p. 124)

Additionally, the framework acts as a basis for the student to provide care to the sick. Students are taught to define, categorize, assimilate, and evaluate data. This creates opportunities in the academic setting for students to reflect on clinical situations. Dumas, Villeneuve, and Chevrier (2000) add, "This reflective type of process evaluation helps students link theory to practice, think critically, and intervene creatively and professionally in very complex situations" (p. 252). They go on to add that the process of learning that nursing students go through in the clinical setting, consists of integrated cognitive, affective, and behavioral components (Dumas et al., 2000).

The preparation of nurses to perform adequately after graduation holds several implications for nurse educators in critical care as well. Fagin and Lynaugh (1992), add that society expects nurses to be independent thinkers, be able to solve problems rapidly, adapt swiftly to change, and work toward continuous personal and professional improvement. Hamilton (1992) and Kelly (1986) support this notion as well. These researchers add that, in general, society requires professionals to prove their autonomy by making sound decisions in emergent situations, transfer their knowledge rapidly from one

function to another, and be committed and efficient in very complex situations. In order for nurses to function in this way, their educational preparation had to have provided them principles of critical care education, as well as clinical experiences to facilitate their learning.

### The Need for Change in Nursing Education

Use of case studies in education is not a new phenomenon. Since its introduction in the 1950s, it has become a recognized instructional methodology in medical schools worldwide (Alavi, 1995; Albanese & Mitchell, 1993). More recently, the idea has filtered into schools and colleges of nursing. Recently, administrative leaders have called for reorganization within nursing education. One aspect of the changes, include developing improved methods of content delivery. The method in which the content is delivered, facilitates a student's ability to integrate that new material into their skills and behaviors as future nurses. At a recent conference of the National League for Nursing (NLN), McGovern and Valiga (1997) summarized it this way:

The goals of baccalaureate nursing education and the National League for Nursing accreditation criteria for baccalaureate programs (NLN, 1992) call for increasing emphasis on cognitive development, which refers to the way in which individuals reason, view knowledge, manage diversity of opinion and conflicting points of view, and relate to authorities or experts. Students who demonstrate cognitive growth are able to employ independent decision-making, provide nursing care despite conflicting or ambiguous information, engage in critical thinking, and appreciate that a particular decision may be right for some but not for others. (p. 33)

Daggett, Butts, and Smith (2002) support the idea of tailoring nursing education in this way:

If nurse educators are to produce valuable and competent nurse clinicians who can prevail over rapid changes, a focus on educational outcomes should be the pivotal

point when redesigning a curriculum. Outcomes, or attributes, that nurse educators want their graduating nursing students to possess should be delineated before the actual revision of the curriculum occurs. The outcomes then serve as the driving force for the revision and are reflected throughout the new. (p. 36)

Case study methodology is one way that nursing educators can meet the challenge of the change the nursing profession has experienced, while providing a contextual environment to understand a wide variety of scenarios. Kolb (1984) is a pioneer in experiential learning and comments, “learning is the process whereby knowledge is created through the transformation of experience” (Kolb, 1984, p. 38).

#### Instructor-and-Student-Centered Models of Academic Classroom Discourse

The instructor-centered model is a frequently used instructional model at the university and college levels, including teacher education institutions (Baiocco & DeWaters, 1998; Tharp & Gallimore, 1988). According to the theory underpinning this model, learning occurs by the transmission of knowledge from the instructor to the student. Therefore, instructors control the learning process by making decisions about what information to transmit and how to sequence it. This is similar in definition to Adams and Galanes (2003) view of linear communication as a model that fixes and separates the roles of sender and receiver. The source (instructor) is seen as the active decision-maker who determines the meaning of the message; while the destination is the passive target (student).

Professors who view students in this way substantiate that the role of the student is to acquire the information and demonstrate adequate knowledge acquisition. Predictably, activities in a many courses are based on the instructor-centered model that will include presentations, lectures, and tests of knowledge.

When knowledge and learning are viewed as measurable and defined products, a course developed under this model will have a clear beginning and ending regulating how much knowledge can be transmitted. In most North American universities the traditional academic year is parceled out into semesters or quarters. Materials in an instructor-centered model include syllabi, reading lists, predetermined assignments, and tests, all of which are connected with the sequencing of transmitted knowledge. Usually, the classroom is organized with students in rows of chairs or desks facing the instructor to facilitate transmission.

Courses and programs organized under principles of a student-centered model are more rare, especially at the undergraduate level (Tharp & Gallimore, 1988). The primary principle of the student-centered model is student control of the learning process. The role of the instructor in the student-centered model is to provide learning opportunities and present possibilities for study, encouraging student exploration and discovery. Students consider the opportunities and possibilities and make the final choices about what they will learn, how, and when. The dominant activities in a student-centered approach include self-initiated and self-assessment of learning performances. In contrast to a more linear model of communication described above, Adams and Galanes (2003) support that student-centered classrooms have a more transactional communication format. Transactional communication, in this context, describes communication that is simultaneous and multidirectional. Every member (instructor and student) is simultaneously sending signals that every other member could potentially receive and interpret. This has the potential to increase classroom dialogue and enhance student



learning opportunities. Students may choose to work in pairs or groups, but collaboration is not a primary principle of the student-centered model (Tharp & Gallimore, 1988).

Student-centered classrooms encourage open discussion of core concepts related to defined learning objectives. Van Boxtel and Roelofs (2001) research supports conceptualized learning in this way:

A collaborative learning situation has a high potential to stimulate students to discuss the meanings of concepts. The students must negotiate goals, represent problems, and understand the meaning of concepts and procedures. Students have to make their thoughts verbally explicit. Due to the need to communicate coherent explanations, the students can gain more conceptual clarity for themselves (Damon & Phelps, 1989). The articulation of their own ideas can also elicit questioning and argumentation. Thus, when student discourse is expected to contribute to the appropriation of domain specific concepts, it is important to know to what extent students actually talk about the meaning of the concepts and whether they try to use the concepts to describe or explain physical phenomena. From a domain specific perspective it is also important to know whether frequently occurring misconceptions within the domain are articulated and discussed. (p. 55-56)

Mercer (1995, 2000) adds that the process of asking questions, interpreting student responses, and responding by the teacher can be described by a few fundamental discourse actions that many teachers use to guide student thinking and open discourse.

Henning's (in press) "bow tie" model (Appendix N) is one conceptual framework used for discourse evaluation in academic classrooms. This model represents instructor use of open-ended questions in initial classroom sessions to stimulate dialogue. An instructor at the beginning of a class may ask an ethical question, for example, because ethical questions promote responses that many students can relate to and have opinions on. The open dialogue encourages student participation and provides an environment conducive to talking.

Similarly, at the conclusion of class sessions, an open-ended question provides students the opportunity to integrate content knowledge into their responses. Often, a follow-up question allows students to incorporate information learned into their response. For example, a student may incorporate technical language and concepts into a discussion regarding treatment of a burn patient. Alternatively, introductory open-ended questions may not elicit such technical or conceptual responses (Henning, in press).

The “middle” of the bow tie represents a period of time in class sessions where discourse is closed, and according to Henning’s model, this provides the instructor an opportunity to provide students with essential information related to course content. An example includes discussion of accepted laboratory values of burn patients where there are definite right or wrong answers. An instructor may continue to encourage participation from the students in this portion of the model; however, essential course content is provided for the students applied in the context of the case scenario. This may represent only a small period of time in the context of the entire course, but may be a necessary part of the course.

Through creation of opportunities for classroom discourse, the “bow tie” provides the opportunity for open teacher-to-student and student-to-student interactions. The extent to which students are assigned roles requiring them to think, interpret, and generate new understandings becomes an important consideration in structuring classes to promote open discourse. Kachur and Prendergast (1997) argued:

it may be misleading to attempt to capture classroom interactions by simply attending to discrete discourse features. Instead, examination of not only the teacher questions but also the teacher-student dialogue in which the questions were posed is necessary to illuminate the complexity of classroom discourse.

Both students and instructors are involved in the process of making meaning, so that this jointly constructed activity supported pupils in becoming self-extending, engaged participants in the language learning process. (p. 80)

Henning and Lockhart (2003) developed a framework for evaluation of discourse based on Mercer's work and included the use of techniques to encourage student participation and create open environments for discussion. Examples of criteria in the framework include: "elicitations, confirmations/rejections, reformulations, repetitions, elaborations, and recaps" (p. 52). This framework was used in this study to evaluate transcripts for concepts of classroom discourse and is explained in detail in Chapter 3. The framework is provided in Appendix L.

Henning's work aligns with The Center for Teaching Excellence (2003) that has outlined standards for encouragement of open discourse in the classroom to facilitate higher order critical thinking. Specifically, this standard reads,

Discussion and discourse results by posing appealing, challenging and purposeful questions. Discussions lead to deeper student responses. It causes connections between and among ideas and assists in problem solving. Discussion can lead to students respecting each other. It becomes a venue for students to develop, refine, reflect upon, and monitor their own thinking. It is a place where the teacher can see the collective mind of the students. (Standard 3.3)

Suggested patterns of discourse that encourage low-level and high-level thinking questions are discussed as well. Low-level questions are those that require students to respond using relatively straightforward thought processes. For example, low-level questions are used to determine how well students are prepared for a task, diagnose gaps in students' knowledge, and summarize information students will use to perform a task. In contrast, high-level thinking questions demand integrated critical thinking. Examples of high-level questions are intended to help students find solutions to complex problems,

drive a discussion to a deeper level, and encourage students to think in new ways (Center for Teaching Excellence, 2003).

Facione et al. (1994) outline critical thinking in the context of the nursing process as a focus on critical thinking as purposeful judgment where emphasis has been placed on decision-making in the context of an identified problem, goal, desired outcome, purpose, etc. It implies giving "reasoned consideration to evidence, contexts, conceptualizations, methods, and criteria which allows for the consideration of the wide diversity of contexts that accompany nursing practice needs for creative, personalized solutions to unpredictable client circumstances" (p. 347). They mention that the consideration of the context, criteria, and evidence that are relevant to a given problem, as well consideration of the purpose of the process of critical thinking is important in the process. Evaluation of instructor discourse and the extent to which this facilitates open classroom discourse provides a conceptual foundation for evaluation of student thinking.

### Critical Thinking

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action (Elder & Paul, 1998). It entails the examination of structures or elements of thought in all reasoning that leads to conclusions or implications. Critical thinking-in being responsive to variable subject matter, issues, and purposes-is incorporated in a family of interwoven modes of thinking, among them:

scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking, and philosophical thinking.

Critical thinking can be seen as having two components: (a) a set of information and belief generating and processing skills and (b) the habit, based on intellectual commitment, of using those skills to guide behavior. It is thus to be contrasted with: (a) the mere acquisition and retention of information alone, because it involves a particular way in which information is sought and treated; (b) the mere possession of a set of skills, because it involves the continual use of them; and (c) the mere use of those skills (as an exercise) without acceptance of their results (Paul, 1993).

Modern critical thinking theory finds its roots primarily in the works of Benjamin Bloom's (1956) taxonomy of learning objectives. He classified learning behaviors in the cognitive domain according to six levels ranging from Knowledge (recitation of facts) to Evaluation (complex valuing and weighing of information; Table 1). Each level relates to a higher level of cognitive ability.

Table 1

*Bloom's (1956) Taxonomy of Learning Objectives*

Cognitive Level	Definition/Example
Knowledge	<p>Focuses upon the remembering and reciting of information. Behavioral verbs often linked with this level are: identify, list, label, name, recall, define, locate, recognize, match, and reproduce.</p> <p>Example: The student will list the six levels of Blooms Taxonomy of Learning Objectives in ascending order.</p>
Comprehension	<p>Focuses upon relating and organizing previously learned information. Behavioral verbs often linked with this level are: explain, relate, generalize, predict, summarize, paraphrase, restate, convert, and demonstrate.</p> <p>Example: The student will explain Blooms Taxonomy of Learning Objectives.</p>
Application	<p>Focuses upon applying information according to a rule or principle in a specific situation. Behavioral verbs often linked with this level are: Solve, choose, interpret, make, put together, change, apply, produce, translate, and construct.</p> <p>Example: The student will construct six learning objectives, one from each level of Blooms Taxonomy of Learning Objectives.</p>
Analysis	<p>Critical thinking which focuses upon parts and their functionality in the whole. Behavioral verbs often linked with this level are: Analyze, compare, categorize, take apart, differentiate, examine, subdivide, distinguish and contrast.</p> <p>Example: The student will distinguish which level of Blooms Taxonomy of Learning Objectives is implied in a list of ten learning objectives.</p>
Synthesis	<p>Critical thinking which focuses upon putting parts together to form a new and original whole. Behavioral verbs often linked with this level are: Invent, create, combine, hypothesize, plan, originate, add to, imagine, and forecast.</p> <p>Example: The student will create a lesson using Blooms Taxonomy of Learning Objectives.</p>
Evaluation	<p>Critical thinking which focuses upon valuing and making judgements based upon information. Behavioral verbs often linked with this level are: Assess, recommend, critique, evaluate, criticize, weigh, and value.</p> <p>Example: The student will critique a classroom teacher's questioning behavior.</p>

Kindsvatter et al. (1991) add,

Learning consistently takes place when critical thinking is combined with relevance. Students need to find personal meaning in the curriculum for it to "sink deep" and last long. Long-term storage criteria for "learned" information: survival, enjoyment, or pain. The remainder of the curriculum is mentally jettisoned after the final assessment. (p. 125)

Facione and Facione (1997) suggest that the very core of critical thinking is interpretation, analysis, evaluation, inference, explanation, and self-regulation. They add that interpretation is the comprehension and expression of meaning or significance of a wide variety of experiences, situations, events, judgments, and beliefs. Interpretation includes the sub-skills of categorization, decoding significance, and clarification of meaning. This is the basic level upon which the others are based.

Analysis refers to identification of the intended and actual inferential relationships among statements, questions, or concepts that are intended to express a belief in an idea, judgment of a situation, or personal opinion. The experts include examining ideas, detecting arguments, and analyzing arguments as sub-skills of analysis.

Evaluation refers to the ability to assess the credibility of statements or other representations that accounts for an individual's description of perception or experience. Evaluation helps the individual to assess the logical strength of the relationships among statements or questions.

Inference refers to the identification of secure elements needed to draw reasonable conclusions and to the formation of hypotheses that consider relevant information from consequences flowing from data, judgments, and beliefs. As sub-skills of inference, the experts list statements of evidence, consideration of alternatives, and the ability to draw

conclusions as important aspects. Students should explain what they think and how they arrived at that judgment. Additionally, they should apply critical thinking strategies to improve on their previous opinions.

Explanation refers to the ability to state the results of one's own reasoning and a justification of that reasoning based on evidence upon which the results were based.

Explanation includes presenting one's reasoning in the form of a valid argument.

Examples of the above categories include: to examine personal views on a controversial issue with sensitivity to the possible influences of biases or self-interest, to monitor understanding or comprehension of something, to separate personal opinions and assumptions from those of the author of a passage or text, to double-check by recalculation of figures, to vary reading speed and method according to the type of material and purpose for reading, to reconsider interpretation or judgment in view of further analysis of the facts of the case, to revise answers in view of the errors discovered in the work, and to change the conclusion in view of the realization of misjudgment of the importance of certain factors in coming to an earlier decision.

Critical thinking by its very nature requires the systematic monitoring of thought. Thinking, to be critical, must not be accepted at face value but must be analyzed and assessed for its clarity, accuracy, relevance, depth, breadth, and logic. We now recognize that critical thinking, by its very nature, requires the recognition that: all reasoning occurs within points of view and frames of reference; proceeds from some goals and objectives; has an informational base; all data, when used in reasoning, must be interpreted; interpretation involves concepts; concepts entail assumptions; and that all basic



inferences in thought have implications. We now recognize that each of these dimensions of thinking needs to be monitored and problems of thinking can occur in any of them.

In other words, questioning that focuses on these fundamentals of thought and reasoning are a basis for critical thinking. Intellectual errors or mistakes can occur in any of these dimensions and students need to be fluent in talking about these structures and standards. Independent of the subject studied, students need to be able to articulate thinking about thinking that reflects basic command of the intellectual dimensions of thought. Paul and Elder (2002) summarize in the following way:

Students need to ask questions like: "Let's see, what is the most fundamental issue here? From what point of view should I approach this problem? Does it make sense for me to assume this? From these data may I infer this? What is implied in this graph? What is the fundamental concept here? Is this consistent with that? What makes this question complex? How could I check the accuracy of these data? If this is so, what else is implied? Is this a credible source of information?, etc..." With intellectual language such as this in the foreground, students can now be taught [to use] critical thinking moves within any subject field. What is more, there is no reason in principle that students cannot take the basic tools of critical thought which they learn in one domain of study and extend it, with appropriate adjustments, to all the other domains and subjects they study. In principle, then, all students can be taught so that they learn how to bring the basic tools of disciplined reasoning into every subject they study. (p. 2)

#### Rationale for Case Study Methodology

Nursing educators are continually challenged to find effective methods in which to deliver their content. Historically, educators have employed a more traditional approach to delivery of the curriculum. That is, the instructor provides all of the content that the student needs to know in a lecture presentation format. Although this method is effective in some contexts, case study approach appears to deepen students' understanding of the content. Case studies emphasize problem-based scenarios, and

challenge students to organize creative solutions to complex problems. Bromley (1990) defines a case study as, “A systematic inquiry into an event or a set of related events, which aims to describe and explain the phenomenon of interest” (p. 300). Additional support comes from Zucker (2001) in that case study method can be used as an alternative to a more traditional approach where description and emphasis on the patient's perspective is central to the process.

Karen Soy (1996) teaches undergraduate nursing at the University of Texas at Austin, and has used a case method approach for several years. She describes the use of this approach in this way:

Case studies are complex because they generally involve multiple sources of data, may include multiple cases within a study, and produce large amounts of data for analysis. Researchers from many disciplines use the case study method to build upon theory, to produce new theory, to dispute or challenge theory, to explain a situation, to provide a basis to apply solutions to situations, to explore, or to describe an object or phenomenon. The advantages of the case study method are its applicability to real-life, contemporary, human situations and its public accessibility through written reports. Case study results relate directly to the common reader's everyday experience and facilitate an understanding of complex real-life situations. (p. 2, unpublished course syllabus)

The clinical experiences that students have are equally important in the effective use of a case method approach. It is the clinical application of the principles and theory that students learn in the classroom, that sets this method apart from the traditional delivery method. Chan (2002) supports this notion in the following way: “Clinical education is a vital component in the curricula of nursing programs because it provides student nurses with opportunities to develop competencies in nursing practice. The clinical learning environment is a multidimensional entity with a complex social context” (p. 70). Fisher and Parkinson (1998) have had similar success in using a case method

approach that combines theory and clinical application. In a recent journal article, they explain it like this:

The results from the two classes indicated it is possible to improve the learning environment of a nursing education classroom. In each group there was a change in the learning environment toward the preference of the students. The instructor's own observations reinforced this view, as greater motivation and cooperation was detected in the classes. It was believed the whole process had been worthwhile for the students and the instructor. An additional outcome for the students was a sense of empowerment the experience provided. (p. 10)

Moos (1974), has used a case method approach for almost three decades and provides an imperative historical description of the approach. Important to this research was, again, the necessary relationship between theoretical understanding of the primary concepts, and a clinical application which contextualizes the students' understanding of those concepts.

The three dimensions are: relationship dimensions (e.g., involvement) which identify the nature and intensity of personal relationships within the environment and assess the extent to which people are involved in the environment and support and help each other; personal development dimensions (e.g., student cohesiveness) which assess personal growth and self-enhancement; and system maintenance and system change dimensions (e.g., innovation) which involve the extent to which the environment is orderly, clear in expectations, able to maintain control, and responsive to change. (p. 3)

With an introduction to the historical foundation of nursing education and an exploration of how a case method approach may improve and enrich understanding of content, I provide examples of cases used in the course in Appendices A to C. The essence of the case is to provide the student with a brief introduction to the patient and to provide some necessary background information to narrow the focus to the topic being discussed. The idea is to provide enough information for the student to apply some of the concepts that have been covered theoretically, but also, to leave the student with

questions that the case does not answer. The intention is that the lack of information will stimulate dialogue in the classroom, as well as challenge students to find the answer to the questions they still have.

#### Advancement of Nursing Education

The presentation of the case study drives the process of learning, not the presentation of subject content or knowledge, such as in lecture-based presentation. Hence, the starting point is a real world phenomenon or problem the learner wishes to learn more about, i.e., a problem that is relevant from the perspective of the learner's future profession (Nulden & Scheepers, 1999). An example of this is when the student groups research care of the burn patient. They are given a case in which they must actively engage current literature to find the most common treatments and care of the burn patient. The students' learning will be reinforced when they are provided clinical experience in the hospital setting.

Typically, success is found in small groups of students. The group is an important resource for the learning process, through a constructivist approach, that includes social interaction and collaboration among the learners (Slavin, 1990). This method has implications for advancing nursing research, particularly nursing theory development and the generation of patient-sensitive nursing interventions (Zucker, 2001). In general, the research points to the fact that students schooled in case study methodology are better able to apply their knowledge of the clinical sciences and have better developed clinical reasoning skills than those students who receive traditional instruction (Lewis, Buckley, Kong, & Mellso, 1992). This method is quite different from lecture-based presentation

formats where rote memorization of the material is common. Case study methodology, in contrast, allows students to use relevant patient cases they are likely to encounter in future practice, thus providing a clinical context as a stimulus for learning (Woody, Albrecht, & Hines, 1999). Clinical experiences augment the theoretical material that the students learn in the classroom. This encourages a link between theory and practice as well as the development of cognitive skills by using real-life scenarios. On completion of the module, it is expected that practitioners will be better skilled and more confident in problem-solving and possess a range of strategies that can be used effectively in their daily professional life (Matthews-Smith, Oberski, & Gray, 2001).

Norman and Schmidt (1992) describe three main roles of a case study approach. The first is the acquisition of factual knowledge (lab values, technical or procedural knowledge), the second is the mastery of general principles or concepts that can be transferred to solve similar problems (transfer of theory into application), and third, the acquisition of prior examples that can be used in future problem-solving situations of a similar nature (clinical application).

In this environment, emphasis is given to student interaction and knowledge, based on students' life experiences. Cliff and Wright (1996) suggest that the directed case study approach consists of specific defined learning objectives, a true-to-life case scenario, pertinent thought provoking questions, and suggestions for additional learning resources as needed. The model used for the purposes of this study is described in the design section of this paper.

The course itself can be an environment in which the student develops a personal ability to communicate professionally. Sedlak (1997) adds, using actual or hypothetical case studies, students build their skills on problem-solving, various health situations, and verbalizing how they feel about different issues. Professional attitudes develop, as this clearly encourages the nursing students to express their attitudes, beliefs and values, ultimately assisting them in implementing optimal care to their clients and patients. The student develops professional relationships and develops critical thinking ability in problem solving. Boud and Feletti (1991) advocate this as a way of learning and a teaching methodology actively engaging students in the modification of attitudes and values. It is grounded in the belief that learning is most effective when students are actively involved and learn within the context that the knowledge is to be used. The combination of theoretical knowledge with an application-oriented clinical experience, enhances students' learning of the content.

Many colleges of nursing and national accreditation agencies in nursing education, support student-centered approaches and encourage student critical thinking in academic settings. Literature supports that open discourse in classrooms occur as a result of inductive teaching methods and meet the aims described. Further, evaluation of instructor discourse provides the degree to which academic classrooms encourage student participation when a teaching approach like case study methodology is used. Therefore, the use of case study methodology in nursing education may serve to promote knowledge acquisition and encourage student participation in classroom dialogue, and formed the basis for this study.

## CHAPTER 3

### RESEARCH METHODOLOGY AND PROCEDURES

This chapter begins with a description of an exploratory study conducted during the 2002 academic year that provided a basis from which the dissertation evolved. The exploratory study section includes: exploratory study design, procedure, results, analysis, summary, conclusions, and implications. The exploratory study describes the use of case study methodology in the context of critical care nursing education.

The dissertation study followed the exploratory study. It described the implementation of alternate forms of student assessment and included an evaluation of classroom discourse that was used to support inductive, student-centered classrooms when case study methodology was used. A discussion of the research methodology for the dissertation, with: a statement of the purpose, the design of the study, the procedure, and an analysis of the data concludes Chapter 3.

#### Introduction to the Exploratory Study

First, student achievement on four multiple choice tests was used in a critical care nursing course as the basis for comparison of a traditional lecture-oriented teaching approach to a case study methodology. Second, using Bloom's (1956) cognitive levels as a basis for evaluating critical thinking, two student groups were compared for their performance on examinations on multiple choice items that contained critical thinking components.

Class sessions were videotaped, transcribed and coded as a method to evaluate students' ability to use case study method to learn critical care nursing content in the context of discussion that was student-led.

Using the context provided by the exploratory study, this study describes how knowledge and critical thinking processes are influenced with the use of case study methodology. Specifically, this study seeks to describe the impact of case study methodology on nursing students' ability to apply critical thinking processes, as reflected in their writing performance on course examinations and speaking in class discussions.

### Exploratory Study Design

#### Setting

The setting used for the exploratory study was a private nursing college in the Midwest. The college contained both baccalaureate and graduate programs of nursing, as well as other programs in allied health. The course utilized as the setting for examination of the effect of case study methodology, and was titled, NU:270, Nursing Care of the Client with Complex Needs. The course was the student's final theory/clinical combination before graduation.

Two instructors provided content and supervised clinical experiences for students. The class met weekly for two hours, one day per week throughout the semester where both course instructors implemented case study methodology in the classroom to deliver course content. Case study methodology is described in detail later in this chapter. Clinical groups were divided into three sections of 6 to 8 students that met weekly for 8 hours, in the hospital setting, eight times during the semester. Clinical experiences were designed to be supplemental and allow for reinforcement of theoretical content.

The instructors for the course mutually defined course objectives at the beginning of the semester where instruction and sequencing of examinations were planned. The principal investigator for this study (and one of the two instructors for the course) delivered content related to burn care, renal failure, brain and spinal cord injury, and liver



failure. Two examinations (course exams one and three) were administered to the students that reflected this content.

The other course instructor delivered content that covered cardiac and respiratory alterations, shock, and multi-system organ failure. Two additional examinations (exams two and four) were administered to reflect this specific content.

### Participants

All participants ( $n = 46$ ) were full-time students enrolled in the critical care nursing course. Two groups were divided by the semester in which they enrolled in the course ( $n = 23$  fall,  $n = 23$  spring). The participants ranged in age from 21 to 27 years of age; all 46 were female. Racial groups represented included: 44 Caucasian, 1 Native-American, and 1 African-American.

### Exploratory Study Methodology

The methodology for this study evolved from an exploratory study conducted during the 2002 academic year. The idea for the study originated after an analysis of the course revealed inefficiencies in the manner in which the course was taught. Faculty that taught the course consistently had difficulties covering all of the objectives in the time frame provided. Often, there was much more material to cover than time available to teach it.

Additionally, the course faculty became frustrated with lecturing to the students. Often, the faculty would stand and deliver course content for the full two-hour time frame. Several concerns surfaced as we recognized the need for a change. The students would interact only occasionally and would complain that the lectures were boring and uninteresting. Additionally, the course content was new to the students, and replete with difficult concepts to attain. This course was an introduction to critical care nursing, and

many students commented that they wanted examples of patient scenarios, in the context of course content, that reinforced learning objectives. The desire and willingness of faculty for a change in delivery method, in addition to students' desire for more examples that encouraged learning, set the context for developing the course into case study format. An intervention group of students during the spring semester of 2003 was instructed using the case study methodology and a comparison group of students was instructed during the fall semester of 2002 using direct lecture-based instruction. In order to focus the study on the differences resulting from two distinct methodological approaches to instruction, the fall comparison group was instructed using only traditional methodologies. The spring intervention group was instructed using case study methodology only. The instructors purposely avoided traditional approaches to instruction with the spring group.

A case study methodology approach seemed to fit naturally with the needs addressed previously. The course lent itself to opportunities for discussion and case studies provided situational learning opportunities for students, as a way of making learning more realistic and interactive. Case studies seemed to create an opportunity for students to gain knowledge of critical care nursing, and an opportunity to apply critical thinking processes in hypothetical case scenarios. This combination of knowledge and critical thinking processes, reinforced concepts vital to preparation of nurses that enter the professional workforce after graduation. The purpose of this exploratory study was to compare the case study methodology to traditional instructional approaches. To achieve this purpose, data from course examinations were compared for each group.

Specifically this exploratory study sought to answer:

1. How does the application of direct instruction enhance student knowledge in the context of critical care nursing education?
2. How does the application of direct instruction enhance student ability to apply critical thinking processes in the context of critical care nursing education?
3. How does the application of case study methodology enhance student knowledge of critical care nursing?
4. How does the application of case study methodology enhance student ability to apply critical thinking processes in the context of critical care nursing education?

#### Exploratory Study Instruments

The instruments used in this exploratory study included entrance American College Testing (ACT) scores, overall college grade point average (GPA), and course examination scores. The two groups' entrance ACT scores and overall GPA were compared to support equivalency between groups.

Course examinations. Course examinations questions were derived from two main sources: from the textbook that accompanied the course, and from faculty who wrote questions themselves. A computer disk accompanied the faculty version of the text, with a test bank of questions related to the chapter material. Other course examination questions were written by course faculty to address course goals not reflected in the text material. All utilized a multiple-choice format. An item analysis of test items was completed using Bloom's (1956) taxonomy of educational objectives to evaluate the level of cognitive complexity of the multiple choice questions found in the course examinations.

Although controversy exists regarding the level to which multiple choice questions accurately reflect higher cognitive level assessment, Morrison and Free (2001)

assert that multiple-choice test items written at the application level or above are representative of critical thinking questions. Masters et al. (2001) claim that the first four levels of Bloom's taxonomy are representative of multiple-choice questions on standardized nursing certification exams and state: "The National Council on Licensure Examination for Registered Nurses (NCLEX-RN) does not assess graduates at the synthesis and evaluation (cognitive) levels: these cannot be assessed with multiple-choice questions" (p. 26). Item analyses were conducted on all examination items and an example of exam one can be found in Appendix D. See Appendix F for an explanation of Bloom's cognitive levels, including Levels 5 and 6.

The item analysis of the four course exams conducted by the course faculty served as a means of classification of individual items, which varied according to the first four levels of the taxonomy and identified various levels of critical thinking within the questions. The analysis of examination items was performed based on a refined version of Morrison and Free's (2001) research on analysis of multiple choice test items that promote and measure critical thinking: multi-logical thinking and verbs commonly associated with categories of cognition.

The first of two steps involved in item analysis began with determination whether the question involved multi-logical thinking. Paul (1993) defines multi-logical thinking and multi-logical problems as one's ability to view problems from different perspectives. Thus, if the question required more knowledge than one fact or assumption to answer, it was categorized as multi-logical. If the question was multi-logical, it was categorized as a higher level (Bloom's application or analysis levels), rather than lower level (Bloom's knowledge or comprehension levels). Morrison and Free (2001) explain the process in this way:

An easy way to determine if a question meets the criterion of requiring multi-logical thinking to answer is to ask if the student must know more than one concept, construct, or fact to answer the test item. If the answer to a test item can be found on one page of a text, it is not a critical-thinking test item. In such a case, the item would be knowledge-based because it would only require memorizing that portion of the text, and it would therefore not meet the criterion for multi-logical thinking. To challenge students to think critically, test items must require the ability to relate and apply concepts to clinically oriented situations. Such multi-logical test items promote critical thinking as well as measure the students' ability to think critically within the discipline of nursing. (p. 20)

The examination items were then categorized based on the verbs that are commonly associated with each of the first four levels. Morrison and Free (2001) provide a listing of such verbs listed previously in this section. For example, if the question was identified as non multi-logical and contained the verbs "identify" or "name," the question was listed as knowledge level. If the question was identified as non multi-logical and contained the verbs "describe" or "explain," the question was listed as comprehension level. For questions that were categorized as multi-logical and contained verbs such as "apply" or "classify," the question was listed as application level. For questions categorized as multi-logical and contained the verbs "compare" or "determine," the question was listed as analysis level. This process was completed for all 280 examination items by the course instructors.

#### Traditional Approach

Students enrolled in the fall semester, the comparison group, were provided the traditional lecture based presentation. This instructional method involved a highly-structured, teacher-centered approach, where the instructor directed and controlled the course. Faculty selected learning tasks, determined the pattern in which it was given, minimized discussion of central points, and maintained a central role during the instructional process (Joyce & Weil, 1986).

This traditional approach was followed in the context of the critical care course. Content was provided to students from an outline of the material in the textbook. Two instructors provided content for the students. The class met weekly for two hours, one day per week throughout the semester. The course started with a stated review of objectives listed in the course syllabus. Course examinations were administered four times and the last examination was comprehensive. The faculty taught the content matter in approximately two hours, once per week, for 12 weeks in the fall semester. Lecture was not held on test days.

#### Case Study Approach

Students who enrolled in the spring semester were treated as the intervention group and were instructed using case study methodology. Students formed groups of three students and utilized the six-step process to analyze the case scenario. With this approach the teacher acted as a facilitator and resource person. A typical class session began with a stated review of objectives and sharing of student/faculty experiences related to the content matter.

The six-step case study approach to nursing education developed by Stepien, Gallagher, and Workman, (1993) provided the framework for this study. Because this model was developed in the specific context of nursing education and contained the elements common to most case study methodologies, it was selected for this study. In the context of the case study approach, students were given a case study that related to that week's content, and were asked to work in pairs or groups of three. Students immediately began talking about information within the case and established dialogue among themselves and the faculty. Discussion was rich within the groups and students created thought-provoking questions about the case.

Students proceeded through the six steps of the model, while the course instructor acted as a guide and facilitated the students' learning. In the course of discussion, the instructor asked how assumptions were made related to care of the hypothetical patient. A review of how specific course content knowledge applied in the context of the case was introduced at this point, and discussion focused on questions generated by students. This provided opportunities for learning outside the classroom and better utilized class time for discussion on concepts of care related to critical care nursing.

The six-step model of case study methodology used in this study by Stepien, Gallagher, and Workman (1993) is presented below.

*Present the problem statement.* Introduce an "ill-structured" problem or scenario to students. They should not have enough prior knowledge to solve the problem. This simply means they will have to gather necessary information or learn new concepts, principles, or skills as they engage in the problem-solving process.

*List what is known.* Student groups list what they know about the scenario. This information is kept under the heading: "What do we know?" This may include data from the situation as well as information based on prior knowledge.

*Develop a problem statement.* A problem statement should come from the students' analysis of what they know. The problem statement will probably have to be refined as new information is discovered and brought to bear on the situation. Typical problem statements may be based on discrepant events, incongruities, anomalies, or stated needs of a client.

*List what is needed.* Presented with a problem, students will need to find information to fill in missing gaps. A second list is prepared under the heading: "What

do we need to know?" These questions will guide searches that may take place on-line, in the library, and in other out-of-class searches.

*List possible actions, recommendations, solutions, or hypotheses.* Under the heading: "What should we do?" students list actions to be taken (e.g., questioning an expert), and formulate and test tentative hypotheses.

*Present and support the solution.* As part of closure, teachers may require students to communicate, orally and/or in writing, their findings and recommendations. The product should include the problem statement, questions, data gathered, analysis of data, and support for solutions or recommendations based on the data analysis.

#### Exploratory Study Data Analysis

Analysis of the data included simple descriptive statistics for evaluation of ACT and GPA as measures of support for equivalency, and a t-test for evaluation of examination scores as a basis to describe differences between groups as statistically significant.

Course examinations were composed of multiple-choice items that represented content knowledge of core concepts in critical care nursing education. An item analysis of the examination questions was conducted as a means of classification of individual items, which varied according to Bloom's taxonomy. The purpose of this analysis was to identify various levels of critical thinking within the questions.

The analysis of examination items was performed based on Morrison and Free's (2001) research on analysis of multiple choice test items that promote and measure critical thinking. Table 2 displays the results of applying Bloom's taxonomic Levels 1-4, to all examination items. The results of Examination 1 display nearly equal representation of each of the level of Bloom's taxonomy. The results of Examination 2



display fewer Level 1 items (9%), a higher percentage of Level 2 items (39.7%), and nearly equal representation of Level 3 and Level 4 items. The results of Examination 3 represent fewer Level 1 (15.6%) and Level 3 (14.1%) items, while nearly 70% of items are in Levels 2 and 3. No Level 4 items were represented. The results of Examination 4 display nearly equal distribution of Levels 1 through 3, while less in Level 4 (13.8%).

Table 2

*Bloom's Taxonomic Classification of Examination Items*

Examination Number	Knowledge Level	Comprehension Level	Application Level	Analysis Level
1: 58 items	<i>n</i> = 14 (24.1%)	<i>n</i> = 16 (27.6%)	<i>n</i> = 14 (24.1%)	<i>n</i> = 14 (24.1%)
2: 78 items	<i>n</i> = 7 (9%)	<i>n</i> = 33 (39.7%)	<i>n</i> = 20 (26.9%)	<i>n</i> = 18 (24.4%)
3: 64 items	<i>n</i> = 10 (15.6%)	<i>n</i> = 22 (34.4%)	<i>n</i> = 23 (35.9%)	<i>n</i> = 9 (14.1%)
4: 80 items	<i>n</i> = 23 (28.8%)	<i>n</i> = 27 (33.8%)	<i>n</i> = 19 (23.8%)	<i>n</i> = 11 (13.8%)
Total: 280 items	<i>n</i> = 54 (19.3%)	<i>n</i> = 98 (35%)	<i>n</i> = 76 (27.1%)	<i>n</i> = 52 (18.6%)

Inter-rater reliability was conducted using Masters et al. (2001) procedure used in their study on assessment of multiple-choice test items (See Appendix F). The two steps involved evaluation of whether the question violated writing guidelines (multi-logical), and the overall assigned cognitive level of the question (Bloom's taxonomic level). All 280 examination items were classified by one additional course instructor, who evaluated each question and assigned a Bloom's taxonomic level based on the same criteria discussed previously. The two course instructors came to 97% agreement on the final Bloom's taxonomic level for all examination items. An example of an examination question where agreement on the appropriate level could not be reached included a question that asked for the student to choose the reason for a patient's unusual behavior

as the result of sustained trauma (see Appendix E: Examination 3). Each instructor had strong opinions as to the basis for the patients behavior and felt that the correct answer for the question represented differing levels. The overwhelming agreement suggested appropriate determination of the levels to which the examination items appropriately assessed cognitive levels.

### Exploratory Study Results

The purpose of this exploratory study was to compare the case study methodology to a traditional instructional approach. To achieve this purpose, data from course examinations were compared for each group. The exploratory study sample included 23 students from the fall semester and 23 students from the spring semester.

Overall college GPA and ACT college entrance scores were used as measures to support group equivalency (see Table 3). Descriptive statistics as well as a t-test were used. Test results for the paired samples demonstrated no significant difference ( $p = .189$  for GPA, and  $p = .388$  for ACT) between the fall and spring groups. The average fall GPA and ACT values were 3.32 and 21.17 respectively, while the average spring GPA and ACT values were 3.27 and 22.52 respectively, thus suggesting little difference in baseline comparison between the two groups.

Table 3

#### *Comparison of Fall and Spring Groups' GPA and ACT Scores*

	Fall (Comparison) <i>n</i> = 23	Spring (Intervention) <i>n</i> = 23	<i>p</i> (2-tailed)
GPA	Mean = 3.32 SD = .36	Mean = 3.27 SD = .31	.189
ACT	Mean = 21.17 SD = 2.90	Mean = 22.52 SD = 4.31	.388

To determine significant differences between performance of the fall (comparison) and spring (intervention) groups, comparisons were made of scores on four course examinations (see Table 4). The data suggest that there was a significant difference in performance on examination 1 ( $n = 23, p < .001$ ) between fall and spring groups, while there was no significant difference between performance on examinations 2, 3 and 4 ( $n = 23$ , and  $p = .704, .828$ , and  $.111$  respectively).

Table 4

*Comparison of Fall and Spring Groups' Examination Scores*

Total	Fall $n = 23$	Spring $n = 23$	p (2-tailed)
Examination 1 58 items	Mean = 46.96 (81%) SD = 4.25	Mean = 40.52 (70%) SD = 3.27	< .001
Examination 2 78 items	Mean = 57.48 (74%) SD = 7.63	Mean = 56.57 (73%) SD = 8.54	.704
Examination 3 64 items	Mean = 57.78 (90%) SD = 5.05	Mean = 57.43 (90%) SD = 5.70	.828
Examination 4 80 items	Mean = 60.65 (76%) SD = 5.10	Mean = 63.48 (79%) SD = 6.58	.111

Table 5 describes the comparison made between the fall and spring group's performance on all examination items according to the first four levels of Bloom's taxonomy. Differences in overall percentage of correct answers on examination items in each of the four levels, were not statistically significant. Students from both groups performed best on Bloom's Level 1 (knowledge) questions present in 54 (~ 20%) examination items (of a possible 280 items). This represented performance in the spring group that was slightly higher (83.75%) than was performance in the fall (81.37%).

Students in the spring group did slightly better (75.14%) than the fall group (73.61%) when asked items that contained aspects of Bloom's Level 2 (comprehension) questions.

Table 5

*Disaggregated Comparison of Examination Results for Intervention and Comparison Groups According to Bloom's Taxonomic Levels*

Total	Fall ( <i>n</i> = 23) % correct by level	Spring ( <i>n</i> = 23) % correct by level	p (2-tailed) <.05
Bloom 1 ( <i>n</i> = 54)	81.37	83.75	.302
Bloom 2 ( <i>n</i> = 98)	73.61	75.14	.585
Bloom 3 ( <i>n</i> = 76)	72.04	71.16	.882
Bloom 4 ( <i>n</i> = 52)	70.49	68.35	.660

Exploratory Study Summary and Conclusions

The purpose of this exploratory study was to compare the case study methodology to traditional instructional approaches and sought to answer:

1. How does the application of direct instruction enhance the student's knowledge in the context of critical care nursing education?
2. How does the application of direct instruction enhance the student's ability to apply critical thinking processes in the context of critical care nursing education?
3. How does the application of case study methodology enhance the student's knowledge of critical care nursing?
4. How does the application of case study methodology enhance the student's ability to apply critical thinking processes in the context of critical care nursing education?

Results from the study indicated: (a) examination scores showed no significant difference in performance between fall and spring groups, although there was a significant difference between groups' performance on the first exam (this difference was thought to be from the initial change in instructional approach and the adaptation of the students to that approach) and (b) that students applied critical thinking processes through

performance on multiple choice exam items that reflected Bloom's taxonomic levels of cognition.

This data suggest that student knowledge, as reflected in examination scores, was not significantly different through use of either traditional or case study methodology approaches. Additionally, critical thinking processes, as reflected in performance on examination items that reflect Bloom's taxonomic levels was not significantly different through the use of either methodology as well. These findings from the exploratory study lend support for further evaluation of whether case study methodology can be an alternative to a traditional instructional approach in critical care nursing education.

#### Exploratory Study Implications

A need existed to further investigate whether a combined direct instruction and case method approach to teaching critical care nursing is more effective than either method individually. Support for this lay in the results of the exploratory study that provided no significant difference on course examinations (except for Examination 1), and support that case study methodology provided an environment conducive to student participation in class discussions through discussion of case scenarios used to represent real clinical scenarios. Case study methodology has the potential to create a classroom environment where students can analyze complex clinical situations, and make difficult decisions regarding appropriate care for patients. The following recommendations address additional areas of research not explored with this study.

1. A replication of this study should be conducted with a larger sample size of participants enrolled in undergraduate critical care nursing courses to determine if there would be different results.

2. A follow-up study should be conducted with the participants in this course, in conjunction with further study, to determine if these two groups are representative of other groups, within the college and externally as well.

3. While there was no overall significant difference between groups' performance (except on examination one) a qualitative study would add a description of participants' involvement in a case study methodology approach to teaching critical care nursing in this manner.

4. Examinations that were used as assessment instruments did not adequately reflect student's critical thinking. Because only the first four levels of Bloom's cognitive levels were examined in the context of examination questions, course examinations should include essay questions that reflect higher-order cognitive levels of synthesis and evaluation.

5. An attempt should be made to further explore the concepts of a case method approach to teaching critical care nursing. Other combinations of delivery may be effective and therefore further study is necessary. Specifically, research investigating the use of case study methodology in the context of critical care nursing education should be conducted to encourage use of Bloom's synthesis and evaluation cognitive levels in assessment of students, as well as student participation in discussions supportive of open discourse in classrooms.

#### Purpose of the Study

This study describes the transformation of a critical-care nursing course from a traditional lecture-based approach to a case study approach. The traditional approach delivered content through abundant teacher centered lecture but did not require students to actively engage in discourse or apply critical thinking skills to real nursing problems.

The case study approach provided students with opportunities to apply critical thinking processes in the context of actual critical care nursing situations. A descriptive approach to the study was selected in order to describe how case study methodology, premised on higher order thinking skills and application of content knowledge, more specifically matched the goals of the nursing education program and the skills nursing professionals will be required to apply in their own practice. This study sought to explore how students' application of content knowledge and higher order thinking skills were reflected in student writing. In the practice of nursing, written documentation of appropriate assessment and interventions are required legal parts of the patient's record of care. For this reason, the written responses of students to specific nursing cases will be analyzed for this study.

Using the context provided by the exploratory study, this study describes how knowledge and critical thinking processes are influenced with the use of case study methodology. Specifically, this study seeks to describe the impact of case study methodology on nursing students' ability to apply critical thinking processes, as reflected in their writing performance on course examinations and speaking in class discussions.

### Design of the Study

#### Case Method Classroom Setting

The study was conducted at a private, baccalaureate nursing college in the Midwest. The participants included 13 seniors in their last year of nursing education and enrolled in a course titled NU:270 - Nursing Care of the Client with Complex Needs. The course provided the students with comprehensive applied and theoretical content in critical care nursing and was their final theory/clinical combination before graduation.

Table 6 below offers a graphical representation of the procedure order and setting for case presentations. Over the course of the sixteen-week semester students met one day per week for two-hour class sessions, for a total of twelve meetings. During these sessions, content topics were addressed using case study methodology where students applied critical thinking processes in the context of hypothetical critical care nursing situations. The specific case studies used were developed by the two faculty members who taught the course and from a case study workbook that accompanied the textbook used for the course.

Specific content covered by the principal investigator (and instructor for the course) were burn injury, acute and chronic renal failure, brain and spinal cord injury, acute digestive disorders and associated trauma. Content areas covered by the other course instructor included cardiac and respiratory disorders, shock, and multi-system organ failure, which were not included for analysis in this study. The study is based on the experience of the principal investigator and the content and examinations that he covered over the course of the exploratory study and dissertation study. Four additional class sessions were reserved for course examinations. An eight-hour clinical component of the course was also scheduled one day each week in a hospital setting for eight weeks of the semester. The two-hour class sessions were structured around the steps found on Table 6.



Table 6  
*Procedure Order And Setting For Case Presentations*

Class Procedure	Setting
1. Introducing objectives	Large group
2. Presenting the case	Large group
3. Discussing general observations	Large group
4. Analyzing the case using Stepien's six-step approach	Small group
5. Presenting content knowledge related to the topic focus	Large group
6. Presenting a second case on the topic focus	Large group
7. Discussing the second case	Large group
8. Generating questions related to the topic focus	Large group

Table 7 provides a graphical representation of the progression of the semester. Individual class sessions followed Henning's (in press) Bow Tie model described in Chapter 2. During class sessions, students initially reviewed the objectives listed in the course syllabus in the large group setting. In class sessions 3A-6 (Topics 2 and 3), the instructor began the session with an ethical dilemma that asked the students to discuss why an alcoholic should or should not receive a liver transplant. Student input was encouraged, as a way of stimulating classroom discourse. The data are reported in Chapter 4.

The instructor presented a case related to the focus topic (see Appendices A-C for examples of case presentation of the case was followed by a question that was designed to facilitate open-discourse) to the students as a large group. For example, "What general observations can you make about this case?" The instructor facilitated discussion for the students to get an understanding of introductory information contained in the case. The large groups were represented in Sessions 1A, 3A, and 5A and reported in Tables 15, 18, and 21. The students then broke away into small groups and proceeded to follow the six-step process (steps one through five) as outlined on page 48-49, as a manner of analyzing the case for specific details related to the objectives stated in the course syllabus. The

small group sessions are listed as 1B, 3B, and 5B respectively, and reported in Tables 16, 19, and 22.

Table 7

*Semester Timetable for Instructor*

Event	Session								
	1A	1B	2	3A	3B	4	5A	5B	6
Date	Sept. 8, 2003	Sept. 8, 2003	Sept. 15, 2003	Nov. 3, 2003	Nov. 3, 2003	Nov. 10, 2003	Nov. 17, 2003	Nov. 17, 2003	Nov. 24, 2003
Setting	Large Group	Small Group	Large Group	Large Group	Small Group	Large Group	Large Group	Small Group	Large Group
Topic	1) Burns and Renal Failure			2) Brain and Spinal Cord Injury			3) GI Alterations and Liver Failure		
Multiple Choice Exam #	One (Administered Sept. 22, 2003)			Three (Administered Dec. 1, 2003)					
Essay Exam #	One (Administered Sept. 22, 2003)			Three (Administered Dec. 1, 2003)					

The introduction to the case, and completion of steps one through five lasted approximately one-half hour (30 minutes). When the students were finished they returned to the large group where the instructor provided supplemental information important for an understanding of the case. This part of the class session represented the closed discourse portion of the course and resembled the traditional lecture format described. In this part of the class session, the students were provided factual information relevant for care for the critically ill client (30 to 45 minutes). Information of this type included relevant laboratory tests and values, typical diagnoses important to the plan of care for the patient in the scenario, and assessment findings that were presented relative to the case for that session.

The remaining class session was used to discuss aspects of the new case to relevant concepts regarding nursing care in the context of the course content for that day.

The instructor facilitated open discussion during this time and helped the students integrate the new content to the second case as a way to facilitate learning. An example of a comment made by the instructor to encourage discussion is: “Tell me what you know about this case.” The intention was that the students were now able to generalize aspects of care, using terminology obtained in discussions and through reflection of content they had learned, to representative case scenarios. The remainder of the class period was used to review any specific details, as well as to provide instructions to the students for the next class session.

The next session began immediately with the implementation of step six from the prior content and is reported in Tables 17, 20, and 23. Individual groups had one to two minutes to organize their information, then presented findings from the questions generated to the rest of the class. Each small group presented information on one aspect of care (approximately three to five minutes). The instructor elaborated on the content and explained how information could be incorporated into their understanding of the content. The entire class session was used to interact with students and assist in their understanding of how the material related to the case. This format usually provided a way to help the students categorize information. These sessions allowed a review of information and additionally provided students the opportunity to interact with the professor and with other students.

### Participants

All participants were full-time students ( $n = 13$ ) currently enrolled in the fall semester critical care nursing course entitled, *Care of the Client with Complex Needs*. The students earn three semester hours of credit for successful completion of the course. Participants' prior clinical experiences varied. Some students were employed as Student

Nurse Technicians part-time which served as additional experience outside of clinical expectations, while others students had only the clinical experiences provided in the context of prior coursework that typically involved three to five other courses. Ninety-five percent of the participants entered the college directly from high school. The remaining 5% were transfer students from other colleges or universities. Participants' mean age was 22 years; two were male; eleven female; and the group was racially homogeneous (Caucasian).

### Case Study Methodology

This study utilized case study methodology as an approach to teaching critical care nursing. Case study methodology as an approach to instruction included presentation of content knowledge and presentation of real nursing problems that required the application of critical thinking skills.

Laboratory samples that fall within an acceptable range, which the students are required to know may be better taught directly. This type of content is suited better towards a direct instruction approach because the values are static. Laboratory values do not vary and this is information that the student will be required to know in the context of the course.

Students are required to apply critical thinking processes when using content information to address critical care nursing problems. For example, with the administration of a medication students should know the effects of the medication, the safe dose for a patient's height and weight, why the medication is prescribed for that patient, the correct dosing schedule, and verification that the route in which the medication is ordered is safe for that patient. With case study methodology, students were required to evaluate the degree to which a hypothetical physician's order was

reasonable based on knowledge of safe medication administration as described above. If a physician's order called for a dose that is double what was considered safe, the student would call for clarification.

### Measures

Measures used to establish consistency among groups included a comparison of performance on the same multiple-choice test from prior years. Average percentage scores of the 2003 fall group were compared to the fall semesters of academic years 2001, as well as the exploratory study group in 2002. Performance on the multiple-choice course examination items was used to assess student achievement in content knowledge and critical thinking as well.

Additionally, performance on essay examinations that evaluate Bloom's synthesis and evaluation levels was evaluated. Analysis of the essay portion of the test was used to evaluate application of critical thinking in critical care nursing situations. Examples of student responses on the essay exams appear in Chapter 4.

Videotapes of class sessions were used to transcribe classroom discourse while applying the six steps of the case study methodology. All transcripts were coded for aspects of teacher and student classroom discourse using Henning and Lockhart's (2003) Classroom Discourse Response Classification (see Appendix L). Specifically, the transcripts were evaluated for the instructor's ability to facilitate student-centered discourse exhibited through student comments in large and small groups.

### Multiple-Choice Course Examinations

The principal investigator for this study (and one of the two instructors for the course) delivered content related to burn care, renal failure, brain and spinal cord injury,

and liver failure. Two examinations (the 1<sup>st</sup> and 3<sup>rd</sup> examinations) were administered to the students that reflected this content.

The other course instructor delivered content that covered cardiac and respiratory alterations, shock, and multi-system organ failure while two additional examinations (the 2<sup>nd</sup> and 4<sup>th</sup> examinations) were administered to reflect this specific content.

The multiple-choice course examination questions were derived from two main sources: from the content in the textbook that accompanied the course, and from knowledge of the faculty who wrote the questions themselves. Many of the course examination questions were taken from a test bank of questions written in conjunction with the textbook by the text's authors. A computer disk accompanied the faculty version of the text, with a test bank of questions related to the chapter material. Other course examination questions were written by the faculty to address course goals not reflected in the text material. All utilized a multiple-choice format.

#### Essay Examination Component

In the fall semester students were asked to write a portion of their course examination in an essay format. A situational case study, created by the investigator using guidelines established in Morrison et al. (1996) was provided in which the student was asked two questions related to care of the patient described in the case. The two questions asked represented higher-level cognitive thinking at Bloom's synthesis and evaluation levels as discussed earlier. The questions asked the student to (a) create a plan of care for the patient in the case (Synthesis Level) and (b) evaluate the plan and assess which aspects are most beneficial (Evaluation Level). The quality of answers was scored based on criteria contained in Holistic Critical Thinking Scoring Rubric (HCTSR) (See Appendix G). The HCTSR evaluates students' ability to read carefully, interpret

evidence, summarize salient points, evaluate arguments found in what they read, and express their reasoned judgment in writing (Facione & Facione, 1994; Norris & Ennis, 1989).

### Videotape of Class Sessions

Six class sessions were videotaped, transcribed and coded to evaluate data regarding students' ability to use case study method to learn critical care nursing content and were evaluated for aspects of instructor-led versus student-led discourse. Individual groups were assigned numerical codes that assisted in anonymous identification of groups for discourse analysis. A computer-generated table was used to randomize the order in which groups were evaluated. Information gathered from transcribed sessions was analyzed based on student use of the 6-step model described in detail below.

### Procedure

Research by Stepien, Gallagher, and Workman (1993) provided the six-step framework for implementation of case study methodology. This particular model was developed in the context of nursing education and is appropriate for this study because it closely resembles the nursing process recognized universally in nursing education programs nationwide and in clinical practice. While the nursing process is essentially a chain of cognitive steps nurses take when developing a plan of care, the six-step framework includes specific psychomotor tasks (list, develop, present, support) students will follow when being introduced to critical care nursing and the nursing process. The six-step framework is a teaching tool used to enhance student development of critical thinking skills by exposing them to step-by-step problem-based situations representative of those encountered in the practice of nursing. Bloom's Taxonomic classification displays the cognitive level in relation to the nursing process and the six-step process.

Table 8 illustrates the parallels between the six-step framework, the nursing process and Bloom's Taxonomy.

Table 8

*Six-Step Framework, Nursing Process, and Bloom's Taxonomy*

Six-step Framework Stepien, Gallagher, & Workman (2001)	The Nursing Process	Bloom's Taxonomy
1. Present the problem statement. Introduce an "ill-structured" problem or scenario to students.	Assessment	Knowledge and Comprehension
2. List what is known		Application
3. Develop a problem statement.		Analysis
4. List what is needed.	Diagnosis	Analysis
5. List possible actions, recommendations, solutions, or hypotheses	Plan	Synthesis
	Implementation	
6. Present and support the solution.	Evaluation	Evaluation

### Analysis

Analysis of the data included a mean comparison of multiple-choice examination scores and were evaluated to establish equivalency between participants in the Fall 2003 group to participants from Fall Semesters 2001 and 2002. Analysis of student scores on multiple choice and essay examinations provide support for students' demonstration of content knowledge that relate to course objectives.

### Multiple-Choice Course Examination Items

For the exploratory study, multiple-choice examination items course examinations one and three were evaluated for components of Bloom's educational objectives using guidelines outlined in Morrison and Free's (2001) study on multiple-choice items that promote and measure critical thinking. The course examinations were composed of multiple-choice items that represented content knowledge of core concepts in critical care nursing education. An item analysis of the examination questions was conducted to



classify individual test items according to the six levels of Bloom's taxonomy. This classification resulted in examination items being grouped by the first four levels of Bloom's Taxonomy. In the current study a comparison was made of performance on examinations one and three for the study group (Fall 2003), to the previous fall class (exploratory study, 2002), and the year previous to the exploratory study (2001). This was done for the purposes of establishing baseline equivalency between groups.

#### Essay Course Examination Items

The essay portion of course examinations was assessed using a modified version of the Holistic Critical Thinking Scoring Rubric (HCTSR, see Appendix G). This rubric was modified to group criteria according to the upper two levels of Bloom's Taxonomy (synthesis and evaluation) as well as to assess the degree to which students were able to synthesize information (interpret evidence, identify salient arguments and draw warranted conclusions) in the assessment, planning, and diagnosis steps of the nursing process, as well as evaluate information (evaluate alternative points of view, justifies key results, and explains assumptions, logically follows where evidence and reason lead) in the implementation and evaluation steps of the nursing process (Facione & Facione, 1994; Norris & Ennis, 1989). Inter-rater reliability was established through both instructors' comparison of results after application of the HCTSR to student's essay responses.

The data from the other course instructor (essay examination two) was not analyzed in this study.

#### Videotaped Class Sessions

Videotapes of six class sessions (each lasting two hours for a total of 12 hours of classroom videotaped sessions) were transcribed and provided data on how students applied content knowledge and critical thinking skills after participation in learning

experiences where the case study approach was utilized. Only data obtained while the principal investigator was in the classroom was used for the purposes of this study. Course sessions from the other instructor were not videotaped and sessions were not evaluated in this study.

Three groups of students were randomly selected and videotaped were included in the composite data. Specifically, student application of critical care nursing skills through participation in classroom discussion was analyzed in the context of instructor-led versus student-led discourse described in Chapter Two.

The class sessions resembled the 6-step process described in the “Exploratory Study Analysis” section. When applying the six-step framework in the context of the nursing program, the faculty member provided critical information for students and acted as a facilitator during the class session while guiding students to ask appropriate and meaningful questions. This method encouraged student-centered discourse and allowed application of critical thinking processes in the context of hypothetical critical care nursing situations.

The modified approach required that the students proceed through Steps 1-5 (review of case, generation of questions, etc.) during the first class session of the unit, then perform Step 6 during the next class session (reporting of results). This teaching approach allowed time for the student to search for answers to the questions generated in class, as well as allow time to prepare for a brief presentation to the rest of the class at the beginning of the next class session.

Additionally, transcripts of the videotaped sessions were coded using Henning’s (2003) Classroom Discourse Response Classification. Teacher discourse in classroom discussions was coded and analyzed using this classification. Comments made by the

instructor were categorized as three types: (a) initiations, (b) responses, or (c) evaluations. Coding classifications included: elicitations, confirmations/rejections, elaborations, etc. (See Appendix L for a complete description of the categories with examples.) Evaluation of the transcripts included the tabulation of the frequency of specific classification types, and in addition, word counts for each type was counted.

To establish inter-rater reliability, the primary researcher conducted an initial reading and coding of the transcript data. Then, two educational faculty members who were external from the study and who were skilled in discourse analysis and coding evaluated the transcripts. They coded the transcripts using the same criteria as the researcher and disagreements in coding were discussed until all coders reached 100% agreement. This demonstrated agreement where each comment made by the professor in the class sessions, were appropriately categorized.

The results of the study are described in Chapter 4. Description of the themes that were observed in the study includes: (a) the results of students' performance on multiple choice and essay examinations and (b) the results of analysis of classroom discourse. Analysis of discourse revealed that students participated in class discussions and that the discussion was open and student-centered.

## CHAPTER 4

### RESULTS

#### Introduction

This chapter provides the results of the study, including a description of multiple-choice test data, essay examination responses, and analysis of discourse. Results of this study were organized and presented around three central themes: (a) that case study methodology did not diminish students' performance on multiple-choice examinations when compared to prior students' scores on the same exams, (b) that essay examination responses from hypothetical case scenarios demonstrated students' knowledge of important course content and critical thinking related to judgment and decision-making, and (c) that discourse revealed increasingly open, student-centered discussions as the instructor learned to implement new instructional strategies.

#### Summary of Results

##### Analysis of Multiple Choice Test Data

Measures used to establish consistency among groups included a comparison of performance on the same multiple-choice tests administered from prior years before the principal investigator implemented case study methodology (2001 and 2002). Average percentage scores of the 2003 fall group were compared to the fall semesters of academic years 2001, as well as the exploratory study group in 2002.

Table 9 reports the results of examination scores from the last three fall groups. There was a slight increase (2%) in 2003 group mean scores on examination one compared to the 2002 group mean score; while there was a slight decrease (3%) in 2003 group mean scores on examination three compared to the 2002 group mean score. The multiple-choice portion of the examinations for the study group (2003) was standardized

to reflect 40 questions of the most-pertinent information contained in the content. The remainder of the exam focused on essay response, of which the results are displayed below. Administration of the exam in prior years contained exclusively multiple-choice items, where the numbers of items per test fluctuated from 60 to 80 in number.

Table 9

*Comparison of Multiple-Choice Examinations Results*

Multiple Choice Examination	Semester and Year		
	Fall 2001 <i>n</i> = 18	Fall 2002 <i>n</i> = 23 (Exploratory Study)	Fall 2003 <i>n</i> = 13
1	Mean = 41.76 / 58 (72%)	Mean = 46.96 / 58 (81%)	Mean = 33.2 / 40 (83%)
3	Mean = 49.28 / 64 (77%)	Mean = 57.78 / 64 (90%)	Mean = 34.8 / 40 (87%)

Analysis of Essay Examination Responses

Table 10 displays data from students' essay examinations. Students were asked to write a portion of their course examination (exams one and three), in essay format. A situational case study, created by the instructor using guidelines established in Morrison et al. (1996) provided the basis for two questions asked which represented higher-level cognitive thinking at Bloom's Synthesis and Evaluation Levels. The questions asked the student to (a) create a plan of care for the patient in the case (Synthesis Level) and (b) evaluate the plan and assess which aspects were most beneficial (Evaluation Level). The quality of their answers was scored based on criteria contained in Holistic Critical Thinking Scoring Rubric (HCTSR; Facione & Facione, 1994). The HCTSR was applied to evaluate students' ability to read carefully, interpret evidence, summarize salient

points, evaluate arguments found in what they read, and express their reasoned judgment in writing (Facione & Facione, 1994; Norris & Ennis, 1989).

Table 10 reports overall student performance on the essay portion of the examinations (Mean = 56.1, 93.5%).

Table 10

*Essay Examination Scores*

Essay Examination	Mean	%
1 (60 points)	55.2	92
3 (60 points)	57.0	95
Overall Means	56.1	93.5

Table 11 reports performance by each category of the nursing process for question one on examination one. This response incorporated all relevant aspects of assessment data related to a thorough assessment of body systems as well as several nursing and medicinal treatment interventions related to the course content provided, therefore the student deserved full-credit. Seven out of 13 students received all 10 points for the “Assessment” portion of the essay. An example of a response that received full-credit in this category is, “Burned by tar. 40% BSA, A/O x 3, extreme pain. IV’s started in bilateral AC. 5 mg MS IV. 100% NRB mask. Rales. Skin peeling on legs et abdomen. Ancef 2 G IV. BP 190/100. P – 135, R – 30, T – 38.0, ABG’s – pH – 7.0, PaO<sub>2</sub> – 100, CO<sub>2</sub> – 32, HCO<sub>3</sub> – 20, Foley inserted, 100 cc return dark yellow urine.” See Appendix J for a description of content related to burns.

An essay response that received 7 points either, left information out, or represented it incorrectly. The following example demonstrated an incomplete answer as well as inaccurate reporting of information vital to the understanding of the content within the case. This answer was incomplete because much more assessment data needed to be incorporated into the answer, including a description of the relevance of his injuries. In this case, his second and third-degree burns warranted immediate first aid care and transport to a burn facility. Additionally, this student reported a stable blood pressure reading when in fact low symptomatic blood pressure is not considered stable. The example read as follows: “Burned by tar. IV’s started, Morphine given, Oxygen applied. The patient’s skin is peeling and blood pressure is stable.”

All 13 students in the study received full points in the “Diagnosis” portion of the exam. All diagnoses were identified as priorities for care during class sessions where burn and renal failure were discussed. Students chose various applicable nursing diagnoses in which to base their care. Examples of diagnoses include, “Fluid Volume Deficit, Risk for Fluid Volume Excess, Altered Tissue Perfusion, and Risk For Infection.”

Ten of 13 students in the study received full-credit in the “Plan” portion of their essay response. Students who received full-credit incorporated a comprehensive set of nursing care interventions addressing the immediate needs of a trauma patient with injury to multiple body systems. A student response that received full-credit is illustrated in the following example: “Plan of care includes perineal and urinary catheter care to prevent infection and to monitor urine output every hour via the foley catheter. My primary goal is to maintain adequate hydration and prevent renal failure. The dark urine suggests that the body is attempting to excrete toxins in the body (i.e., hemoglobin and myoglobin)

from extensive burn injury. The low urine output suggests dehydration and therefore adequate fluid (without fluid overload) is essential. This will be done via IV (Lactated Ringers solution) and oral intake of fluids. My plan therefore is to continue to monitor renal function through urine output, as well as monitor their lab levels like the BUN and Creatinine.”

Students who received a 7 in this category incorrectly reported data or left out important information that was essential to understanding the topic. For example, one student’s plan failed to address burn treatment following discharge from the Emergency Room. Since a treatment plan must be comprehensive and include follow-up instructions after discharge, this student’s response required additional information.

Table 11 displays the frequency in which students scored in each of the four point categories established, and represents their performance on the Synthesis Cognitive Level question for the essay portion on the first exam.

Table 11

*Exam One, Question One (Synthesis Cognitive Level): “Use the nursing process to devise a plan of care for the patient in the case study, identifying specific nursing interventions.”*

Nursing Process	Frequency			
	10 points	7 points	4 points	1 point
Assessment	7	4	2	
Diagnosis	13			
Plan	10	2	1	

Table 12 reports data of students’ responses to question two on examination one. The Implementation portion of question two on exam one asked students to carry-out their plan of care established in the Planning portion mentioned above. Nine of 13 students received full-credit for their response. This answer incorporates all aspects of



content related to the implementation of a well-designed plan of care for a renal failure patient, as described in class. This student's response addressed the important areas of: intake/output measurement, laboratory analysis, vital sign evaluation, and medication intervention. Therefore it deserved full-credit. An example of a response that received full-credit is, "I plan to notify the physician if the patient's output is less than 30ccs per hour. I will assess the patient's weight daily and look for an increase or decrease, I will monitor and record the patient's intake and output, and check for patency of the catheter every hour if the output is less than 30ccs to see if there could be an occlusion. If greater than 30ccs per hour, then re-assess every four hours. I will monitor the patient's labs especially the BUN, Creatinine, and electrolytes and give the patient Kayexalate if the potassium is 6.5 or higher. Also, I will assess the patient's vitals and respiratory status hourly until stable then every two to four hours after that. I would have the patient rate his pain level and would give IV Morphine 2-5 mg every hour as needed for pain."

A student response that was less specific, provided incomplete information, or incorrectly represented content that was discussed in class, was given less points. This answer is less-specific because no explanation was given in regard to how the airway would be protected or which specific interventions would be used to protect the airway. Additionally, no specific mention was made of specific medications used to treat this patient's condition. This is important because discussion centered on the importance of knowing which drugs were used to treat specific conditions, and the appropriate doses for each medication. An example of a student response that received a 7 is included for comparison. "I would monitor the patient's airway and take his vitals. I would also need to administer any medications that the physician had ordered. I would check his labs and

call the physician if there were any changes in his condition. Maintenance of tissue perfusion and decreasing the risk of infection is important because of his open wounds.”

Eleven of 13 students received full-credit for their answer on the second part of question two of exam one. This answer deserved full credit because the evaluation statement includes important aspects for a follow-up plan of care, including the specific interventions evaluated, and the date/time expected to meet the goal. An example of a response that received full-credit is, “The patient’s lab values (BUN and Creatinine) will fall within expected ranges within three to five days with appropriate intervention. If the patient is unable to maintain fluid status, adjust medications and fluid/nutrition as appropriate. If urine output has not improved, reassess plan of care and adjust measures to reflect revised plan.”

An example of an incomplete answer that received a 7 is provided for comparison. This student failed to incorporate specific goals in the statement, and additionally failed to put a time constraint for the evaluation and is illustrated in the following example: “The patient’s vital signs, serum electrolytes, and urine output will be within normal limits.”

The third part of question two, exam one asks the student to provide rationale as to why their stated plan of care is warranted over alternate plans of care. Most students (10 of 13) performed well and received full-credit for their responses. This student’s answer deserved full credit because she could adequately justify why her plan of care was warranted over another plan of care. Justification was made for interventions and for the chosen diagnosis. An example of a response that received full-credit is, “Fluid volume deficit is a priority diagnosis because having a fluid volume deficit places the patient at risk for hypovolemic shock and acute renal failure. The client’s airway and breathing are

stable and ABG's are improving with oxygen administration, therefore Ineffective Airway is not a priority diagnosis at this point versus other diagnoses that can be addressed when he is stable.”

Students who received a 7 in this category did not prioritize their chosen diagnosis. They did not adequately justify why the chosen diagnosis was warranted over other plausible diagnoses. The following example illustrates this: “I chose this diagnosis because my assessment revealed altered lab values and decreased perfusion to his organs...” Another example is: “I feel that this diagnosis is best for this patient because his lab values reveal that he is in renal failure. His urine output is less which is an indication of acute renal failure.”

Table 12 displays score frequencies in each of the four rubric categories for the evaluation portion of the essay examination.

Table 12

*Exam One, Question Two (Evaluation Cognitive Level):*

*“Provide rationale to justify why your plan of care is warranted over alternative points of view.”*

Nursing Process	Frequency			
	10 points	7 points	4 points	1 point
Implementation	9	3	1	
Evaluation	11	2		
Evaluation	10	3		

Table 13 reports the results of students' responses to question one of examination three. Slightly better than one-half (7 of 13 or 54%) of the students received full-credit. This answer describes all the risk factors, type of injury, as well as a thorough description of the injuries and the significance of each. A full-credit response incorporated all aspects of assessment data as described in class. An example includes, “Male, 35 y/o,

MVA, unrestrained (high-risk), possible ETOH which is another risk factor for trauma, unconscious. Lacerations to head and chest reveal associated injuries – possible contusion or hemorrhage. Skull intact. Airway patent, but patient is risk for aspiration due to localized injury. Stabilization of C-Spine is related to possible spinal cord injury sustained from accident...”

Students who received a 7, either left out vital assessment data or did not provide a rationale justifying the significance of their assessment data. An example in this category follows: “Patient was in MVA in need of attention. Patient was unrestrained with lacerations, and unconscious. ABG’s and other labs abnormal. Vital signs unstable.” For a description of course content related to this answer, see Appendix J.

All students (13 of 13) received full-credit on the second part of the first question in examination three related to the Diagnosis. Students’ responses included, “Ineffective Airway Clearance, Risk for Infection, and Impaired Gas Exchange.” All of these responses represent appropriate nursing diagnoses that were mentioned in class as relevant to patient care.

The third part of the first question for examination three asked the student to devise a plan of care for the patient in the case scenario. Most students (10 of 13) responded with suitable answers that received full-credit. Students who received full-credit recognized the interaction that occurred among multiple body systems in response to trauma, and adequately addressed an appropriate plan of care in the context of the scenario. The following is an example of a response that received full-credit: “The patient will: regain a level of consciousness to that of his functioning prior to his accident, reduce seizing through medication administration by the nurse, have lab values equal to that prior to his injury, not experience increased intracranial pressure above 15,

have clear lung sounds, have no further deficit in neurological status (pupils equal, round and reactive), be oriented to person, place and time.”

Answers that received a 7, were due to a plan that had little relevance to the chosen diagnosis, or did not support the assessment data gathered. This answer left out other important aspects related to appropriate interventions for this patient including: the patient’s risk for infection from his wounds, his immuno-compromised status, and his potential for fluid excess. The following example illustrates an underdeveloped answer: “Patient will have an effective airway clearance and have a regular rate and depth of breathing. Patient will also show no signs of dyspnea or accessory muscle use.”

Table 13 displays score frequencies in each of the four rubric categories for the synthesis portion of the essay examination.

Table 13

*Exam Three, Question One (Synthesis Cognitive Level):*

*“Use the nursing process to devise a plan of care for the patient in the case study, identifying specific nursing interventions.”*

Nursing Process	Frequency			
	10 points	7 points	4 points	1 point
Assessment	7	6		
Diagnosis	13			
Plan	10	3		

Table 14 reports the results of students’ responses to question two of examination three. All 13 students received full-credit on the first part of question two, exam three. A complete answer included implementation of care addressed earlier in the “Plan” portion of the examination. A student received full-credit if interventions reflected appropriate care as stated in class and in the text used for the class as the following example illustrates: “Assess neurological status every 15 minutes to ensure that the patient’s ICP

is not increasing and contact physician immediately if the patient's status deteriorates. Administer medications like Mannitol and Phenytoin, Decadron, Valium, and Fentanyl as ordered by the physician. Monitor respiratory status, turn the patient every two hours and elevate head of bed thirty degrees (unless contraindicated)."

The majority of students (11 of 13) received full-credit for the second part of question two, exam three. This example demonstrates a response that incorporates an understanding of their chosen plan of care in the context of the needs for their client. "Patient has regained consciousness and is now off of the ventilator. Patient is showing effective airway clearance by maintaining adequate respirations, able to cough and deep breathe, shows no signs of dyspnea, or accessory muscle use. Lungs are clear bilaterally."

Students who received a score of 7 were less specific in their ability to explain how their chosen diagnosis impacted the patient's immediate needs. The following example lacks an appropriate rationale for care. This student did not specifically mention the priority needs of the patient nor the interventions implemented: "The plan of care I chose for this patient has met all of his priority needs, and my interventions will assist in his care. The patient outcomes that I addressed are priorities as well, and are part of the diagnosis for this patient that will provide a positive outcome for him."

Nearly all students (12 of 13) also received full-credit for the third part of question two, exam three. In this category a fully developed answer justified why the chosen diagnosis was superior to other plausible diagnoses as the following illustrates: "I decided to choose this diagnosis because airway management is so vital to the patient, especially with suspected spinal cord injury. His ABG's indicated respiratory acidosis and his lungs revealed rales, additionally he was seizing at the trauma center." Another

student response was, “Overall, I believe that adequate airway clearance is warranted over immobility, impaired skin integrity and anxiety because making sure oxygen is being delivered and carbon dioxide being removed from the body are important to keep the patient alive.”

The student received a score of 7 if no justification was provided for the selection of one diagnosis over other plausible diagnoses as the following example illustrates: “I chose this diagnosis because his airway management is vital especially with suspected spinal cord injury. His labs values were altered, his assessment data showed problems with his breathing, and he was seizing at the medical center.”

Table 14 displays the frequency in which students scored in each of the four point categories established, and represents their performance on the Evaluation Cognitive Level question for the essay portion on the third exam.

Table 14

*Exam Three, Question Two (Evaluation Cognitive Level):*

*“Provide rationale to justify why your plan of care is warranted over alternative points of view.”*

Nursing Process	Frequency			
	10 points	7 points	4 points	1 point
Implementation	13			
Evaluation	11	2		
Evaluation	12	1		

### Analysis of Discourse

The results of analysis of discourse focused on three themes: (a) that the teacher’s questioning strategies stimulated student discourse, (b) that the number of students responding to questions increased and their answers became progressively more complex

during the semester, and (c) the change in physical environment enhanced the quality of student discourse and facilitated a student-centered classroom.

The sections that follow provide the results of analysis of discourse, with examples of comments that demonstrated student-centered discourse. In summary, instructor comments seemed to facilitate student participation as class sessions were increasingly more open when an ethical question was asked at the beginning of a session than when no ethical question was asked. An example of an ethical question is provided with the description of the class sessions where topic 2 was presented.

Topic 1 (Burns and Renal Failure) began with a large-group presentation of a case scenario related to the topic. After a brief discussion students were asked to begin working in small groups to complete Stepien's Six-Step Process on this case. This topic was introduced without the use of an open-ended ethical question as was used to introduce the two subsequent topics. As a result, a low number of student-initiated responses were observed the initial class session. Through the weekly meetings with two faculty mentors, it was decided to insert an ethical discussion question at the introduction of each of the next two topic areas. The purpose of these discussion questions was to stimulate student engagement, interest and participation in topic discussions. As anticipated, the number of students participating in introductory discussions, the number of student comments and the length of student responses, increased.

Topic 2 began with the ethical question: "Should a brain-injured patient be allowed to live on life support?" Nearly all students participated in this introductory discussion. Their responses were longer as compared with responses for introductory discussion for Topic 1. This discussion was also more complex in that students



responded to each other's comments and initiated subordinate questions related to the topic.

The researcher met with the same faculty mentors after the conclusion of the Topic 2 sessions. After discussing the observed increase in student participation in introductory class discussion, it was determined that Topic 3 would again be introduced with an ethical question. But a follow-up question at the conclusion of topic 3 would provide the students an additional opportunity for open discourse. The ethical question selected for Topic 3 was, "Should an alcoholic receive a liver transplant?" Similar to the ethical question asked in Topic 2, this question stimulated open discussion as students volunteered comments, questions and responses to each other's statements.

At the conclusion of the topic 3, the question was asked, "Given what you *now* know about liver failure, should an alcoholic receive a liver transplant?" When responding to this open-ended question, students applied course content to engage in a lively discussion of the ethical dilemmas faced by the medical community today.

In the following section, class sessions are described and analyzed in chronological order as displayed in Table 8 of Chapter 3. Analysis of teacher discourse in large-group sessions 1A, 3A, and 5A, focused on classifying teacher discourse according to Henning and Lockhart's Discourse Response Classification (2003).

In small group sessions 1B, 3B, and 5B groups of two or three students focused on: (a) completing the first five steps of the Stepien Six Step Process; (b) discussing content within the context of the case scenario and (c) deciding appropriate interventions for the client in the case scenario.

The final sessions for each topic area (Large Group Sessions 2, 4, and 6) addressed step six of the Stepien Six Step Process. At this point students reported their

findings (step 6) to the class in a large group setting. Specifically, students reported the results of their research into questions they raised during analysis of the case in small group sessions (1B, 3B, 5B). In the large group sessions 2, 4, and 6, students summarized their findings while the instructor inserted relevant comments clarifying incorrect statements or elaborating on content knowledge. All groups reported their findings in this manner.

When comparing large group sessions 2, 4 and 6, a progressively increasing number of student interactions can be observed. Student responses became progressively more complex and detailed, reflecting an understanding of course content. This phenomenon illustrates how the use of case study methodology encourages student engagement in application of higher order thinking which in turn has implications for nursing education.

Large Group Session 1A. Table 15 reports data of instructor discourse in the context of the session. The first session of topic one began where the professor's discourse was primarily focused (5 of 13 occurrences) on procedural comments related to instructions regarding use of the steps for case analysis. This was attributed to the instructors need to provide guidance on how to use case study methodology as well as to help the students become more familiar on learning the format of the course. The majority type of discourse focused on instructor initiation (5 of 13 occurrences) or response (6 of 13 occurrences) in the context of discussion of course content.

The intent of procedural comments was to instruct the students on how to use the six-step process and provide information on how to incorporate each step as a basis from which to analyze the cases that represented the content material for that topic. Initially, the students did not ask questions, and were only asking for clarification of information

that the professor had provided. Additionally, the remainder of interactions focused on confirming information that had been provided to them. The totals represented an instructor-focused class session based on the amount (5 of 13 occurrences) and type (procedural) of interactions.

Meaningful student participation in class discussions occurred. Early in the semester during the large group Session 1A, students were less inclined to participate with substantial responses to professor elicitations. There were a total of only 8 student interactions and only 5 of the 13 students participated in the overall discussion. In early large group sessions, an elicitation by the professor usually only drew one response by a student. As we move through Sessions 3A and 5A, you will notice the number and complexity of student responses increased. Student comments from the transcripts of videotaped course sessions during the initial large group Session 1A, provide clear examples. Responses were usually succinct and brief.

Professor: “[What are your] initial observations?”

Student 1: “He’s acidotic.”

Professor: “O.K. He’s acidotic. Good. Speak up so everyone can hear you also.”

Student 2: “He’s in renal failure.”

Professor: “O.K. Good. You don’t have to necessarily make conclusions. She took a step and said ‘in failure, and acidotic.’”

There was only one instance in Session 1A where a reformulation statement by the professor was met with four different students discussing the topic in any detail. The students responded to the others’ comments enriching the class discussion and interpersonal interaction of the students.

Student 3: “He’s in pain from the location and severity of the burns.”

Student 1: “He’s losing consciousness.”

Student 4: “His respirations are decreasing from his last assessment so he’s in respiratory failure.”

Student 2: “His blood pressure dropped from the last assessment.”

Professor: “...Are there other things that haven’t been mentioned, that you’ve noticed?”

Table 15

*Topic 1, Session 1A (September 8, 2003)*

Discourse Category	Discourse Sub-Category	Professor Totals by frequency (Word Count)
Initiations	Elicitation	4 (50)
	Cues	1 (64)
	Repeat	0
Responses	Reformulate	1 (10)
	Procedural	5 (181)
	Recap	0
	Elaboration	0
Evaluations	Explanation	0
	Confirmation	2 (6)
	Rejection	0
Totals		13 (411)

Small Group Session 1B. Table 16 reports coded data of instructor discourse in session 1B. Following each large group setting, the students were arranged in small groups of three (one dyad) in which they implemented Steps 2-5 of the case study methodology described in Chapter 3. The first small-group session contained the same number of instructor procedural responses (5 of 13 occurrences), although overall, the number of instructor initiations and responses was less than in the first large group session (8 of 13 occurrences). At this period in the class sessions, the instructor facilitated student groups and encouraged use of Steps 2-5 as a method of analyzing the case. The number of elaborations increased (2 occurrences) as well as confirmations (3

occurrences) while the instructor assisted the students in the small group setting. The instructor's role in this session was facilitative in nature and focused on providing the students the opportunity to generate questions, as described in the Case Study Methodology Design section in Chapter 3. The small groups were student- focused and thus required less instructor intervention.

The first small group session (1B) involved more instructor intercessions than later sessions (4 occurrences). Session 3B had one occurrence while 5B had no occurrences of instructor intercession. An example is as follows:

Student 7: "O.K. Our question is for the vitals, do you want to know what the vitals are, or do you just want to know that they are unstable?"

Professor: That's good. Either one is correct really...you took it a step further...because you recognize that something is wrong..."

Table 16 reports the results of small group Session 1B.

Table 16

*Topic 1, Session 1B (September 8, 2003)*

Discourse Category	Discourse Sub-Category	Professor Totals by Frequency (Word Count)
Initiations	Elicitation	3 (63)
	Cues	0
Responses	Repeat	0
	Reformulate	0
	Procedure	5 (149)
	Recap	0
Evaluations	Elaboration	2 (69)
	Explanation	0
	Confirmation	3 (11)
	Rejection	0
	Totals	13 (192)

Large Group Session 2. The last large group session discourse of Topic 1 is reported in Table 17. This is the portion of the class where the students reported their

findings to the instructor and the rest of the class the following week. This session was represented by teacher-initiated elicitations (15 occurrences), cues (4 occurrences), confirmations (14 occurrences) and elaborations (5 occurrences). Students' reports typically focused on findings of their own analyses of the case and incorporation of information obtained from sources identified in the context of the class discussion.

The instructor would initiate discussion, provide procedural directions, and confirm student answers as a way of responding to each student groups' response to the content. An examples of discourse in Session 2 is:

Professor: "Now, I'd like to revisit last weeks' case and apply some of the material to that, since we went through it so quickly. So, we'll start there. Let's start with the first group."

Student 1: "We talked about what caused the burns. The actual agents that caused the injury."

Student 2: "Also about what types of burns were associated with certain agents, and what the risk factors for burns are. We thought that was important because some of the information that we read in the book, and the stuff that we covered last week reinforced that you may treat burns differently based on the agent that caused it."

Professor: "This reinforces content information that related to our discussion on risk factors [of burns]."

Table 17 reports the data.

Table 17

*Topic 1, Session 2 (September 15, 2003)*

Discourse Category	Discourse Sub-Category	Professor Totals Frequency (Word Count)
Initiations	Elicitation	15 (80)
	Cues	4 (266)
Responses	Repeat	0
	Reformulate	1 (15)
	Procedure	4 (193)
	Recap	1 (23)
	Elaboration	5 (142)
Evaluations	Explanation	0
	Confirmation	14 (46)
	Rejection	0
Totals		44 (765)

Large Group Session 3A. Table 18 reports instructor discourse in context of the session. There were a moderate number of elicitations (8 occurrences) where the instructor asked questions intended to stimulate discussion. Instructor-led procedural comments (1 of 9 occurrences), elaborations (0 occurrences), and confirmations (0 occurrences) were less than in Session 1A.

In response to the increased number of elicitations by the professor (8 occurrences from 4 occurrences), the number of student interactions increased to 19, with 9 of the 13 students participating. Additionally, a greater number of student-to-student interactions occurred (12 responses from 6), as well as an increased length of student responses (see Appendix N), demonstrating an increased participation in class discussions. Examples of student discourse in Session 3A demonstrate participation, as well as the complexity of their statements in the context of the large group discussions.

Professor: "How do you resolve the issue of letting the parents decide whether to let their child live or die, while moderating the need to let people go?"

Student 10: "I don't think there is one template to follow. Each case is going to be different and no two situations will be the same. In every case, you have to get the family, health care team, and other people involved to educate the parents to allow them to make their own decision."

Professor: "What about a Down's Syndrome patient...?"

Student 4: "Parents still have the right to decide even if the parent can't pay for it or anything..."

Student 8: "I don't want to live like that..."

Student 12: "We can't push our opinions on people. Our opinions have to remain separate."

Student 4: "We are taught to help people come to a decision."

Student 8: "People need to be brutally honest. We need to say to people the truth..."

Student 12: "They have to have all of the facts."

Student 8: "It was never seriously discussed with the family..."

Student 13: "Another situation was when a guy came into the ICU when I was working there..."

Student 10: "...I had a case where a mother came in aborting a baby, and the physician told the mom that it wasn't a good situation, and asked her what she wanted to do..."

Professor: "Great discussion. I appreciate your thoughtfulness on these issues..."



Table 18

*Topic 2, Session 3A (November 3, 2003)*

Discourse Category	Discourse Sub-Category	Professor Totals by Frequency (Word Count)
Initiations	Elicitation	8 (190)
	Cues	0
Responses	Repeat	0
	Reformulate	0
	Procedure	1 (58)
	Recap	0
Evaluations	Elaboration	0
	Explanation	0
	Confirmation	0
	Rejection	0
Totals		9 (248)

Small Group Session 3B. The results of the small group setting within Topic 2 (Session 3B) are displayed in Table 19. There were two facilitative type interactions by the professor, reformulation (1 occurrence) and elaboration (1 occurrence), in which students were asked to form small student groups for case analysis for less instructor-led discussion. Instructor interaction was more facilitative in nature, as shown in Table 19. The teacher gave less direct instructions to students than in previous small group settings (2 occurrences) as students became more familiar with how to use case study methodology.

Reduced instructor interaction with students in small group sessions (3 occurrences over sessions 1B, 3B and 5B) limited the degree to which student thinking could be assessed through teacher response. Discourse was directed from student-to-student in the small sessions. However, examples of their discourse demonstrate that students became more skilled in the process of case evaluation, and seemed to take on the role of instructor (as facilitator) in subsequent small group sessions. Students

demonstrated that they began to evaluate each other's responses for relevancy, as the instructor would in similar circumstances in a large group setting. Examples of their discourse follow:

Student 11: "O.K. Here is some information that could be useful. He was transported to a trauma facility for care. That is important because he has access to better care than if he were stuck in some rural hospital somewhere."

Student 13: "It helps to be able to read through the whole case. I see that he was drinking alcohol and it was late. That sounds like some risk factors for his injuries."

Student 12: "He is intubated. Was that done in the field?"

Student 13: "He is in respiratory failure."

Student 11: "It leads to respiratory failure before he is intubated. Since they have secured his airway, he is no longer in failure."

Student 11: "What about his other injuries? Of the patient who died?"

Student 12: "I think that we would want to know that his blood pressure was different from his upper extremities to his lower ones. That could mean some serious bleeding. Also, he doesn't have any feeling in his lower legs, and he doesn't have any bladder control. That may signify spinal injury."

Student 11: "He is in respiratory acidosis. That is significant. Until the ventilator corrects some of the retained carbon dioxide, he will be in acidosis."

Table 19 reports the results of the data.

Table 19

*Topic 2, Session 3B (November 3, 2003)*

Discourse Category	Discourse Sub-Category	Professor Totals by Frequency (Word Count)
Initiations	Elicitation	0
Responses	Repeat	0
	Reformulate	1 (45)
	Procedure	2 (80)
	Recap	0
	Elaboration	1 (44)
Evaluations	Explanation	0
	Confirmation	1 (11)
Totals	Rejection	0
		5 (180)

Large Group Session 4. Table 20 reports instructor discourse in the context of the session. Session 4 began with small groups reporting their findings in a large group setting, in response to questions generated the prior week. Fewer professor elicitation occurred (4 occurrences) than in previous, similarly structured sessions (Session 2). The number of professor confirmations was less (5 occurrences), while the number elaborations (4 occurrences) remained similar to Session 2.

Another example of discourse that provides an example of teacher evaluation of student comments in Session 4, is as follows:

Professor: “What do you think a global problem, or maybe a specific problem of either of the two individuals in the case? Can you discuss any of their problems in the context of some of the content that we’ve covered in the last session?”

Student 1: “We focused on the risk factors of his being male, having had alcohol, and being at a high-risk age group.”

Professor: “That is great. As you remember, males at their ages are at higher risk for injury, especially when alcohol and motor vehicles are involved...”

Table 20

*Topic 2, Session 4 (November 10, 2003)*

Discourse Category	Discourse Sub-Category	Professor Totals by Frequency (Word Count)
Initiations	Elicitation	4 (50)
	Cues	1 (9)
Responses	Repeat	0
	Reformulate	0
	Procedure	1 (39)
	Recap	0
Evaluations	Elaboration	4 (288)
	Explanation	0
	Confirmation	5 (31)
	Rejection	0
Totals		15 (417)

Large Group Session 5A. The data from Session 5A of Topic 3 is reported in Table 21. This session also began with an ethical question in order to generate student discussion: “Should a chronic alcoholic be given a liver transplant?” Nearly equal numbers of instructor elicitation occurred (7 occurrences) in which questions were asked in an open and communicative atmosphere. Only two procedural responses by the instructor occurred, similar to previous large group settings where an ethical question was asked of the students (Session 2). Discourse resulted from evaluations of the statements made (2 occurrences), where students would respond with disagreements or challenges to information presented.

The final introductory large group Session, 5A, resulted in the greatest amount of large group participation by students compared to Sessions 1A and 3A. While students’ overall word count in Session 5A was nearly equal to that of Session 3A (539 words), 11

of 13 students participated in the discussion in the context of the same number of elicitations by the professor as in Session 3A (8 occurrences).

Examples of student discourse provide the context for the increased interaction and greater participation by the students in Session 5A.

Professor: "Should a chronic alcoholic be allowed a liver transplant?"

Student 2: "If they sign a contract that promises they will stop drinking."

Student 4: "Even if they sign a contract, it won't guarantee that they will stop drinking."

Student 6: "It's like those people who get a heart transplant...how do you decide who gets one?"

Student 3: "I don't think they should be at the top of the list."

Professor: "So, you see it as a disease?"

Student 3: "I have a hard time forgiving people like that..."

Professor: "Why?"

Student 12: "Would you not do heart surgery on someone who is obese that needs it...?"

Student 8: "Where do you draw the line...?"

Professor: "Are you saying that we in the medical community shouldn't consider lifestyle? Only consider the need?"

Student 11: "If I were deciding, I would give it to them."

Student 13: "I had a patient once where the family didn't understand the implications of my patient's problem."

Professor: "So, you think he should get the transplant?"

Student 2: "Yes I see it from both ways..."

Student 1: "Where do you draw the line...?"

Student 10: "There seems to be a lot of conflict..."

Student 3: “If there are conflicting cases where an older person and a younger person have the same problems, the younger person should get it...”

Student 1: “He may have not gotten the help...”

Student 6: “...there are health promotion and weight loss centers” [for obesity].

Student 9: “This guy...is doing this to himself...”

Student 4: “...but that doesn’t mean he should be allowed to die, does it?”

Table 21

*Topic 3, Session 5A (November 17, 2003)*

Discourse Category	Discourse Sub-Category	Professor Totals by Frequency (Word Count)
Initiations	Elicitation	7 (66)
	Cues	1 (15)
	Responses	0
Responses	Repeat	0
	Reformulate	0
	Procedure	2 (85)
Evaluations	Recap	0
	Elaboration	1 (18)
	Explanation	0
Evaluations	Confirmation	1 (9)
	Rejection	0
Totals		12 (193)

Small Group Session 5B. Data from small group sessions that followed (Session 5B) the large group setting for Topic 3 is reported in Table 22. Similar to previous sessions (Sessions 1B and 3B), the instructor responded once with a procedural interaction as a manner of providing information to students. An example of the discourse is as follows:

Professor: “Please review the case and proceed on through the steps as before. Let me know if you have any questions.”

Student 1: “O.K., let’s get started...”

Discussion that followed was exclusively between students within their small groups. The only additional instructor intercession was at the end of the time period allotted for the small groups approximately 30 minutes after the small groups had convened.

In later discussion, students’ comments focused on relevant course content from the case scenario, and students made judgments on whether the information was of importance to include as a question to pursue further. When the professor initiated discourse (elicitations and cues), students participated in the discussions demonstrated by their lengthy and elaborate responses to the ethical questions posed.

In contrast, when discussion focused around factual and discrete information, students participated less as shown by less frequent student-to-student interaction (4 occurrences), as in Session 1A where the instructor provided instructions and lecture content. Discourse related to factual information that had been presented by the instructor during periods of lecture resulted in less participation by students (4 occurrences) and reduced frequency of student responses at certain periods throughout the class session. Table 22 provides the results of the data.

An example of that discourse where students were involved in discussion of course content in Session 5B, is as follows:

Student 7: “We need to know the labs, I mean the levels like the B.U.N., Creatinine and Albumin. Let’s write them down.”

Student 8: “Let’s just put alternate labs. We need to know those.”

Student 7: “We need to know that his lungs are increasingly fluid-filled and that’s part of his assessment.”

Student 8: “He has decreased breath sounds. Also, [his injury] was caused by the kerosene. The fact that he inhaled it would have caused his lung problems.”

Student 7: “What about his pain? What are they going to give him for the pain? I know they may give things like NSAIDS, but would that be later?”

Table 22 reports the data for this session.

Table 22

*Topic 3, Session 5B (November 17, 2003)*

Discourse Category	Discourse Sub-Category	Professor Totals Frequency (Word Count)
Initiations	Elicitation	0
	Cues	0
Responses	Repeat	0
	Reformulate	0
	Procedure	1
		(38)
Evaluations	Recap	0
	Elaboration	0
	Explanation	0
	Confirmation	0
	Rejection	0
Totals		1
		(38)

Large Group Session 6. Data from the final session of Topic 3 are reported in Table 23. This session is similar in format to previous sessions (2 and 4) in which student groups reported data in the context of the large group setting. One difference was that a follow-up question was asked of students at the conclusion of the class as a way to allow students to discuss how course content may have influenced their initial responses to the ethical question posed in Session 5A.

Elicitations (6 occurrences) and cues (1 occurrence) made by the instructor facilitated classroom discussion. Students had a tendency to interact, but each interaction resulted in support of their position on the matter or through challenging other students’



comments. The follow-up question which asked, “Given what you know now about liver failure, do you still feel the same way about liver transplantation for chronic alcoholics?”

This allowed students to integrate their understanding of the main concepts of the unit and use concepts that they had just learned in class to articulate a comprehensive view of nursing care for the ill. Examples of students’ responses provide a context for the participation and student-to-student interaction that followed.

Professor: “O.K. then. Now that we have thoroughly analyzed the case, and applied some information in the context of the case, I’m interested in knowing what you now think of the question that I posed initially? I’ll ask again, do you think that an alcoholic should receive a liver transplant?”

Student 4: “My take on it is that a lot of what we’ve talked about like the Diabetes and other endocrine problems put these people at risk for some of these problems. I mean, if a patient has a chronic malnutrition problem that causes some of the muscle-wasting and protein-energy malnutrition that we discussed, it is hard to say that we wouldn’t grant someone like this who is in need, a transplant. I mean, was it really his fault?”

Professor: “Good point. It is hard to say why people drink. He should be responsible for himself, but maybe because he has so many health concerns, isn’t educated regarding his health, and maybe that he doesn’t have a very good support system [are reasons]. Maybe these things led to his drinking, and he got depressed and started to drink. It is hard to say.”

Student 9: “He should be held accountable just like all the rest of us. Just like I said before, we all have to be responsible for ourselves. We in the medical community have to educate those people and try to get them to take responsibility for themselves so that they can make healthy lifestyle choices. Otherwise, where do you draw the line? Who gets the care, and who doesn’t?”

Student 1: “Maybe a way to address it is to initiate a change in the health care system. Maybe we have to come up with a way to address peoples’ health care problems in a more comprehensive way...we would have the supporting documentation in order to make sound decisions, and then they may not be as difficult, as black-and-white as this case is.”

Student 10: “Maybe we need to be looking at it just as we are now. Maybe we in the medical profession are doing it right. Maybe those who are medically in-need are the ones who truly need it most, regardless of how it happened. There are a bunch of ways that people get sick, and each person is different. For us to say that one person deserves it over another is confusing the issue of what our purpose

is. We are supposed to be providing equal care regardless of a person's background. If we look at providing care to those who need it, the ethical issues aren't as difficult to solve."

Student 5: "We can implement complex interventions like the PPN and TPN, IV fluids, and we can order a lot of complex tests like CBC's, renal function tests, and even provide transplants to those who need it most and the quickest. I think management of these types of patients will be enhanced as new technology comes about from new research..."

Table 23

*Topic 3, Session 6 (November 24, 2003)*

Discourse Category	Discourse Sub-Category	Professor Totals Frequency (Word Count)
Initiations	Elicitation	6 (75)
	Cues	1 (20)
Responses	Repeat	0
	Reformulate	0
	Procedure	3 (124)
	Recap	1 (25)
	Elaboration	2 (166)
Evaluations	Explanation	0
	Confirmation	7 (36)
	Rejection	0
Totals		20 (464)

### Summary

In this chapter, analysis of results focused around three themes that emerged during the course of this study. Results demonstrated: (a) that case study methodology did not diminish students' performance on multiple-choice examinations when compared to prior students' scores on the same exams, (b) that essay examination responses from hypothetical case scenarios demonstrated students' knowledge of important course content and critical thinking related to judgment and decision-making, and (c) that

discourse revealed increasingly open, student-centered discussions as the instructor learned to implement new instructional strategies.

Results of student performance on multiple-choice and essay examinations in this study demonstrate that implementation of case study methodology provides the context for evaluation of students' knowledge that closely matches nursing education's goal of bringing students' thinking to the higher levels on Bloom's Taxonomy of synthesis and evaluation. The results also seem to demonstrate that implementation of case study methodology facilitates participation in classroom discourse and provides the context for critical thinking and applied judgment to real clinical nursing situations. Additionally, faculty in undergraduate critical care nursing courses may benefit from case study methodology as encouragement for students to participate and interact with course instructors. These findings provide a context for the discussion of the results that follow in Chapter 5.

## CHAPTER 5

### DISCUSSION

#### Introduction

This chapter provides a summary of the study and includes a discussion of the major themes that emerged. The themes include the changes in the quality of student discourse that occurred as a result of the interventions, and an interpretation of the study in the context of nursing education. This chapter includes a discussion of the implications of the study for undergraduate nursing education and the nursing profession.

#### Summary and Conclusions of Study

The purpose of this study was to describe case study methodology in the context of critical care nursing education. Using the context provided by the exploratory study, this study informed the aspects of knowledge gained and critical thinking processes developed through the use of case study methodology. Specifically, this study represented an initial effort to investigate how a case study methodology could be used in the context of critical care nursing education, to improve students' knowledge of content specific to critical care nursing and facilitate critical thinking processes vital to clinical decision making. Students' writing performance on course examinations and speaking in class discussions were used to measure the effectiveness of case study methodology.

The use of case study methodology facilitates creation of a student-centered classroom environment, which includes facilitating student discourse in both large and small group settings and changing the physical arrangement of the classroom. Successful execution of case study methodology requires faculty to become skilled in the process of

questioning students, thus encouraging an environment where students actively participate in discussion. Although there are numerous variables that impact the quality of discourse in the classroom, the quality of student discourse that occurred was the result, in part, of the quality of questions asked by the instructor. Careful attention to the arrangement of the classroom provided an environment conducive to student participation. Other variables that relate to quality classroom discourse that necessitate consideration include: communication apprehension, group size, and vocabulary.

Academic nursing faculty that employ case study methodology can expect (a) students to demonstrate knowledge of critical care nursing content through performance on multiple-choice and essay examinations, (b) students to demonstrate critical thinking as reflected in essay examination responses, and (c) that classroom discourse will be increasingly open and student-centered.

This study contributes to an understanding of how case study methodology can be utilized in critical care nursing education. It demonstrates that careful implementation of case methodology will provide students the opportunity to apply content knowledge and demonstrate their decision-making abilities and higher order thinking skills. Because case study methodology is premised on a student-centered classroom characterized by critical thinking and problem solving, it more fully matches the goals of the nursing education program and the demands of the profession.

Nursing education faculty can expect changes in their classroom environments through implementation of case study methodology. Student centered classrooms provide opportunities for participation, particularly when faculty and student involvement

in discourse provides a context in which to speak openly about course content and discuss controversial issues related to professional practice. Additionally, well-crafted open-ended questions will increase the likelihood that students participate in discussions.

Implementation of case study methodology will place new demands on the instructor and will necessitate a realignment of teaching practices. Throughout this study, the researcher benefited from two mentors who provided suggestions for instructional changes that included methods to facilitate more open classroom discourse resulting in increased student engagement and participation. The mentoring provided support and guidance in gradually transforming instruction from a traditional lecture-based approach to a case study methodology-based approach which required students to apply content knowledge and higher order thinking skills.

#### Recommendations for Student Assessment

Faculty can expect student assessment in their courses to change dramatically with the implementation of case study methodology. This study suggests that group performance on multiple-choice examinations can be expected not to diminish when case study methodology is used. Instructors can expect that the use of a case study approach in academic classroom environments facilitates students' acquisition of content knowledge as effectively as a traditional approach to instruction. However, whether the instructor uses a traditional lecture-based approach or a case study approach, performance on multiple-choice exams measures Bloom's lower four levels.

Assessment of Bloom's upper two levels, synthesis and evaluation, necessitates the use of alternative methods of assessment such as essay examinations. These kinds of

examinations are essential in a course that employs case study methodology because assessment of this type aligns with the goals of the course. Additionally, essay examinations allow nursing faculty to develop assessments that more closely resemble environments in which students will find themselves following graduation. Essay examinations provide the instructor the appropriate tool for evaluation of the student's decision-making abilities in complex case scenarios.

### Recommendations for Classroom Discourse

Instructors who apply case study methodology can expect their role in classroom discussion to change in both large group and small group settings.

#### Large Group Sessions

When first introduced to case study methodology, students may ask few questions and limit their questions to seeking clarification regarding content information. Students may appear to like the use of case studies, but may not be accustomed to using them as part of their learning material. Initially, students may feel uncomfortable and intimidated by this methodology. But with experience, they will likely become more comfortable, ask more complex and engaging questions, interact with each other more naturally and frequently, and participate actively in open classroom discourse.

Introductory large group sessions may be instructor-focused until students become comfortable using the process and become better skilled in analyzing the case scenarios. Once the students become more comfortable, faculty can expect increased student participation in class discussion. A portion of the large-group discussion in this study became student-led by the end of the three units. However, in early large group

sessions, discussion questions posed by the professor drew few student responses. This pattern changed dramatically with experience both on the part of the instructor and the students. This may be due in part because the ability of the instructor to ask questions developed with experience just as students' comfort level increased with experience.

### Small Group Sessions

The instructor's role in the small group sessions will most likely be more facilitative in nature and less directive. Faculty can expect minimal instructor interaction with the students in the small group. Small groups provide the opportunity for students to apply content knowledge in an active way but small groups do not directly involve the instructor in a significant role. In this sense, students may evaluate each other's responses just as the instructor would in a large group setting.

Students may elaborate on questions posed by other students in small group settings, and clarify meaning for each other as a way of understanding the material. For example, often students asked each other definitions of terms, or answered questions regarding clarification of content in the text. Additionally, students may confirm others' responses in their communication with each other as they prioritize case information. These interactions place students in roles that resemble that of the instructor. Faculty may also notice that discussions in the context of the small groups provide meaningful participation in class discussions although early in the semester students may be less inclined to participate. However, as the semester progresses, students may become more comfortable with the six-step process, may be able to analyze the case studies with greater skill, and eagerly anticipate participation in classroom discussions.



### Recommendations for Nursing Education

This study represents an alignment of nursing instruction to clinical practice. Themes that emerged from this alignment include the changes to instructional practice, changes to student participation in class discussions, and changes to the physical environment and nursing curriculum. Nursing education advocates the development of critical thinking and problem solving in clinical practice and case study methodology provides opportunities for undergraduate students' learning and participation through hypothetical case scenarios.

This study described the transformation of a critical-care nursing course from a traditional lecture-based approach to a case study approach. The traditional approach addressed the course content through teacher-centered lectures, but did not require that students actively engage in classroom discourse or apply critical thinking skills to real nursing problems, as the case study methodology did. A case study approach provided students with opportunities to apply critical thinking processes in the context of simulated critical care nursing situations.

Faculty can expect that, in addition to using a student-centered teaching methodology, when a classroom is arranged to enhance communication, increased participation is a likely result. Case study methodology, premised on higher order thinking skills and application of content knowledge, more specifically matches goals of nursing education programs and skills nursing professionals will be required to apply in their own practice.

Students' application of content knowledge and higher order thinking skills were reflected in student speaking and writing through class discussions and written assignments. In the practice of nursing, verbal communication assists in the delivery of continuous, effective care, while written documentation of appropriate assessment and interventions are required legal parts of the patient's record of care. For this reason, the written responses of students obtained through essay examinations, as well as the verbal responses of students to specific nursing cases obtained through transcription of videotaped class discussions, were analyzed and interpreted for this study.

Themes that emerged from this study demonstrate that faculty may expect to see students participate in class sessions when a context is provided for inclusion in discussions. Students can transfer concepts and ideas into discussion, and demonstrate an understanding of the content through use of Stepien's six-step process for case analysis. Additionally, teacher comments may lead to further discussions in large group settings and students can expect to take a more facilitative role in discussions in small group settings.

Graduates of nursing programs who demonstrate an understanding of content knowledge and the critical thinking skills to apply such knowledge to complex health care problems are the promise for the future of the nursing profession. Meeting this challenge starts with nursing educators. If only after the student graduates he or she is faced with critical nursing problems, it may be too late. Therefore, continued research in case study methodology is necessary.

### Recommendations for Further Research

Additional research could include exploration of how particular characteristics of students influence implementation of case study methodology. Specifically, qualities like: a student's self-concept, fluency in the English language, gender, and ability to accept change may be important considerations when implementing case study methodology. Further research should also address the degree to which students perceive case study methodology to be useful in their nursing education program. Because resistance to new instructional methods may provide challenges to instructors who wish to implement case study methodology, further research should also address the most effective ways to implement change from traditional teaching methods to case methodology. Surveying graduates of a nursing program may be an effective way to determine the degree to which students perceive case study methodology to be effective in preparing them for real nursing practice in the profession.

Individual characteristics of instructors may also influence implementation of case study methodology. Important considerations include: prior teaching experience, communication style, and familiarity with the course content. Research related to these instructor characteristics may inform the practice of nursing educators wishing to initiate a larger scale implementation of case study methodology.

Methods of staff development for effective implementation of case study methodology and specifically the role of mentoring are other areas that warrant further research. In this study, two professors mentored the researcher in the use of open discourse as a means of extending and enriching class discussion. Further research related to a mentoring process specifically applied to case study methodology should be

conducted. This led to implementation of new instructional strategies that increased participation in class discussions and provided a classroom environment supporting critical thinking.

The purpose of this study was to describe case study methodology in the context of critical care nursing education. Using the context provided by the exploratory study, this study informed the aspects of knowledge gained and critical thinking processes developed through the use of case study methodology.

Specifically this study described how a traditional lecture-centered critical-care nursing course was transformed to become a student centered engaging environment for learning. In this context students learned to wrestle with real nursing problems, to generate important questions, to apply higher order thinking skills, and consider powerful ethical questions that confront today's health professional. In short, this study describes how the gap between theory and practice was narrowed through a teaching method that bridged the classroom with the realities of the nursing profession.

Today's complex society places increasing demands on health professionals as delivery of health services collides with fundamentally democratic values; and new medical breakthroughs fall short for lack of adequate delivery systems. In this environment the moment-by-moment decisions of health providers only become more significant. This study provides guidance and insight for instructors and leaders of nursing education programs who hold in their hands the promise of the next generation, who seek to position their programs with tomorrow in mind, and who seek to meet the health challenges of the twenty-first century.

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## APPENDIX A

## CASE STUDY

## Unit 1: Body Defenses and Burns

## Step 1: Case

A 45 y.o. caucasian male is being transported from his worksite by ambulance to your ER with multiple burns over various parts of his body. Your report includes that he is coming to you conscious and alert with 2 IV's of Normal Saline (NS) at 200 ml/hour. His VS are: BP – 175/100, P – 120, R – 30, T – 39.0. You are staffing trauma room #1 and will be providing his care.

The condition of the patient is: ABG's – Ph – 7.0, PaO<sub>2</sub> – 88, CO<sub>2</sub> – 25, HC0<sub>3</sub> – 18. Pt has facial edema and evidence of hair loss. Lungs reveal rales and his skin is peeling in large quantities on his chest and abdomen. His GCS is 10 and he is experiencing increasing pain.

Initially, the physician orders: Continue fluid bolus per burn protocol, Ancef 2 G IV, consult surgery for debridement, transfer to ICU.

Step 2: List what is known/observations about the example given.

Step 3: Develop problem statement based on your observations (What do we want to know?)

Step 4: List what is needed (What do we now need to know to answer the question in Step 3?)

The patient is becoming more agitated and restless.

VS: BP - 190/110, P – 116, R – 24, T – 35.0

You determine that he has 40% of his total body surface area (BSA) burned (upper torso, neck, and front of his face).

The burns apparently were from a barrel of kerosene that tipped over and ignited near him. He is reporting more difficulty breathing and you notice more generalized edema forming in the areas burned.

His lungs are increasingly fluid-filled and his SaO<sub>2</sub> is dropping. His consciousness is waning (GCS-7). His VS are: BP – 90/50, P – 40, R – 10, T – 36.1

Step 2: List what is known/observations about the example given

Step 3: Develop problem statement based on your observations (What do we want to know?)

Step 4: List what is needed (What do we now need to know to answer the question in Step 3?)

Step 5: List possible actions

Step 6: Present and support the solution

## APPENDIX B

## CASE STUDY

## Unit 2: Acute neurological electrical alterations, Acute brain and spinal cord injury

## Step 1: Case

You are a flight nurse being called out at 0130 from a regional trauma medical center to a motor vehicle accident that occurred approximately 15 minutes ago on a busy thoroughfare in a suburb of a major metropolitan city. On arrival to the scene your team determines that the car has multiple patients in need of immediate attention. You see a driver, and one passenger, the car smells of beer.

The driver is an un-restrained Caucasian, male, 35 years of age, unconscious with several lacerations to the head and chest (as far as you can see at this point), and not breathing. While you are stabilizing the c-spine, removing the patient from the vehicle, securing the airway, and beginning other resuscitative measures, your partner is tending to the passenger.

The passenger is an un-restrained Caucasian male, 28 years, conscious, with multiple, bleeding lacerations to the head and chest. His C-spine is stabilized and when you attempt to assist him from the vehicle onto a long-board, he reports to you that he is unable to move his legs and reports severe pain in the middle of his back.

Meanwhile, the driver is placed on a long-board, c-spine collar on, head elevated, while resuscitative measures ensue. The patient is intubated, I.V.'s of 0.9 NS are hung

via 2 14-Ga H.L.'s peripherally placed in each A.C. Initial V.S. are: BP – 72/44, P – 134, R - 12 (Vent), T – 35.4, SaO<sub>2</sub> – 94% per vent.

The passenger's spine is stabilized and he is helped to the long-board where immediately, 2 I.V.'s of 0.9 NS are initiated. You notice that the entire lower portion of his clothes are wet. As you take his V.S., he begins to tell you that he is feeling worse, and he suddenly loses consciousness. You promptly begin bag/valve mask ventilations, before placing an ETT. His V.S. are: BP – 60/34, P – 36, R – 12 (Vent), T – 35.2, SaO<sub>2</sub> – 100% per vent.

Step 2: List what is known/observations about the example given

Step 3: Develop problem statement based on your observations (What do we want to know?)

Step 4: List what is needed (What do we now need to know to answer the question in Step 3?)

**Step 1: Case**

You arrive at the trauma center with both patients. The updated condition of the driver is: unconscious, intubated, on vent., C-spine fracture at C2, ABG's – Ph – 7.2, PaO<sub>2</sub> – 50, CO<sub>2</sub> – 60, HCO<sub>3</sub> – 10. Pt has facial edema, and you notice a clear fluid draining from his ears (B). Lungs reveal rales (B), and the patient appears to be seizing. His GCS is three. You are unable to obtain a pulse, and you cannot obtain a BP. You call for a code blue. His ECG monitor shows an irregular pattern of beats. You begin CPR.

The physician orders: Immediate t-q pacing, Epi – 1 amp. Repeat q 5 min x 2, Atropine – 1 mg repeat q 5 min x 2, mannitol – 0.5 mg/kg/IV, Phenytoin – 100 mg IVP & 1 Gram IV T.R. @ 50mg/min, Decadron 250 mg, IVP. You code the patient, for well over one hour. The patient expires at approximately 3 a.m.

The passenger remains unconscious, intubated and on the vent. ABG's – pH 7.4, PaO<sub>2</sub> – 70, CO<sub>2</sub> – 30, HCO<sub>3</sub> – 20. Pt has no fine/gross motor movement to lower/upper extremities, limbs are cool to touch, with +1 peripheral pulses. VS: BP- 100/50, P – 48, R – 12 (vent), T – 36.3. You place a urinary catheter and an NG. Labs: Na – 139, K – 3.5, (Total) Ca – 13. Lungs clear, skin cool and pink, bowel sounds faint. Pupils – PERRLA.

The physician orders: Decadron 200 mg, Valium 10 mg IVP, Fentanyl 100 mcg, Zantac 50 mg IV, Heparin 1000 u SQ. Neurosurgery consult, prep for surgery and transfer to SICU.

**Step 2: List what is known/observations about the example given**

Step 3: Develop problem statement based on your observations (What do we want to know?)

Step 4: List what is needed (What do we now need to know to answer the question in Step 3?)

Step 5: List possible actions

Step 6: Present and support the solution



## APPENDIX C

## CASE STUDY

## Unit 3: Digestion, Elimination &amp; Endocrine

## Step 1: Case

You are receiving a transfer from the ER to the medical ICU in which you work.

The patient is a 60 y.o. Hispanic, thin, has poor personal hygiene, and is homeless.

Your assessment reveals: VS – BP: 90/46 (sitting), 146/88 (lying), P: 86, R: 24, T: 39.6 C, SaO<sub>2</sub>: 88% on RA, Lungs – Coarse throughout, CXR: B infiltrate. Neuro: Lethargic, confused, PERRLA, sclera jaundiced, fine tremors to arms/hands B. Integ. – Numerous decubiti, poorly managed. Labs – Na: 130, K: 3.0, RBC's: 3, Hgb:8, Hct:28, Plt:50, WBC's: 20. Gluc. 600, LFT's: all elevated, Urine: + Ketones, serum ammonia level: 180 ug/dl. Cardiac: His ECG reveals Sinus Rhythm w/ freq. PVC's. GI: abdomen enlarged/rounded and firm, emesis X 2 of foul smelling, brown liquid.

Orders read: Place PICC, IVF: Bolus 1 L of 0.9 NS TF w/ D5.9 w/ 30 meq KCL, Phenergan 25 mg, MTV of pharmacy choice then TPN, Solumedrol 125 mg IV, Insulin 5 u Regular IV now, recheck accu-check in 30 min., call results, sliding scale regular insulin Q4, place urinary catheter, NG to LCS, 1 u PRBC's, 6-units of Platelets, Dietary consult, Diabetic consult, Social service consult, Resp. Tx Q4/prn, O<sub>2</sub> TK sat's > 92 %.

Step 2: List what is known/observations about the example given

Step 3: Develop problem statement based on your observations (what do we want to know?)

Step 4: List what is needed (what do we now need to know to answer the question in Step 3?)

Step 1: Case

The following day you take care of this patient and his updated condition is as follows: VS – BP: 110/72, P: 70, R: 20, T: 38.4 C, SaO<sub>2</sub>: 94% on 4 L O<sub>2</sub>/NC, Lungs – Coarse B, Neuro: Lethargic, less confused, PERRLA, sclera continued jaundiced, fine tremors to arms/hands B have reduced as well. Integ. – No change, although ET has seen the patient and is managing his wounds, Labs – Na: 137, K: 3.4, RBC's: 7, Hgb:10, Hct:34, Plt:50, WBC's: 16. Gluc. 287, LFT's: continued elevated, Urine: + Ketones, serum ammonia level: 100 ug/dl. Cardiac: ECG: Sinus Rhythm w/ occ. PVC's. GI: abdomen soft & non-tender to palp.. NG had over 2 L of stool out over the night.

Orders read: Admit to medical floor, continue orders.

Step 2: List what is known/observations about the example given

Step 3: Develop problem statement based on your observations (What do we want to know?)

Step 4: List what is needed (What do we now need to know to answer the question in Step 3?)

Step 5: List possible actions

Step 6: Present and support the solution

## APPENDIX D

## EXAM 1

Directions: Answer each of the following with the best possible answer. Fill in the corresponding circle on the answer sheet. Do not write on the test itself.

1. The nurse is assessing a client with an endotracheal tube in place. What data would confirm that the tube was inserted too far into the trachea?
  - A. Decreased breath sounds over the left chest.
  - B. Increased rhonchi at the lung bases bilaterally.
  - C. The client is able to speak and there is no increase in coughing.
  - D. The alarm continues to sound indicating decreased oxygen tension.
  
2. Which of the following best describes suctioning through an endotracheal tube?
  - A. The catheter is inserted into the endotracheal tube, intermittent suction is applied until no further secretions are retrieved, the catheter is then withdrawn.
  - B. The catheter is inserted through the nose and the upper airway is suctioned; the catheter is then removed from the upper airway and inserted into the endotracheal tube to suction the lower airway.
  - C. With suction applied, the catheter is inserted into the endotracheal tube; when resistance is met, the catheter is slowly withdrawn.
  - D. The catheter is inserted into the endotracheal tube to a depth of approximately 18 to 20 inches; suction is applied during withdrawal.
  
3. The nurse enters data on a burned patient and discovers she has written on the wrong chart. This can best be corrected by:
  - A. white out the wrong information and write over it.
  - B. recopy the page with the error so the chart will be neat.
  - C. draw a straight line through the error, write "error," initial, and date.
  - D. erase the error so it will not be confusing.
  
4. What nursing observations would indicate that the cuff on an endotracheal tube was leaking?
  - A. A rise in the peak pressure on the ventilator.
  - B. The client is able to speak.
  - C. Increased swallowing efforts by the client.
  - D. Increased rales (crackles) over the left lung field.

5. Suctioning a tracheostomy is a successful intervention when:
- A. there is no longer a pleural friction rub.
  - B. the normal breath sounds are diminished.
  - C. the client indicates that breathing is better.
  - D. the secretions obtained are thick and tenacious.
6. After signing a consent for a laryngectomy, a client asks, "the doctor says he's going to take part of my throat out and put a hole in my neck to breathe. Will I be able to talk like before?" The nurse's best answer would be:
- A. "Would you like to talk to the doctor again to answer your questions?"
  - B. "We have lots of clients with this operation. You'll talk again. You'll see."
  - C. "Not like before but there is nothing to worry about. This procedure is done often."
  - D. "Why don't you tell me what you know about your operation. You seem very concerned."
7. A client's entire left lower leg and left arm are severely burned when a barbecue overturns onto cement. A nurse who is present recognizes that initial first aid includes:
- A. removing the clothing over the site of the burn.
  - B. rubbing ointment on the burn.
  - C. stopping the fire in the barbecue grill.
  - D. administering oral fluids.
8. A client is brought to the hospital where the victim is diagnosed as having full-thickness burns. The family asks what is involved in a full-thickness burn. The most accurate response by the nurse would be that the:
- A. epidermis has been damaged.
  - B. dermis has been partially damaged.
  - C. epidermis and dermis have been damaged.
  - D. structures necessary for regrowth of epithelial cells are present.
9. IV fluids are ordered in a client with severe burns. An assessment finding that would indicate that the treatment was inadequate would be:
- A. polyuria.
  - B. bradycardia.
  - C. restlessness.
  - D. hypertension.

10. When using appropriate endotracheal suctioning principles, the nurse should plan to use:
- A. 50-60 mmHg pressure applied continuously on the catheter as its inserted for 15 second.
  - B. 150-160 mmHg pressure applied intermittently on the catheter during insertion for 8 seconds.
  - C. 150-160 mmHg pressure applied continuously on the catheter during withdrawal for 20 seconds.
  - D. 110-120 mmHg pressure applied intermittently on catheter withdrawal for 10-15 seconds.
11. During suctioning, the client's heart rate decreases by 20 beats per minute and becomes irregular. In relation to further suctioning through a tracheostomy, the nurse interprets this as indicating the need for?
- A. better preoxygenation
  - B. lower suction pressure
  - C. less frequent suctioning
  - D. antidysrhythmic drug therapy
12. Silver sulfadiazine (Silvadene) is ordered for treatment of a burn wound. An advantage of this treatment is that it:
- A. hardens eschar, allowing faster recovery period.
  - B. is absorbed more rapidly than other topical agents.
  - C. is broad spectrum & acts against some fungi & yeast.
  - D. increases granulocyte formation for efficient wound healing.
13. The client's burns require mechanically debridement. The nurse should reinforce what has been taught the patient by explaining that:
- A. hydrotherapy will be used to remove dead tissue.
  - B. enzymatic agents will be applied daily to the wounds.
  - C. incisions will be made along the length of the eschar.
  - D. mechanical devices will continually move his extremities.
14. How thick should a topical antimicrobial agent be applied?
- A.  $1/16^{\text{th}}$  inches.
  - B.  $1/4^{\text{th}}$  inches.
  - C.  $1/2$  inches
  - D. 1 inch.

**Eunice Hogan, a 44-year-old bank teller, fell asleep while smoking a cigarette. She suffered severe burns of the face, neck and anterior chest. Questions 16 through 24 deal with Mrs. Hogan's care.**

15. Using the "rule of nines," which of the following is the best estimate of the total body-surface area burned?
- A. 9%
  - B. 18%
  - C. 31%
  - D. 45%
16. The nurse determines that Mrs. Hogan has second- and third-degree burns. Which of the following would be characteristic of a fresh, second-degree burn?
- A. Absence of pain and pressure sensations.
  - B. White or dark, dry, leathery appearance.
  - C. Wet and blistering.
  - D. Superficial and red appearance.
17. Because of the location of Mrs. Hogan's burns, what is the nurse's primary concern?
- A. debride and dress the wounds
  - B. initiate and administer antibiotics
  - C. frequently observe for hoarseness, stridor, and dyspnea
  - D. obtain a thorough history of events leading to the accident
18. A narcotic IV was ordered to control Mrs. Hogan's pain. Why was the IV route selected?
- A. Burns cause excruciating pain, requiring relief.
  - B. Circulatory blood volume is reduced, delaying absorption from subcutaneous and muscle tissue.
  - C. Cardiac function is enhanced by immediate action of the drug.
  - D. Metabolism of the drug would be delayed because of decreased insulin production.
19. Mafenide acetate (Sulfamylon) is applied to Mrs. Hogan's wounds every 12 hours. The nurse's assessment would include observation for which of the following side effects of this drug?
- A. metabolic acidosis
  - B. discoloration of the skin
  - C. maceration of the skin
  - D. dehydration and electrolyte loss

20. Eventually, autografts are done. Care of the donor site includes the same care as is done for any partial-thickness wound. This includes all **except**:
- A. changing the dressing every shift.
  - B. reporting any odor to the physician.
  - C. clean and inspect the wound prior to the dressing change.
  - D. keep the wound protected to aid healing.
21. Due to the location of the burns, which of the following nursing measures would most likely cause Mrs. Hogan to have contractures?
- A. Change the location of the bed or the TV set, or both, daily.
  - B. Encourage her to chew gum and blow up balloons.
  - C. Avoid using a pillow or place the head in a position of hyperextension.
  - D. Help her to assume a position of comfort.
22. What is the primary goal of all burn-wound care?
- A. to debride the wound of dead tissue and eschar
  - B. to decrease fluid intake
  - C. to maintain pre-burn body weight
  - D. to decrease formation of disfiguring scars

**Tim Allen was struck by lightning. He was knocked to the ground but did not lose consciousness. He enters the ER walking. His vital signs are stable. Question #27 and 28 deal with his care.**

23. When doing an assessment of Mr. Allen, the nurse would expect to find:
- A. nausea and vomiting.
  - B. globinuria.
  - C. minor external signs with possibly severe internal injuries.
  - D. liver study abnormalities.
24. The internal organ(s) at most risk from electrical burns are:
- A. the brain and spinal cord.
  - B. organs highest in water content.
  - C. the lungs.
  - D. the extremities.

**Monica Marsh is a 25-year-old teacher who delivered a normal 7-pound girl 2 days ago. Mrs. Marsh developed a post partum fever and was placed on Keflin 500mg IV qid. During administration of the second dose of the drug, Mrs. Marsh became apprehensive and complained of difficulty breathing. Questions #31 through 34 deal with Mrs. Marsh's care.**

25. Which of the following Potential Complications should the nurse suspect?
- A. PC: Allergic Reaction
  - B. PC: Respiratory Acidosis
  - C. PC: Immunodeficiency
  - D. PC: Pulmonary Edema
26. Mrs. Marsh's difficulty in breathing is most likely due to:
- A. presence of fluid in the lungs.
  - B. widespread vasodilation and third spacing.
  - C. presence of thick mucous in the tracheobronchial tree.
  - D. laryngeal edema and bronchospasm.
27. The most important immediate nursing action would be to:
- A. reassure Mrs. Marsh that everything will be fine.
  - B. discontinue the drug.
  - C. elevate the head of the bed and notify the physician.
  - D. call the code for a cardiac arrest.
28. Mrs. Marsh went home the following day. The discharge teaching which is most important for Mrs. Marsh is:
- A. that she must not take Keflin or a cephalosporin again.
  - B. conditions to be alert for in her baby and herself.
  - C. how to give a baby bath.
  - D. to carry benadryl at all times.
29. A nursing intervention that decreases sensory deprivation in clients in a critical care environment is:
- A. conversing with clients whenever giving care and when time allows.
  - B. playing soothing music in-patient rooms.
  - C. preventing clients from taking naps during the day.
  - D. providing care in an unhurried manner.



30. Diet therapy in the client with a severe burn must include:
- A. adequate protein and caloric intake to meet metabolic demands.
  - B. snacks help to fight fatigue.
  - C. oral intake of cooled liquids to help decrease body temperature.
  - D. intravenous total parenteral nutrition.
31. Mr. James' foot has healed from a full thickness burn. For which problem is he at highest risk?
- A. High risk for infection related to fragile skin.
  - B. Body image disturbance related to a disfigured foot.
  - C. Chronic pain related to burn pain.
  - D. High risk for injury related to absence of sensation.
32. Tom Cannon, an 18-year-old high school student, experienced a partial-thickness 2<sup>nd</sup> degree burn. What should the nurse expect to see when assessing Tom's wound?
- A. The burned skin will have erythema with mild edema, pain, and increased sensitivity to heat.
  - B. There will be the formation of blisters with a wet, shiny, weeping surface. The wound will blanch with pressure. It will be very painful.
  - C. The burned skin will appear red and waxy white without blister formation.
  - D. A burn scab that appears as a hard, dry, leathery eschar will be evident on the skin.
33. Nancy Nurse, RN, receives an order to hang an aminophylline drip. The drip is to be mixed with a ratio of 1mg of aminophylline to 5cc of D5W. How many mg of aminophylline must be added to a 250cc bag of D5W in order to have the correct dilution?
- A. 5 mg's
  - B. 10 mg's
  - C. 25 mg's
  - D. 50 mg's
34. Aminophylline is supplied in vials containing 20mg/cc. How many cc's of the drug must be drawn up in order to administer a 300mg bolus?
- A. 10 cc's
  - B. 15 cc's
  - C. 20 cc's
  - D. 60 cc's

35. Which lab value **does not** elevate because of fluid volume loss in a burn patient?
- A. hemoglobin
  - B. hematocrit
  - C. blood urea nitrogen
  - D. serum protein
36. An incision created on a burned extremity which allows outward swelling of tissues in order to relieve pressure on distal blood vessels and restores circulation is called a/an:
- A. escharotomy
  - B. digitotomy
  - C. laryngotomy
  - D. dermatotomy
37. During the initial treatment of a burn patient his pulse rate goes up to 116 beats per minute. This event is most likely due to:
- A. a cardiac disorder.
  - B. hypovolemia.
  - C. decreased blood pressure.
  - D. decreased urine output.
38. A systemic sign of infection is:
- A. bradycardia.
  - B. hypertension.
  - C. altered level of consciousness.
  - D. metabolic alkalosis.
39. Which of the following is the most common overall sign of acute renal failure?
- A. urine develops a fruity odor
  - B. expected urine output increases or decreases
  - C. urine specific gravity is greater than 1.040
  - D. urine develops a root beer color
40. While caring for a client in the oligarch phase of acute renal failure, the nurse's plan of care should include:
- A. maintaining reverse isolation to prevent infection.
  - B. Meticulous skin care to prevent skin breakdown
  - C. Increasing the client's protein intake to prevent muscle wasting
  - D. Encouraging fluid intake to prevent dehydration

41. You observe labored respirations with coarse rales throughout the lungs in the client with acute renal failure. The most appropriate nursing intervention would be to:
- A. assess the color of lips and nailbeds and capillary refill.
  - B. have the client cough then auscultate the lungs again.
  - C. assess for ankle edema.
  - D. count the respiratory rate.
42. Laboratory findings you would expect to find in the client with chronic renal failure are:
- A. BUN 10 to 30 mg/dL, potassium 4.0 ,Eq/L, creatinine 0.5 to 1.5 mg/dL.
  - B. decreased serum calcium, serum pH 7.2, potassium 6.5 mEq/L, creatinine 4.5 mg/dL.
  - C. BUN 15 mg/dL, decreased serum calcium, creatinine 1.0 mg/dL.
  - D. BUN 35-40 mg/dL, potassium 3.5 mEq/L, pH 7.35, decreased serum calcium
43. In the patient with chronic renal failure, Kussmaul respirations occur. Which of the following statements best describes the rationale for this occurrence?
- A. The lungs compensate for metabolic acidosis by excreting CO<sub>2</sub> through the lungs.
  - B. The kidneys cannot excrete the bicarbonate ion or the hydrogen ion.
  - C. The kidneys are unable to excrete the potassium ion, resulting in acidosis.
  - D. The kidneys are unable to excrete sodium and phosphorus resulting in alkalosis.
44. The client in renal failure has an elevated serum potassium and the nurse administers sodium polystyrene sulfonate (Kayexalate). This drug is administered because of its ability to:
- A. increase potassium excretion from the colon.
  - B. release hydrogen ions for sodium ions.
  - C. Increase calcium absorption in the colon.
  - D. exchange sodium for potassium ions in the colon.
45. Which of the following clients with chronic renal failure would *not* be a candidate for peritoneal dialysis?
- A. A man with severe cardiovascular disease
  - B. A client with diabetes mellitus
  - C. A woman with severe respiratory disease
  - D. A 10-year-old-child

46. Mrs. Lee, a client with chronic renal failure, is receiving calcium carbonate. What is the rationale for this treatment?
- A. Calcium helps prevent ulcer formation.
  - B. Calcium binds with phosphorus to eliminate it from the body.
  - C. Calcium helps to prevent constipation.
  - D. Calcium binds with potassium to eliminate  $K^+$  from the body.
47. You are caring for Mrs. Patrick, a chronic dialysis patient who has an arteriovenous fistula. Nursing care of the fistula should include:
- A. Irrigating the fistula with heparin to prevent clotting.
  - B. Frequent dressing changes to prevent infection.
  - C. Washing the fistula site with soap and water.
  - D. Checking the blood pressure in the arm with the fistula to see if circulation is adequate.
48. When assessing a patient with chronic renal failure, you note tetany of several muscles. This may be an indication of:
- A. hyponatremia.
  - B. hyperkalemia.
  - C. hypocalcemia.
  - D. anemia.
49. The nurse would monitor which of the following laboratory values to monitor the effect of erythropoietin being given to a client with chronic renal failure?
- A. Hematocrit
  - B. Blood urea nitrogen
  - C. Leukocyte count
  - D. Serum creatinine
50. The nurse performing intermittent peritoneal dialysis notes that the client's medical record shows that the client has not had a bowel movement for 3 days. The nurse would be careful to assess the client for which of the following manifestations related to this information?
- A. Fluid leakage.
  - B. Cloudy dialysate output.
  - C. Reduced catheter outflow.
  - D. Increased thirst.

51. The nurse would encourage the client receiving peritoneal dialysis to do which of the following to manage low back pain associated with increased weight in the abdomen?
- A. Lying down as much as possible.
  - B. Walking on surfaces with gradual inclines.
  - C. Reducing voluntary fluid intake.
  - D. Performing specified exercises.
52. The normal medical management for hyponatremia in acute renal failure is:
- A. administration of 3% saline.
  - B. administration of Kayexalate and sorbital.
  - C. fluid restriction and diuretics.
  - D. high sodium diet and low potassium diet.
53. The nurse is conducting peritoneal dialysis for a client with renal failure. The drainage tubing has no outflow. Which of the following actions should the nurse take first?
- A. Notify the physician
  - B. Check the tubing for kinks or obstruction
  - C. Try a more concentrated dialysate solution
  - D. Apply a 5-pound sandbag to the abdomen
54. Which of the following strategies would be *least* helpful to the nurse who is trying to assist a client with renal failure stay within the prescribed fluid restriction?
- A. Put allotted water into a spray bottle.
  - B. Use ice chips liberally instead of fluids.
  - C. Give medications at mealtimes.
  - D. Provide frequent oral hygiene.
55. Which of the following dietary modifications should the nurse suggest to a client receiving peritoneal dialysis?
- A. "Try to eat more protein."
  - B. "High fiber foods will help prevent constipation."
  - C. "Dairy products are a good source of calcium."
  - D. "Eggs and cheese are easy to digest."

56. The client's dose of Lanoxin is .375 mg/day. During renal failure, the dose is decreased by two-thirds (i.e. he will get only 1/3 the normal dose) How much Lanoxin should be given?
- A. .125 mg/day
  - B. .225 mg/day
  - C. .25 mg/day
  - D. .333 mg/day
57. The client has just completed hemodialysis. The nurse notes that he has a fever of 100 degrees F. Which of the following is the most appropriate nursing action?
- A. Encourage the client to drink fluids.
  - B. Notify the physician immediately.
  - C. Check the AV fistula site for infection and continue to monitor the vital signs as ordered.
  - D. Do nothing, as this is an expected finding.
58. The nurse should assess the client with uremia for which of these expected clinical manifestations?
- A. Hiccups
  - B. Muscle cramps
  - C. Itching
  - D. All of the above
- Mary Smith, a 36 y.o. R.N., develops a hypersensitivity reaction to latex. Upon exposure she develops urticaria, sneezing, coughing, wheezing, hypotension and shock. Questions 59-61 deal with her care.
59. Mary's clinical manifestations of latex allergy lead you to determine that she is having a:
- A. Type I anaphylactic reaction
  - B. Type II cytotoxic reaction
  - C. Type III immune complex reaction
  - D. Type IV cell-mediated reaction

60. During this type of hypersensitivity reaction, the pathophysiologic mechanisms are:
- A. IgE production mediates the immediate response by activating mast cells and basophils, causing them to degranulate and release mediators such as histamine.
  - B. Complement-dependent mechanisms involving IgG & IgM activate the complement system and injure the cell to which the antigen is bound, leading to further cell injury and edema.
  - C. Sensitized T cells respond to antigens by releasing lymphokines, which direct phagocytic cell activity.
  - D. Antigen-antibody complexes deposit in vessels and tissue walls leading to inflammation and airway narrowing.
61. A major nursing responsibility in providing care for Mary would be to:
- A. Teach her regarding latex allergy
  - B. Assess her knowledge concerning latex allergies
  - C. Discuss with her the possibility of needing to change careers.
  - D. None of the above.

**Terry Thompson is admitted to your unit with no medical diagnosis. He has a history of food allergy. Offending foods have not been determined. Questions 62 & 63 deal with Mr. Thompson's care.**

62. Diagnosis of Mr. Thompson's food allergy is most dependent on:
- A. Measuring the serum blood tryptase levels
  - B. A thorough history
  - C. Placebo controlled food challenge
  - D. Elimination of specific foods from his diet.
63. The most important nursing action for Mr. Thompson is:
- A. Teach him to avoid persons with upper respiratory infections
  - B. Provide a diet high in calories, and high in vitamins
  - C. Provide him with information concerning antihistamine therapy
  - D. Determine his ability to cooperate in skin testing and the double-blind, placebo-controlled food challenge.

## APPENDIX E

## EXAM III

Directions: Complete each of the following questions on the answer sheet with the best possible answer. Do not write on the test itself.

1. When one seizure after another occurs without the client's regaining consciousness between seizures, it is called:
  - A. frequent seizures.
  - B. febrile seizures.
  - C. status epilepticus.
  - D. petit mal seizures.
  
2. The intravenous drug of choice for the disorder listed in #1 is:
  - A. diazepam (Valium).
  - B. phenobarbital.
  - C. codeine.
  - D. Tegretol.
  
3. The most important nursing responsibility during a seizure is to:
  - A. note the type of seizure, where it began, the type of movement, and parts of the body involved.
  - B. maintain a patent airway.
  - C. protect against the client biting his/her tongue.
  - D. patient teach concerning compliance to medication regimen.

**Charles Anderson, age 24, is the victim of an automobile accident, and is admitted to the emergency room with a deep laceration on the right side of his head and a bleeding abrasion on his face. He is drowsy but able to respond to verbal stimuli. His vital signs are blood pressure 114/70 mm Hg, pulse 100, respirations 28. Dexamethasone (Decadron) is ordered, and he is admitted to the ICU for further observation. Questions #4 through #12 deal with Mr. Anderson's care.**

4. The nurse knows that an injury to the right side of the brain may produce pupil dilation on:
  - A. the same side.
  - B. the opposite side.
  - C. on both sides.



5. Which of the following would be **INAPPROPRIATE** as an assessment priority for Mr. Anderson?
- A. level of consciousness
  - B. vital signs
  - C. bladder fullness
  - D. motor reflexes

**Mr. Anderson becomes confused during the night and falls quietly asleep. The nurse takes his vital signs and finds his blood pressure is 155/60 mm Hg, his pulse is 64, and his respirations are 18. Increased intracranial pressure is suspected.**

6. Several hours later, Mr. Anderson has a seizure secondary to increased intracranial pressure. Which of following would be included in the initial treatment?
- A. craniotomy
  - B. induced barbiturate coma
  - C. osmotic diuretics and corticosteroids
  - D. phenobarbital (Luminal) and phenytoin sodium (Dilantin)
7. Between the onset of increased intracranial pressure and the most serious complication, there is a period of time available to decrease intracranial pressure. What is the most serious complication of increased intracranial pressure?
- A. cerebral hypoxia
  - B. seizures
  - C. vascular occlusion
  - D. herniation
8. Hyperventilation decreases intracranial pressure by:
- A. causing cerebral vasoconstriction.
  - B. increasing cerebral oxygenation.
  - C. increasing the pCO<sub>2</sub>.
  - D. changing metabolism from anaerobic to aerobic.

9. Two weeks later, Mr. Anderson's condition has stabilized. He is restless, talks incessantly, and asks repetitive questions. These behaviors are most indicative of:
- A. depression.
  - B. anxiety.
  - C. anger.
  - D. denial.
10. Which of the following is probably **not** the underlying cause of his behavior?
- A. powerlessness.
  - B. fear of dying.
  - C. decreased self-esteem.
  - D. role acceptance.
11. Unequal pupillary light reflexes in the unconscious client are NOT likely to be a symptom of:
- A. cardiac arrest.
  - B. brain contusion.
  - C. epidural hematoma.
  - D. brain tumor.
12. Decerebrate posturing in response to painful stimuli is exhibited by which of the following?
- A. extension of lower and upper extremities
  - B. extension of lower and flexion of upper extremities
  - C. flexion of lower and upper extremities
  - D. flexion of lower extremities and extension of upper extremities

**During the first 8 hours after a head injury, John Jones, excretes 3500 ml of urine; his fluid intake has been 800 ml, and no diuretics have been given. Questions #13 through #16 deal with Mr. Jones' care.**

13. Mr. Jones' clinical signs are probably indicative of:
- A. cerebral mellitus.
  - B. diabetes insipidus.
  - C. syndrome of inappropriate antidiuretic hormone (SIADH).
  - D. cerebral concussion.

14. The affected area of Mr. Jones' brain is probably the:
- A. right hemisphere.
  - B. left hemisphere.
  - C. posterior pituitary lobe.
  - D. thalamus.
15. This condition could lead to:
- A. increased intracranial pressure.
  - B. hypovolemia and electrolyte imbalance.
  - C. cerebral infection.
  - D. ketosis and acidosis.
16. What would you expect the specific gravity of Mr. Jones' urine to be?
- A. low
  - B. high
  - C. normal
  - D. variable
17. Which of the following disorders would most likely be accompanied by a sudden, severe headache, photophobia, neck rigidity, and loss of consciousness?
- A. subdural hematoma
  - B. intracranial hemorrhage
  - C. hydrocephalus
  - D. encephalitis
18. When is cerebral vasospasm most likely to occur?
- A. after the evacuation of a subdural hematoma
  - B. during surgery for a pituitary tumor
  - C. after a ruptured cerebral aneurysm
  - D. during herniation

**Mr. Mark Malone, a 25 year old, is admitted to the emergency room with a possible spinal injury following a car accident. He is conscious and unable to move his legs or his arms on command. Questions #19 through #27 deal with Mr. Malone's care.**

19. When transferring a client with a possible spinal cord injury, what is the most important consideration for the nurse to remember?
- A. Support the lower extremities since they are likely to be weak or paralyzed.
  - B. Explain what you are about to do so the client can assist you.
  - C. Support the back with additional pillows to prevent further spinal trauma.
  - D. Immobilize the head, neck, and back to prevent further spinal trauma.
20. Which of the following would occur if Mr. Malone has spinal shock?
- A. spastic paralysis
  - B. hypertension
  - C. diaphoresis below the level of injury
  - D. loss of bowel and bladder tone
21. Mr. Malone has **complete severance of the spinal cord at C3-4**. Select the most important action for a nurse caring for this kind of client in the acute stage following injury.
- A. Turn and position at least q2h.
  - B. Prevent the complications of immobility.
  - C. Maintain a patent airway and adequate ventilation.
  - D. Monitor renal output.
22. Immediately after his injury, Mr. Malone's bladder will:
- A. be spastic.
  - B. be atonic.
  - C. empty with slightest stimulus.
  - D. be normal.

23. Which of the following is correct concerning the relationship between the branches of the autonomic nervous system?
- A. The parasympathetic branch excites all systems, and the sympathetic inhibits all systems.
  - B. The parasympathetic branch excites most systems except the gastrointestinal tract and urinary bladder, and the sympathetic has the opposite effect.
  - C. The sympathetic branch excites most systems but inhibits the gastrointestinal tract and urinary bladder; the parasympathetic branch inhibits most systems but stimulates the gastrointestinal tract and urinary bladder.
  - D. There is no relationship between the two branches.
24. When would the nurse expect Mr. Malone to exhibit return of normal motor function?
- A. immediately
  - B. within 24 hours
  - C. in a few months
  - D. never
25. A bowel and bladder training program is to be established for Mr. Malone. He has a Foley catheter, which is clamped for intervals to increase bladder capacity. The plan is to use an external catheter and to teach him to stimulate voiding by stimulating his thigh. After the catheter has been clamped for 1 hour, Mr. Malone complains of a headache, is sweating, and has an elevated blood pressure. The most probable cause of these signs and symptoms is:
- A. exaggerated parasympathetic system response.
  - B. autonomic dysreflexia
  - C. suppression of the sympathetic nervous system.
  - D. septicemia resulting from lack of flushing of bacteria from the bladder.
26. The most probable stimulus for this episode is:
- A. bowel distension.
  - B. stimulation of the urinary sphincter by the Foley catheter.
  - C. bladder distension.
  - E. fear.

27. Mr. Malone is cautioned not to drink too much milk. He is told that it could contribute to his problems with kidney stones. He asks why it would be a problem now since he is drinking no more milk than before the accident. The nurse should respond that:
- A. he is probably drinking more milk than before the accident and just doesn't realize it.
  - B. he has better absorption of calcium now than before the accident.
  - C. his kidneys are not clearing calcium as well as before surgery.
  - D. the lack of stress on the long bones causes demineralization and increases the amount of calcium to be cleared by the kidneys.
28. Tom Smith, an 18 year old, was injured in a diving accident. He is diagnosed as having an anterior cord compression. You would expect him to have:
- A. loss of motor function and decreased pain sensation lasting hours to becoming permanent
  - B. loss of touch, position, pressure sensation and vibration below the level of injury.
  - C. loss of motor function, position and pressure sensation below the level of injury.
  - D. loss of temperature sensation, position, and motor function contralateral to the injury.
29. Methylprednisolone (Solu-Medrol) is ordered at a dosage of 30 mg/Kg of body weight. The patient weighs 60Kg. How much methylprednisolone should you administer?
- A. 180 mg
  - B. 240 mg
  - C. 930 mg
  - D. 1800 Mg
30. An IV of 0.9NS is ordered at 80 cc's/hr. With a drip factor of 15 drops per cc, how fast should the IV run?
- A. 10 gtts/min
  - B. 20 gtts/min
  - C. 30 gtts/min
  - D. 40 gtts/min

31. Nursing measures which are most important in prevention of contractures in the client with a spinal cord injury are:
- A. splinting, position, and range of motion exercises.
  - B. range of motion exercises and frequent turning.
  - C. frequent turning and splinting of extremities.
  - D. splinting of extremities and positioning.
32. Patients with a high cervical injury should not receive narcotic analgesics. Why?
- A. Cervical injuries cause no pain.
  - B. The narcotic may further depress respirations.
  - C. ASA (aspirin) is excellent for relieving pain associated with spinal cord injury.
  - D. It may further impair renal function.
33. In maintenance of the airway in a person with a suspected spinal cord injury, which of the following is contraindicated?
- A. hyperextension of the neck
  - B. the jaw thrust method
  - C. nasotracheal suctioning
  - D. insertion of an artificial airway
34. Which of the following is contraindicated in the client with increased intracranial pressure?
- A. frequent neuro checks
  - B. side rails up
  - C. flexion of the neck
  - D. turn side to side

**Vincent Smith, a 56 year old, is admitted with a diagnosis of possible GI hemorrhage. Questions #35 through #38 deal with Mr. Smith's care.**

35. Signs and symptoms of gastric hemorrhage you would expect are:
- A. dizziness, restless, orthostatic hypotension, dark green emesis and tarry stools.
  - B. orthostatic hypotension, tachycardia, hematemesis, and tarry stools.
  - C. somnolence, bradycardia, hypotension, brown nasogastric drainage, and thirst.
  - D. bright red blood in stools, tachycardia, thirst, hypotension, and hematemesis.
36. Diagnostic tests you anticipate that Mr. Smith will have include all **EXCEPT**:
- A. endoscopy.
  - B. angioplasty.
  - C. HGB & HCT.
  - D. possible x-rays, abdominal CT or MRI.
37. Orders have been given to neutralize gastric acidity. Methods used to do this include:
- A. administration of PO or NG antacids, and H2 inhibitors.
  - B. iced saline lavage, blood transfusions, and administration of vasopressin.
  - C. blood transfusions, administration of antihistamines, and frequent vital signs.
  - E. bedrest, maintenance of fluid and electrolyte balance and administration of PO or NG antacids.
38. A major complication of gastric hemorrhage is perforation. Signs and symptoms of this complication include:
- A. fever, tachycardia, dehydration, sudden and severe abdominal pain with rebound tenderness and rigidity.
  - B. hypotension, abdominal pain with tenderness to palpation, and hyperactive bowel sounds.
  - C. hyperactive bowel sounds, vague non-localized abdominal pain, and fever.
  - D. dehydration, abdominal pain with rebound tenderness and rigidity, hypothermia, and hypotension.



**John Ward is a 44 year old transient, who has a 30 year history of alcohol abuse and a 10 year history of cirrhosis. He is admitted with hematemesis and rectal bleeding. His admission diagnosis is bleeding esophageal varices with ascites. His blood pressure is 110/50 mm Hg, pulse 112, respirations 24, temperature 99° F (37.2°C) rectally. His breath smells of alcohol and he reports having drunk whiskey within the past three hours. He has an IV of 5% dextrose and water running at 125 cc/hr. Questions #39 through #50 deal with Mr. Ward's care.**

39. Which of the following is an **INCORRECT** statement about cirrhosis?
- A. It is a chronic disease resulting in inflammation, degeneration, and necrosis of the liver.
  - B. It causes obstruction of the venous and sinusoidal channels of the liver.
  - C. It is frequently caused by alcohol abuse.
  - D. It causes decreased resistance to blood flow throughout the liver.
40. Which of the following would most likely be observed during an assessment of Mr. Ward?
- A. peripheral edema, right upper quadrant pain, hemorrhoids, decreased urine output and dark urine
  - B. spider angiomas, palmar erythema, chest pain, and lower abdominal pain
  - C. hepatomegaly, decreased peripheral pulses, cool extremities, and intermittent claudication
  - D. dyspnea, pruritus, inspiratory stridor, and intermittent jaundice
41. Which of the following laboratory results would **NOT** be expected with the diagnosis of cirrhosis?
- A. elevated ammonia levels
  - B. decreased prothrombin time and leukocytes
  - C. decreased platelets and increased bilirubin
  - D. elevated SGPT, SGOT, and LDH
42. The most important pathological factor contributing to the formation of esophageal varices that the nurse needs to consider when planning care for Mr. Ward is:
- A. increased platelet count.
  - B. increased pulmonary artery pressure.
  - C. portal hypertension.
  - D. renal failure.

43. In assessing Mr. Ward, the nurse knows that portal hypertension usually does **NOT** cause:
- A. esophageal varices.
  - B. ascites.
  - C. hemorrhoids.
  - D. pulmonary edema.

**Mr. Ward was discharged and four months later readmitted in a comatose state.**

44. Knowing Mr. Ward's history, what condition would the nurse most likely suspect?
- A. brain tumor
  - B. respiratory failure
  - C. hepatic encephalopathy
  - D. Parkinson's disease
45. While caring for Mr. Ward, the nurse must consider that the most important pathophysiological factor contributing to his current state is which of the following:
- A. increased serum ammonia levels.
  - B. increased prothrombin time.
  - C. portal hypotension.
  - D. increased serum bilirubin.
46. Which of the following would the nurse prepare to administer to Mr. Ward?
- A. neomycin and lactulose
  - B. protein tube feeding
  - C. phenobarbital
  - D. phenytoin sodium (Dilantin)
47. What is the therapeutic effect of the treatment in question #46?
- A. to decrease muscular twitching
  - B. to induce sedation
  - C. to provide nutrition that promotes healing
  - D. to decrease serum ammonia levels

48. In planning care for Mr. Ward, which of the following statements best describes the necessary dietary alterations?
- A. high calorie and vitamins
  - B. low fat
  - C. low carbohydrate
  - D. high fiber
49. Mr. Ward develops sudden oliguria, azotemia and hyponatremia. He is afebrile. The nurse suspects:
- A. acute renal failure.
  - B. pancreatitis.
  - C. hepatorenal syndrome.
  - D. congestive heart failure.
50. With the development of oliguria, Mr. Ward's gentamicin is stopped. Why?
- A. He no longer needs it since his fever has subsided.
  - B. His muscle tremors indicate that he is developing central nervous system irritation from the drug.
  - C. It is nephrotoxic.
  - D. It is ototoxic.

**Match the following aspects of CVAs with their types (a or b). Answers may be used more than once.**

- |                                    |                |
|------------------------------------|----------------|
| 51. ___ sudden onset               | A. ischemic    |
| 52. ___ ruptured aneurysm          | B. hemorrhagic |
| 53. ___ embolus                    |                |
| 54. ___ thrombus                   |                |
| 55. ___ arteriovenous malformation |                |

56. Which of the following chronic diseases should the nurse specifically inquire about when assessing a client with head trauma?
- A. rheumatoid arthritis
  - B. hypertension
  - C. Osteoporosis
  - D. Graves' disease
57. The most common respiratory complication that occurs following a craniotomy is:
- A. aspiration.
  - B. hyperventilation
  - C. pneumothorax.
  - D. apnea.
58. Which of the following medications for pain management would the nurse expect to administer to the client who has had a craniotomy for a cerebral aneurysm?
- A. acetaminophen with codeine (Tylenol with codeine)
  - B. acetylsalicylic acid (aspirin)
  - C. meperidine hydrochloride (Demerol)
  - D. morphine sulfate

**Match the following:**

- |     |                                 |    |                    |
|-----|---------------------------------|----|--------------------|
| 59  | ___ bilirubin not excreted      | A. | encephalopathy     |
| 60. | ___ impaired ammonia metabolism | B. | bleeding           |
| 61. | ___ thin-walled distended veins | C. | jaundice           |
| 62. | ___ vitamin K deficiency        | D. | ascites            |
|     |                                 | E. | esophageal varices |
63. Vasopressin (Pitressin) therapy for GI bleeding results in:
- A. improved blood flow in the portal system.
  - B. relaxation of vascular bed smooth muscle.
  - C. effective long-term control of variceal bleeding.
  - D. vasoconstriction of abdominal blood vessels.

64. Persons with nasogastric tubes connected to suction should be NPO.
- A. True
  - B. False
65. Following a portosystemic decompression shunting procedure, the nurse should immediately report:
- A. increased urinary output.
  - B. decreased heart rate to 72 beats per minute.
  - C. increased abdominal girth measurements.
  - D. slightly increased BP.
66. The most appropriate solution for irrigating a nasogastric tube in the post-op patient is:
- A. tap water.
  - B. D5W.
  - C. Lactated Ringers solution.
  - D. normal saline.
67. The only sure method for checking nasogastric tube placement is:
- A. insertion of air into the tube while auscultating over the stomach area.
  - B. x-ray of the stomach.
  - C. check for the pH of stomach aspirate.
  - D. auscultating for bowel sounds.
68. The purpose of iced saline irrigations in the person with a gastric hemorrhage is to:
- A. cause gastric vasoconstriction and decreased bleeding.
  - B. decrease thirst in the patient who is NPO.
  - C. provide chloride in the person who is deficient in chloride.
  - D. moisten the gastric lining.
69. What question(s) is appropriate for the nurse to ask the client in order to evaluate if the client is oriented to person, place, and time?
- A. Can you count backwards from 100 by 7?
  - B. Can you do as I ask you to do?
  - C. What is your name? Where are you? What day is it?
  - D. What does "a stitch in time saves nine" mean?

70. Which of the following is **NOT** an indicator of meningeal irritability?
- A. positive Babinski's
  - B. presence of nuchal rigidity
  - C. positive Brudzinski's sign
  - D. positive Kernig's sign
71. The nurse should observe for which of these complications following a paracentesis in a client with ascites?
- A. hyperproteinemia
  - B. massive vasoconstriction
  - C. hypovolemic shock
  - D. diuresis
72. A client has been admitted following a head injury from an automobile accident. The nurse assesses the following vital signs: **8:00:** BP 120/80; pulse 88, **9:00:** BP 130/80; pulse 74, **10:00:** BP 138/76; pulse 62. What is the significance of these vital signs?
- A. hypovolemia
  - B. hypertension
  - C. increased intracranial pressure
  - D. mild changes in vital signs
73. The nurse should question the administration of which of these drugs to a client with cirrhosis?
- A. acetaminophen (Tylenol)
  - B. furosemide (Lasix)
  - C. lactulose
  - D. Milk of Magnesia

## APPENDIX F

## MAJOR CATEGORIES IN THE TAXONOMY OF EDUCATIONAL OBJECTIVES

*Categories in the Cognitive Domain: (with Outcome-Illustrating Verbs)*

**Knowledge** of terminology; specific facts; ways and means of dealing with specifics (conventions, trends and sequences, classifications and categories, criteria, methodology); universals and abstractions in a field (principles and generalizations, theories and structures):

Knowledge is (here) defined as the remembering (recalling) of appropriate, previously learned information. Examples include: defines; describes; enumerates; identifies; labels; lists; matches; names; reads; records; reproduces; selects; states; views.

**Comprehension:** Grasping (understanding) the meaning of informational materials.

Examples include: classifies; cites; converts; describes; discusses; estimates; explains; generalizes; gives examples; makes sense out of; paraphrases; restates (in own words); summarizes; traces; understands.

**Application:** The use of previously learned information in new and concrete situations to solve problems that have single or best answers. Examples include: acts; administers; articulates; assesses; charts; collects; computes; constructs; contributes; controls; determines; develops; discovers; establishes; extends; implements; includes; informs; instructs; operationalizes; participates; predicts; prepares; preserves; produces; projects; provides; relates; reports; shows; solves; teaches; transfers; uses; utilizes.

**Analysis:** The breaking down of informational materials into their component parts, examining (and trying to understand the organizational structure of) such information to

develop divergent conclusions by identifying motives or causes, making inferences, and/or finding evidence to support generalizations. Examples include: breaks down; correlates; diagrams; differentiates; discriminates; distinguishes; focuses; illustrates; infers; limits; outlines; points out; prioritizes; recognizes; separates; subdivides.

**Synthesis:** Creatively or divergently applying prior knowledge and skills to produce a new or original whole. Examples include: adapts; anticipates; categorizes; collaborates; combines; communicates; compares; compiles; composes; contrasts; creates; designs; devises; expresses; facilitates; formulates; generates; incorporates; individualizes; initiates; integrates; intervenes; models; modifies; negotiates; plans; progresses; rearranges; reconstructs; reinforces; reorganizes; revises; structures; substitutes; validates.

**Evaluation:** Judging the value of material based on personal values/opinions, resulting in an end product, with a given purpose, without real right or wrong answers. Examples include: appraises; compares & contrasts; concludes; criticizes; critiques; decides; defends; interprets; judges; justifies; reframes; supports.



## APPENDIX G

## MASTER'S, ET AL. (2001) ASSESSMENT OF MULTIPLE-CHOICE QUESTIONS

Step 1: The cognitive level of questions was evaluated using a table describing Bloom's cognitive taxonomy

Verbs Associated with the First Four Categories of Cognition  
for Bloom's Taxonomy of Educational Objectives

**Knowledge:** Ability to remember, recall, or recognize specific elements in a subject area.

Memory may include facts, terms, trends, sequence, classifications of elements, theories, generalizations, and any type of information taught for the purpose of immediate recall.

**Comprehension:** Ability to translate, interpret, or extrapolate memorized information requiring "understanding," which includes rephrasing knowledge, explaining or summarizing knowledge, and making inferences beyond the literal meaning of knowledge.

**Application:** Ability to apply principles and generalization to new problems and situations, requiring that the student identify the relevant and extraneous information in a problem, order the relevant information in a sequence appropriate to solving the problem, and use acquired knowledge to seek a solution. Questions may involve rules, principles, generalizations, theories, methods, or concepts.

**Analysis:** Ability to break down material into its constituent elements and examine the structure and the relationship of the elements. Abilities include classifying information, drawing inferences, using criteria to discern a pattern or structure, recognizing organizational principles, or using contextual clues to determine factors that influence organization of the material.

## APPENDIX H

**HOLISTIC CRITICAL THINKING SCORING RUBRIC WITH NURSING PROCESS  
FOR ESSAY EXAMINATION QUESTIONS 1 & 2**

	Exam Question	Nursing Process	Grading Criteria			
Exam Question # 1	Use the nursing process to devise a plan of care for the patient in the case study, identifying specific nursing interventions. (Synthesis Level)	Assessment	Accurately interprets evidence, statements, and questions <b>10 points</b>	Often interprets evidence, statements, and questions accurately <b>7 points</b>	Often misinterprets evidence, statements, and questions <b>4 points</b>	Offers biased interpretations of evidence, statements, questions, information, or the points of view of others. <b>1 point</b>
		Diagnosis	Identifies salient arguments <b>10 points</b>	Often identifies salient arguments <b>7 points</b>	Occasionally misidentifies salient arguments <b>4 points</b>	Fails to identify relevant arguments <b>1 point</b>
		Plan	Draws warranted conclusions <b>10 points</b>	Often draws warranted conclusions <b>7 points</b>	Occasionally draws illegitimate conclusions <b>4 points</b>	Argues using fallacious or irrelevant reasons, and unwarranted claims <b>1 point</b>
Exam Question # 2	Provide rationale to justify why your plan of care is warranted over alternative points of view. (Evaluation Level)	Implementation	Analyzes and evaluates alternative points of view <b>10 points</b>	Often analyzes and evaluates alternative points of view <b>7 points</b>	Occasionally incorrectly analyzes and misevaluates alternative points of view <b>4 points</b>	Ignores or superficially evaluates obvious alternative points of view <b>1 point</b>
		Evaluation	Justifies key results and explains assumptions <b>10 points</b>	Often justifies key results and explains assumptions <b>7 points</b>	Occasionally incorrectly justifies key results and does not explain assumptions <b>4 points</b>	Does not justify results or procedures, nor explain reasons <b>1 point</b>
			Logically follows where evidence and reason lead <b>10 points</b>	Often logically follows where evidence and reason lead <b>7 points</b>	Occasionally illogically follows where evidence and reason lead <b>4 points</b>	Regardless of evidence, maintains or defends views based on self-interest or preconceptions <b>1 point</b>

APPENDIX I  
COURSE CONTENT

BURNS

<b>Anatomy and Physiology Review</b>	Protection, Homeostasis, Thermoregulation, Sensory Reception, Vitamin D Production, Processing of Antigenic Substances Function of the Integumentary System Dermatologic Care: Appearance and Self-Esteem Effects of Aging: Adolescence, Adulthood, Older Adulthood Client in the Emergent Phase of a Burn Injury
<b>Medical Management</b>	Assessing the Burn, Wound Care, Prevent Tissue Ischemia, Transport to a Burn Facility
<b>Etiology &amp; Risk Factors</b>	Thermal, Chemical, Electrical, Radiation, Inhalation Pathophysiology of a Burn Injury Direct Injury to Skin, Fluid Shifts, Pulmonary System, Inhalation Injury, Myocardial Depression, Altered Skin Integrity, Immunosuppression, Psychological Response

<b>Clinical Manifestations of a Client with a Burn Injury</b>	Degree of Injury, Fluid and Electrolyte Imbalance, Alterations in Respiration, Decreased Cardiac Output, Pain Responses, Altered Level of Consciousness, Psychological Alterations
<b>Client in the Acute Phase of a Burn Injury</b>	Medical Management: Prevent Infection, Metabolic Support, Minimize Pain, Provide Wound Care, Provide Psychological Support  Labs (normal values): Serum - Albumin (3.5-5 g/dl), Urine - Bilirubin (neg.), Ketones (neg.), pH (4.5-8.0), protein (neg.) specific gravity (1.003-1.030)).
<b>Client in the Emergent Phase of a Burn Injury</b>	Nursing Diagnoses: Impaired Gas Exchange , Altered Tissue Perfusion: Peripheral, Ineffective Airway Clearance, Altered Tissue Perfusion: Renal, Fluid Volume Deficit, Risk for Infection, Impaired Physical Mobility, Ineffective Family Coping
<b>Client in the Acute Phase of a Burn Injury</b>	Nursing Diagnoses: Impaired Gas Exchange, Ineffective Family Coping Skills, Ineffective Airway Clearance, Self-Esteem Disturbance, Hypothermia, Impaired Physical Mobility, Risk for Infection/Impaired Tissue Integrity, Altered Nutrition Surgical Management - Debridement Nursing Management - Preoperative

	<b>Care, Postoperative Care</b>
<b>Management of Clients with Acute Renal Failure</b>	<p>Defined: Abrupt loss (hours to days) of kidney function.</p> <p>Etiology and Risk Factors</p> <ul style="list-style-type: none"> <li>• Prerenal - Interference w/ perfusion, R/T hypovol., volume shifts, decreased c.o., decreased pvr, vascular obstruction</li> <li>• Intrarenal - Parenchymal changes (tubular necrosis), R/T nephrotoxins (myoglobin), trauma, diabetes, infection, transplant rejection</li> <li>• Postrenal - Obstruction in the urinary tract, R/T prostatic hypertrophy, calculi, tumors, urethral damage, spinal cord injury.</li> </ul> <p>Pathophysiology - Unable to conserve Na which leads to renin-angiotensin-aldosterone system. Vascular supply is then redistributed...reduced blood flow decreases GFR - oliguria</p> <p>Clinical Manifestations - Oliguria (1-8 wks.), return of GFR and level BUN signal diuretic phase, Recovery phase (3-12 mo.)</p>
<b>Outcome Management: Medical</b>	<p>Prevent Acute Renal Failure - Oliguric ARF = less than 400ml/d</p> <p>Maintain Fluid and Electrolyte Balance and Nutrition - Lab findings (BUN 10-20mg/dl, Cr.0.7-1.3mg/dl, Ca 8.5-10.5 mg/dl, Na 135-145 meq/l, K 3.5-5 meq/l)</p> <p>Replace Renal Function - Dialysis or Continuous Renal Replacement Therapy (CRRT).</p> <p>Prevent Infection - Secondary infection common R/T lowered immunity</p> <p>Monitor Client - Hyperkalemia, acidotic state, most dangerous</p>
<b>Nursing Management</b>	<p>Fluid Volume Deficit or Fluid Volume Excess (I/O, V.S., skin turgor, mucous membranes, daily weights, labs).</p> <p>Altered Nutrition: less than body requirements</p> <p>Risk for Infection - Watch V.S., skin, labs</p> <p>Risk for Impaired Skin Integrity (Skin breakdown possible - meticulous care necessary).</p> <p>Anxiety</p>
<b>Chronic Renal Failure</b>	<p>Etiology and Risk Factors: Progressive reduction in functioning renal tissue. Glomerulonephritis, ARF, polycystic disease, obstruction, recurring pyelonephritis. Additionally, DM, HTN, SLE, Sickle cell.</p> <p>Pathophysiology - Degredation of nephrons with lowering renal fx., GFR falls - BUN/CRT rise - nephrons hypertrophy - and</p>

	<p>solutes increase - causing more damage. When GFR falls to 10 - 20 ml/min....requires dialysis.</p> <p>Clinical Manifestations: multi-system changes - Reduced renal reserve (elevated BUN w/o S/S), Renal insuff. (mild azotemia (increased nitrogen)), Renal failure (severe azotemia, acidosis, anemia, hypernat., hyperkal., and hyperphos.), ESRD (altered excretion and systemic involvement).</p>
<b>Chronic Renal Failure: Changes</b>	<p>Electrolytes: Hyponatremia (R/T water retention), hyperkalemia(ECG change), hypocalcemia (muscle tetany), hyperphosphatemia (osteomalacia).</p> <p>Metabolic - BUN/CRT rise, proteinuria, metabolic acidosis (ammonia buildup) which contributes to hyperkalemia.</p> <p>Hematologic - anemia, reduced erythropoietin</p> <p>GI - Anorexia, N/V, metallic taste, ulcers, constipation</p> <p>Cardiovascular - HTN, Dysrhythmias, atherosclerosis</p> <p>Respiratory - Pulmonary edema</p> <p>Musculoskeletal - osteoporosis, joint pain</p> <p>Integumentary - dry, itchy skin (pruritus), petechiae (tiny hemorrhagic spots)</p>
<b>Chronic Renal Failure: Treatment</b>	<p>Erythropoietin - Stimulates RBC production/Monitor HCT</p> <p>Kayexalate - Binds K and increases K excretion from colon</p> <p>Calcium Carbonate - Binds w/ phosphorus</p> <p>Diuretics/Fluid restriction - facilitates excretion of fluid buildup</p> <p>Dialysis - peritoneal (easier, managed at home, used for pt.s w/ CVD, DM, and Children. C/I w/ peritonitis &amp; respiratory disease) and hemodialysis (all other cases, including drug o.d.). Need A/V fistula placed (Wash w/ soap and water, watch for bleeding/infection, check bruit/thrill q shift)</p> <p>Surgery - Renal transplantation</p>
<b>Outcome Management</b>	<p>Preserve Renal Function &amp; Delay Dialysis</p> <p>Alleviate Extra-renal Manifestations</p> <p>Improve Body Chemistry: peritoneal dialysis, hemodialysis, medications</p> <p>Quality of Life: Chronic Renal Failure</p> <p>Nursing Management/Outcomes:</p> <p>Fluid Volume Deficit or Excess (I/O)</p> <p>Altered Nutrition: less than (decrease N/V, increase pallatibility).</p> <p>Constipation (Bran, stool softeners)</p> <p>Risk for Impaired Skin Integrity (Oils in bath water, avoid pressure areas)</p>

	<p>Fatigue (Maintain exercise regimen)</p> <p>Risk for Ineffective Coping (Allow decision making, provide support)</p> <p>Risk for Ineffective Management of Therapeutic Regimen (Provide info., explain procedure, reduce anxiety).</p> <p>Risk for Infection (Aseptic tech.)</p> <p>Risk for Ineffective Breathing (CDB, semi-fowler)</p> <p>Risk for Injury (dressing to protect site, clean A/V fistula site, No BP in affected arm).</p>
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**Neurological Alterations: Brain and Spinal Cord Injury/Increased ICP**  
**Acute Neurological Alterations – Status Epilepticus**

<b>Acute Alterations</b>	<p>Status Epilepticus - (def.) A medical emergency in which a client has continuous seizures (or seizures in rapid succession), without regaining consciousness, lasting for at least 30 minutes.</p> <p>Etiology</p> <ul style="list-style-type: none"> <li>• Genetic predisposition</li> <li>• Acute febrile state / Infection</li> <li>• Head injury / Trauma</li> <li>• Metabolic / Endocrine disorders (Hypoglycemia)</li> <li>• Brain tumors</li> <li>• Hypoxia</li> <li>• Fluid &amp; Electrolyte disorders</li> </ul> <p>Drug &amp; ETOH withdrawal</p>
<b>Pathophysiology</b>	<p>Many of these systemic responses are thought to result from the catecholamine surge that accompanies the condition. Hypertension, tachycardia, cardiac arrhythmias, and hyperglycemia are examples of these systemic effects.</p> <p>Body temperature may increase in patients following the vigorous muscle activity that accompanies GCSE (but of course infectious etiologies also must be considered in febrile patients). Lactic acidosis is common after a single generalized motor seizure and resolves with termination of the seizure.</p> <p>Cerebral metabolic demand increases greatly with GCSE; however, cerebral blood flow and oxygenation are thought to be preserved or even elevated early in the course of GCSE. Researchers experimented with paralyzed and artificially ventilated animals with many of the systemic metabolic changes controlled and concluded that neuronal loss after focal or generalized status epilepticus is linked to the abnormal neuronal discharges and not simply to the systemic effects of GCSE. The hippocampus seems especially vulnerable to damage by this mechanism.</p> <p>The hippocampus serves primarily to augment the capabilities of the underlying neocortical memory system. What occurs is that the hippocampus has access to the highest level information that is being processed by the neocortex at any given point in time. Another important quality of hippocampal representations is their snapshot like quality and the importance of contextual information in storage and recall. Most seizures terminate spontaneously. Which processes are involved in seizure termination and why or how these processes fail in status epilepticus is an active area of inquiry.</p>

<b>Signs / Symptoms</b>	<ul style="list-style-type: none"> <li>• Generalized Seizures</li> <li>• Tonic-Clonic = Stiffening or rigidity of muscles lasting 10-20 sec.</li> <li>• Focal seizure = Slow, repetitive jerking of a body part</li> <li>• Absence seizure (petit mal) = Sudden, brief cessation of all motor activity accompanied by a blank stare</li> <li>• Myoclonic = brief generalized jerking of extremities</li> <li>• Atonic (drop attacks) = sudden, momentary loss of muscle tone.</li> </ul> <p>Partial Seizures</p> <ul style="list-style-type: none"> <li>• Simple = conscious w/localized jerking</li> <li>• Complex = momentary loss of consciousness w/ periods of unintentionally altered behavior</li> <li>• Memory loss</li> <li>• Drowsiness (post-ictal)</li> <li>• Incontinence</li> <li>• Vomiting</li> <li>• Hypoxia</li> </ul> <p>Automatism (lip smacking, repeated swallowing)</p>
<b>Nursing Management</b>	<p>Tests</p> <ul style="list-style-type: none"> <li>• Hx / P.E.</li> <li>• Urology / Serology</li> <li>• CT / MRI / EEG / Skull XR</li> <li>• CSF analysis</li> <li>• Miniprofile</li> <li>• Drug screen toxicology</li> <li>• Prevention</li> <li>• Maintain med schedules</li> <li>• Injury</li> <li>• Aspiration</li> <li>• Assess/Monitor</li> <li>• Airway/breathing (during and after)</li> </ul> <p>Activities</p> <ul style="list-style-type: none"> <li>• Maintain airway (head to side / prepare suction)</li> <li>• Loosen clothing (no restraints)</li> <li>• Pad side rails or assist to floor</li> <li>• O2 / meds</li> <li>• Identify triggers (bright lights, loud noises)</li> <li>• Document type, time and duration of seizure</li> <li>• Avoid ETOH, fatigue and stress</li> </ul> <p>Pharmacology</p> <ul style="list-style-type: none"> <li>• Anticonvulsants (Diazepam 5-10 mg q 10-20 min, Lorazepam 4 mg q 10-15 min, Phenytoin 15-18 mg/kg slow IV push – not to exceed 50 mg/min)</li> </ul>



	<ul style="list-style-type: none"> <li>• Sedatives (Anesthetics if indicated)</li> </ul> <p>Considerations Complex symptom r/t brain disorders, metabolic states, trauma, drugs, and disease Goals: airway, seizure prevention, O<sub>2</sub>, protection, and reducing complications Nursing DX include: Risk for injury, Ineffective airway clearance, anxiety and fear, ineffective individual coping, and knowledge deficit. (Huff, 1997).</p>
<b>Increased ICP</b>	<p>Etiology Increased ICP can occur from trauma, hemorrhage, tumors, edema (inc. fluid surrounding brain), inflammation (inc. bulk r/t inc. blood vol.), or hydrocephalus. These can impair circulation, interfere with the absorption of CSF, alter nerve cell fx, and lead to brain stem decompression and death.</p> <p>Pathophysiology Munro-Kellie Hypothesis – Triad</p> <ul style="list-style-type: none"> <li>• CSF, Blood volume, and Brain Tissue – one of these must compensate b/c of limited space within the cranial vault. Initially CSF is displaced to spinal canal, when compliance is exceeded, ICP rises and other compensatory mechanisms begin</li> </ul> <p>Second phase of compensation is reduction in blood volume.</p> <ul style="list-style-type: none"> <li>• 40 – 60 % = cerebral tissue becomes acidotic</li> <li>• 60% &gt; = Alterations in cerebral metabolism, brain tissue hypoxia, and brain tissue ischemia</li> </ul> <p>Third phase (most lethal) = displacement of tissue causes herniation of tissue out of cranial vault which often results in death</p> <p>Herniations (5 types)</p> <ul style="list-style-type: none"> <li>• Transcalvarial – through the skull - outward</li> <li>• Central transtentorial – inward/downward displacement through the tentorial notch</li> <li>• Cingulate – btwn two frontal lobes/ pressed under falx cerebri</li> <li>• Lateral (Uncal) – temporal lobe compressed</li> <li>• Tonsillar – cerebellar tonsils are driven btwn the post. arch of the atlas and medulla</li> </ul> <p>Risk Factors</p> <ul style="list-style-type: none"> <li>• Meningitis</li> <li>• Trauma / Hemorrhage</li> <li>• Tumors / abscesses</li> <li>• Stroke</li> <li>• Hydrocephalus</li> <li>• Signs / Symptoms</li> </ul>

	<ul style="list-style-type: none"> <li>• Decline in LOC</li> <li>• Confusion / disorientation / blurred vision</li> <li>• Drowsiness / weakness</li> <li>• HA / vomiting</li> </ul> <p>Abnormal respirations – Cheyne-Stokes to apnea  Inc. BP, wide PP (sys – dias) &gt;40, Brady – Cushing’s Triad  Seizures / + Babinski</p> <p>Tests</p> <ul style="list-style-type: none"> <li>• Hx / P.E.</li> <li>• CT / MRI</li> <li>• EEG</li> <li>• Assess and Monitor:</li> <li>• Resp. status for (breathing, CO2 levels)</li> <li>• Neuro checks q15 min. (V.S., PERLA, LOC)</li> <li>• Posturing (decorticate, decerebrate, flaccid)</li> </ul> <p>Electrolyte and acid base imbalance</p> <p>Nursing Management - Glasgow Coma Scale (GCS)</p> <ul style="list-style-type: none"> <li>• Objective measurement of 3 components – Range in score from 3 to 15 total</li> <li>• Eye opening (1 N.R. to 4 spontaneous)</li> <li>• Verbal response (1 N.R. to 5 oriented)</li> <li>• Motor response (1 N.R. to 6 obeys commands)</li> </ul> <p>Nursing Management - Activities</p> <ul style="list-style-type: none"> <li>• I.D. and treat cause</li> <li>• HOB 30 – 45</li> <li>• C-Spine precautions</li> <li>• Maintain airway</li> <li>• Seizure precautions / pad rails</li> <li>• Avoid use of MSO4 (masks s/s)</li> </ul> <p>Nursing Management</p> <ul style="list-style-type: none"> <li>• Maintain Temp ( temp ICP)</li> <li>• Emotional support</li> <li>• Risk for immobility (turn, footboards)</li> <li>• Limit P.O.</li> <li>• Avoid sneezing, coughing, and Valsalva</li> <li>• Surgery / mech. vent. as needed</li> <li>• Hyperventilate (CO2 causes vasodilation)</li> </ul> <p>Pharmacology</p> <ul style="list-style-type: none"> <li>• Mannitol (Osmotic diuretic) (0.25-1g/kg IV)</li> <li>• Anticonvulsants (Phenytoin, Diazepam)</li> <li>• I.V. fluids (avoid hypotonic soln’s like 0.45NS)</li> <li>• Antipyretics (Tylenol)</li> <li>• Corticosteroids (Decadron)</li> </ul>
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	<p>Considerations</p> <p>ICP is a symptom - Can rapidly lead to death</p> <p>ABC's</p> <p>Maintain perfusion</p> <p>Reduce pressure</p> <p>Fluid/Electrolyte balance</p> <p>Prevent complications</p> <p>Maintain cognition</p> <p>Nursing Dx: Ineff. airway clearance, Potential comp. head injury, Altered nutrition, Impaired skin integrity, Risk for injury, Ineff. family coping</p>
<p><b>Brain and Spinal Cord Injury</b></p>	<p>Key Points</p> <p>Fatal in 30% of cases and secondary events include: Ischemia r/t hypoxia and hypotension, hemorrhage and cerebral edema. Clients often have other major injury which may contribute to problem.</p> <p>Etiology</p> <p>A sudden force to the head</p> <p>Acceleration - Immobile head vs. moving object</p> <p>Deceleration - Moving head vs. immobile object</p> <p>Deformation - Force disrupts integrity of skull</p> <p>Risk Factors</p> <p>ETOH</p> <p>Age (&lt;30)</p> <p>Time (evenings/weekends)</p> <p>Blunt Trauma</p> <p>Head strikes immobile object</p> <p>Involves several structures (parenchyma and blood vessels)</p> <p>Major bruising</p> <p>Nerve involvement</p> <p>CSF leaks</p> <p>Penetrating Trauma</p> <p>Foreign Bodies</p> <p>Knives, bullets</p> <p>Bone fragments cause local injury via laceration of tissue...hematomas develop...may lead to herniations</p> <p>Infection may result r/t open environment</p> <p>Coup and Contrecoup</p> <p>Coup - Injury immediately at point of impact</p> <p>Contrecoup - Injury at opposite side of brain</p> <p>Skull Fracture - Fracture does not necessarily mean brain injury.</p> <p>Linear - Thin lines / No tx if no brain injury</p> <p>Depressed - May be palpated</p> <p>Basilar - Base of frontal and temporal lobes (may be bruising of eyes and behind ears). Signs and Symptoms</p>

	<p>include: CSF leak, increased ICP, and subdural hematoma</p> <p><b>Concussion</b> LOC 5 min. or less &amp; retrograde amnesia...usually no brain damage</p> <p><b>Contusion</b> Brain is damaged (hemorrhage, nerve fiber involvement) Usually localized to one area (esp. brain stem) S/S - ICP, may see amnesia, hypotension Diffuse Axonal Injury/ Brain Stem Most severe and involves entire cerebral tissue Mild - LOC 6 - 24 hours, mild/short-term disability Moderate - coma &lt; 24 hours, incomplete recovery on awakening Severe - Primary injury to brain stem...posturing and coma...may not see cerebral edema or ICP</p>
<b>Nursing Management</b>	<ul style="list-style-type: none"> <li>• Assess Resp. status</li> <li>• Airway</li> <li>• Neuro q 15 min.</li> <li>• Seizure Prec.</li> <li>• Maintain safety</li> <li>• Check for ICP</li> <li>• Elevate Head</li> <li>• No coughing</li> <li>• Check for posturing, pain/restlessness and administer meds as needed. Check for infection and report any CSF presence.</li> <li>• Pharmacology</li> <li>• Mannitol</li> <li>• Corticosteroids</li> <li>• Anti-hypertensives</li> <li>• Anti-pyretics</li> <li>• Anticonvulsants / Analgesia</li> <li>• Key Points - considerations of management are related to those of Head Trauma &amp; ICP</li> <li>• ABC's</li> <li>• Maintain cerebral perfusion</li> <li>• Maintain F &amp; E balance</li> <li>• Prevent complications</li> <li>• Maintain cognitive function</li> <li>• Cerebral Edema</li> <li>• Increase in fluid surrounding tissues of brain</li> <li>• Reaches maximum w/i 2 - 3 days</li> <li>• Treatments</li> <li>• Mannitol</li> <li>• Therapeutic hyperventilation (resultant vasoconstriction)</li> </ul>

	<ul style="list-style-type: none"> <li>• Cerebral Vascular Accident</li> <li>• Ischemic - Most common (~ 85%)</li> <li>• Thrombotic (stenosis) or embolic (plaque) blockage of blood flow</li> <li>• Hemorrhagic</li> <li>• Bleeding into brain or subarachnoid space</li> <li>• Secondary to HTN &amp; Age &gt; 50</li> <li>• Intracranial Hemorrhage</li> <li>• Intracerebral Hemorrhage (ICH)</li> <li>• (See previous slide - Hemorrhagic CVA)</li> <li>• Subarachnoid Hemorrhage (SAH)</li> <li>• Bleeding into subarachnoid space</li> <li>• Develops from brain injury, aneurysms and tumors, and anticoagulant therapy</li> <li>• Infection</li> <li>• Bacterial Meningitis</li> <li>• Meningial inflammation (also involves arachnoid and subarachnoid spaces)</li> <li>• Bacterial Toxins</li> <li>• Tetanus, Diphtheria, and Botulism</li> <li>• Cause of problems is the entry into the CSF</li> <li>• Respiratory support, neuromuscular blocking agents, Tetanus IG, Pen. G, prophylactic anticoagulants</li> <li>• S/S - Restlessness, agitation, irritability, HA, Nuchal rigidity, Chills/Fever, Photophobia, + Brudzinski (hip flexion), + Kernig (hamstring pain) - p. 1945 in text.</li> <li>• Diabetes Insipidus</li> <li>• Deficient Antidiuretic Hormone</li> <li>• Inability to conserve water</li> <li>• CNS etiology..r/t localized or generalized edema from head trauma</li> <li>• Risk Factors - head injury, tumors, infections, medications: ETOH, glucocorticoids, phenytoin, and lithium</li> <li>• Will present w/ dry, cool skin and mucous membranes, tachycardic and F/E imbalance</li> <li>• Syndrome of Inappropriate Antidiuretic Hormone (SIADH)</li> <li>• Excessive ADH</li> <li>• Etiology is most commonly from malignancy</li> <li>• Risk factors result from tumors, infections, and many of the chemotherapeutics</li> <li>• Results in - Water retention, hyponatremia</li> <li>• S/S - dec. deep reflexes, fatigue, HA, A/N/V, seizures,</li> </ul>
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	<p>coma</p> <ul style="list-style-type: none"> <li>• Neurogenic Pulmonary Edema</li> <li>• Pulmonary edema - Abn. Accumulation of fluid interstitially around alveoli</li> <li>• R/T fluid movement and gradient pressures</li> <li>• Result of pulmonary edema from CNS injury</li> <li>• Inc. ICP, seizures, trauma</li> <li>• Barotrauma - Inc. PEEP</li> <li>• Fluid overload</li> <li>• Drugs - Narcotics</li> <li>• Arteriovenous(AV) Malformation</li> <li>• Vascular lesions w/ tangled arteries and veins</li> <li>• Shunting that bypasses capillary bed</li> <li>• R/T trauma when blood bypasses hematoma <ul style="list-style-type: none"> <li>○ Incidence intracranially in cerebral hemispheres</li> <li>○ Incidence in spinal cord on post. aspect</li> </ul> </li> <li>• Post Trauma Response</li> <li>• Include assessment of Altered behavior</li> <li>• Monitor for HA, poor concentration, dizziness, irritability, noise sensitivity, restlessness, anxiety and possibly amnesia.</li> <li>• GCS ( p. 2035)</li> <li>• VS, Neuro's, ABC's, and continual reassessment.</li> </ul>
<b>Brain Death</b>	<p>Ethical considerations  Consider the patient and family wishes.  Brain death def. : Irreversible cessation of circ. and resp. function, AND, Irreversible cessation of all functions of the brain (and brain stem)  Spinal Cord Injury  Degrees of severity - Mild ("Whiplash") to complete transection  Most commonly at cervical and lower thoracic  Spinal shock results in complete loss of skeletal muscle function, bowel and bladder tone, sexual function and autonomic reflexes  Etiology  Trauma most common / Male btwn 16 – 30</p> <p>Spinal Cord Injury  Types  Flexion-Rotation  R/T acute hyperflexion - involves ligaments, blood vessels ischemia of spinal cord (C5-C6)  Hyperextension</p>

	<p>involves ligaments and dislocation of vertebrae  may involve complete transection (although rare)  <b>Compression</b>  R/T falls and jumps (lands on head, sacrum or feet)  Cord compression of lumbar and lower thoracic</p> <p><b>Pathophysiology</b>  Result of acceleration, deceleration, or impact injuries  Bleeding and edema spreads along cord (peaks w/I 2-3 days, subsides after 7 days)  Spasticity of muscles leads to loss of reflex  May lead to systemic involvement (bowel and bladder)  Level of injury is classified as skeletal involvement and neurologic level.</p> <p><b>Signs / Symptoms</b>  Respiratory instability  Motor / Sensory changes below level of injury and loss of reflexes below injury  Pain  Quadriplegia / Paraplegia  Muscle spasms  Hypercalcemia</p> <p><b>Nursing Management</b>  Assess  VS, Neuro, and check for thrombophlebitis  Spinal shock (brady, Hypotension, flaccid paralysis, loss of reflex, and paralytic ileus)  Autonomic dysreflexia ( HTN, brady, HA, pupil dilation, blurred vision, diaphoresis and nausea)  Maintain airway  Maintain skin integrity  Maintain fluid intake / teach self cath  Institute bowel training  Teaching</p> <p><b>Pharmacology</b>  Corticosteroids (Decadron)  Muscle relaxants (Valium)  Anti Spasmodics (Dantrium)  Analgesia  Antidepressants  Histamine receptor antagonists (Zantac)  Anticoagulants  Stool softeners</p>
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<p><b>Altered Nutrition, Liver Function and Endocrine</b></p>	<p><b>Pathophysiology</b></p> <p>Develops over weeks to months causing a depletion of adipose and eventual loss of muscle. Results in a hypermetabolic state from severe illness causes increase in depletion of albumin (visceral protein), and increases protein breakdown (serum).</p> <p><b>Clinical Presentation</b></p> <ul style="list-style-type: none"> <li>• Postural hypotension / diminished v. return</li> <li>• Increased pulmonary secretions / decreased ex. tolerance</li> <li>• Increased incidence of infection</li> <li>• Delayed wound healing</li> <li>• Diarrhea</li> </ul> <p><b>Management includes:</b></p> <ul style="list-style-type: none"> <li>• Identification</li> <li>• Comprehensive assessment</li> <li>• Review of medical hx</li> <li>• Weight and diet hx</li> <li>• Anthropometric measures (% lean mus. mass...etc.)</li> <li>• Biochemical profiles</li> <li>• Examination</li> </ul> <p>Goals must be practical, safe and appropriate and may include the use of supplements. May also include use of tubes (NG, PEG).</p> <p>CI in intestinal obstruction, ileus, severe diarrhea, intestinal ischemia, or malabsorption syndrome</p> <p><b>TPN (Total Parenteral Nutrition)</b></p> <ul style="list-style-type: none"> <li>• glucose, lipids, A.A., Fluids, Elec., Vit., and Trace elements (i.e. zinc)</li> </ul> <p><b>PPN (Peripheral Parenteral Nutrition)</b></p> <ul style="list-style-type: none"> <li>• Reduced glucose</li> <li>• Need adequate peripheral IV access</li> <li>• 5 – 10 day regimen</li> </ul> <p><b>Nursing Management</b></p> <ul style="list-style-type: none"> <li>• Altered Nutrition</li> <li>• Impaired Swallowing</li> <li>• Self-care deficit</li> <li>•</li> </ul> <p><b>Cirrhosis: Defined in text – Chronic, progressive disease characterized by fibrosis and nodule formation</b></p> <ul style="list-style-type: none"> <li>• Alcoholic - abuse</li> <li>• Postnecrotic – hepatitis</li> </ul>
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	<ul style="list-style-type: none"> <li>• Biliary – bile stasis in ducts</li> <li>• Cardiac – A/V disease or prolonged pericarditis</li> </ul> <p>Etiology</p> <ul style="list-style-type: none"> <li>• Excessive ETOH</li> <li>• Genetic predisposition</li> <li>• Familial tendency</li> <li>• Hypersensitivities</li> <li>• Bile duct obstruction, hepatic congestion</li> <li>• Drugs (Tylenol)</li> </ul>
<b>Pathophysiology</b>	<p>Nodular consistency is from scar tissue formed which alters blood and lymph flow. Bile stasis and jaundice result which leads to portal vein HTN. This results in bleeding varicies of esophageal, umbilical, and superior rectus veins. Ascites accumulate in the peritoneum. Waste build-up (ammonia) leading to hepatic encephalopathy.</p> <p>Clinical Presentation</p> <ul style="list-style-type: none"> <li>• Hepatomegaly</li> <li>• Vascular changes (varicies, renal failure)</li> <li>• Altered laboratory tests (anemia, leukopenia)</li> <li>• Infections (r/t splenic involvement)</li> </ul> <p style="text-align: center;">Unit 3G: Endocrine</p> <p>Diabetic Ketoacidosis defined: A complication of Type I (usu) resulting from too little insulin, exacerbation of the stress response, or insulin resistance</p> <p>Pathophysiology</p> <ul style="list-style-type: none"> <li>• Relative lack of insulin</li> <li>• Body uses fats and proteins</li> <li>• Hormone production antagonizes the effects of insulin...promoting more hypoglycemia</li> <li>• Results in dehydration, ketosis, and electrolyte imbalance</li> </ul> <p>Clinical Presentation</p> <ul style="list-style-type: none"> <li>• Hyperglycemia</li> <li>• Including polyuria and polydipsia</li> <li>• Hyperosmolality (BUN, CRT)</li> <li>• Dehydration</li> <li>• Electrolyte imbalances</li> <li>• Hyperkalemia, Hypokalemia, Hyponatremia</li> <li>• Hypoglycemia</li> <li>• Metabolic Acidosis</li> </ul> <p>Management</p> <ul style="list-style-type: none"> <li>• Rehydration</li> <li>• NS (1 L in first hour, followed by 2 – 8 L over next 24 hours)</li> </ul>

	<ul style="list-style-type: none"> <li>• Reverse shock</li> <li>• PRBC's, Albumin, or Dextran</li> <li>• Restore Potassium Balance</li> <li>• Correct PH and give Insulin</li> <li>• Prevent recurrence</li> </ul> <p>HHNS defined: Extreme hyperglycemia, profound dehydration, mild ketonuria, and absence of acidosis (usu w/ type 2 diabetics). HHNS has a higher mortality Major difference is lack of ketonuria</p> <p>Treatment</p> <ul style="list-style-type: none"> <li>• Insulin infusion</li> <li>• Dextrose and insulin to achieve blood glucose level of 250 mg/dl</li> <li>• Vigorous fluids</li> <li>• NS</li> <li>• Electrolyte replacement</li> </ul> <p>K, Na, Cl, Phosphates</p>
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## APPENDIX J

## TRANSCRIPTS

September 8, 2003

## LARGE GROUP

Professor (P) or Student (S#)	Discourse Code	Discourse
P	PROC	Allright, we'll go ahead and get started then. Everyone has a copy of the case scenario in front of them. I have you sitting next to the person you'll be working with. I'd like to keep this consistent throughout the semester. Some people are gone at times, but try to keep these groups throughout the semester. Take out your syllabus. Review the objectives 1 through 3B. Just briefly think about the objectives and how they relate in the context of this case. Over the next two sessions we'll be discussing these objectives through the case. Think about these topics as you read the case. Take just about a minute or so, read through the case and give me your initial observations. The back side of the paper should be the steps, which I'll go over later.
P	EL	Initial observations?
S1:	ELAB	He's acidotic.
P	C PROC	Ok he's acidotic. Good. Speak up so everyone can hear you also.
S2:	ELAB	He's in renal failure.
P P P	C PROC REF	Ok. Good. You don't have to necessarily make conclusions. She took a step and said "in failure and acidotic."
S3:	ELAB	He's in pain. From the location and severity of the burns.
S1:	ELAB	He's losing consciousness.
S4:	ELAB	His respirations are decreasing from his last assessment so he's in respiratory failure.
S2	ELAB	His blood pressure dropped from the last assessment.

P P	PROC EL	I see a lot of talk among your groups. Are there other things that haven't been mentioned, that you've noticed?
S3:	ELAB	Due to the large surface area of his skin that was burned, he is not able to maintain his body temperature.
P	EL	Is there anything that one group may have mentioned that anyone would like to build on? Or any thing that you've noticed?
S5	ELAB	It's respiratory.
P P P	REF EL C CUE	So, you're saying that it's respiratory acidosis.  Does anyone disagree? Or agree?  Ok, that's good.  That's what I want you to be thinking about. Every time we start one of these, I want you to review the objectives. This helps us to brainstorm our ideas. As I mentioned last week, you know more about burns than maybe what you thought. You make general observations about what we do for these patients.  That is a lot of what we do in critical care: we observe, look for trends, intervene, and see the effect of what we did. We've thought about our problem, and I'd like you to analyze it using the six steps that I identified last week.

P	PROC	Start with step 2. You've been presented with the case now start analyzing the case for what you know.
P	EL	What things are evident?
P	CUE	I'll give you an example. The fact that he is 45 years old, transported from his worksite
P	EL	Is that significant?
P	CUE	I want you to think about things like that. I want you to write down everything that you think is significant about this case, ok? Whatever you think you know about burns, renal failure; about all of the objectives that we have listed.
P	EL	So, is age a risk factor for burns? Is employment a risk factor? Are there other aspects in this case that you think are significant about coming to an understanding of burns and renal failure?
P	PROC	Go ahead and work in your groups. Spend about 10 min. Break it apart and come up with as much information as you can.

## SMALL GROUPS

S7	EL	Ok, our question is for the vitals, do you want to know what the vitals are, or do you just want to know that they are unstable?
P P	C ELAB	That's good either one is correct really. What you said when you said that they were unstable is taking it a step further because what you said is that you recognize that something is wrong and you've passed judgment on it.
S7	ELAB	We need to know the labs; I mean the levels, like the BUN, Creatinine, and the Albumin.
S7	EL	Let's write them down.
S7	EL	Are they in the book? Let's look.
S8	ELAB	Let's just put alternate labs. We need to know those.
S7	ELAB	There are ketones in his urine.
S8	EL	Look at his pH that's important. I think his pH is important isn't that affected in some way?
S7	ELAB	We need to know that his lungs are increasingly fluid filled and that's part of his assessment.
S7	EL	What is a glasgow coma scale do we need to know that?
S8	C	Yes let's put that one down.
S8	XP	Oh, and he has decreased breath sounds. Also, it was caused by the kerosene the fact that he inhaled it would have caused his lung problems.
S7	XP	Over 40 percent of his body.
S7	XP	We probably need to know about the rales in his lungs and he is losing consciousness. He will be in trouble soon.
S8	ELAB EL	I think this is important here. His dehydration. What could be causing that? Let's put that down.
S7	EL	But that's going to cause some of his labs to be off also.
S7	ELAB	The dehydration would alter the make up of his blood so his labs would come back abnormal.
S8	EL	His enzymes are off too.
S7	EL	What if we don't know what some of the labs are?

P	C	That is o.k.
P	PROC	I'm not asking you to come to conclusions just to observe what you feel is the understanding of the case. You are already thinking that some of the labs are important and evaluating and treating the patient. Part of that discussion comes later.
S7:	EL	What about his pain? What are they going to give him for the pain? I know they may give things like NSAIDS, but that would be later? Maybe we should put that down.
P	PROC	Go on to step 3. Take the information you observed in the last step, start asking yourself questions about that information and start to draw inferences from it. The group up here was asking the question "What if we don't know what the normal lab values are?" My response was that that is ok. I'm more interested in that you are asking the question "Which labs are important and what are the typical values?"
P	EL	See the difference?

P	PROC	Look through your observations and group them and ask yourself questions about the information that you take from the case.
S8:	EL	We know the electrolytes are important. Should we write that?
S7	R	No, that was the last step.
S7	PROC	This step is where we are generating questions out of the information.
S7	C	Ok then.
	EL	We should ask a question then of which labs are important right?
S8	C	Yeah that sounds good.
S8	EL	What effect would altered labs have on the patient's outcome? What else?
S7	EL	Which diagnoses would be important?
S8	C	Yeah.
	EL	I just thought of another one. Which vital signs are important?

S7	C	Ok, sounds good.
S7	EL	The question would be, "What is the significance of unstable vitals?"
S8	EL	What systems will be affected, or what effect do burns have on the different body systems of the body?
S7	C	Ok, that is a good question.
S7	EL	How common are burns and who does it affect most? That would be a question.
S7	EL	So, if Kerosene caused the burn, we would want to know what types of burns kerosene causes. Right?
S8	C	Yeah, that's right
S8	ELAB	Because that would be a chemical burn, and there are other types, like thermal, and electrical.
S7	C	Yeah.
S7	ELAB	Because there are inhalation injuries also and he might have been burned inside (his lungs) and we couldn't necessarily see that but he is having trouble breathing so I think that is important.
S8	C	Yeah.
S8	ELAB	He was burned from the fire, but he also had other types of injuries.
P	ELAB	You recognized that kerosene causes specific types of injury and that leads you to wonder whether there are other types of injury that kerosene causes, as well as if there are other types of burns.
P	C	Good.
S7	ELAB	That's why we would want to know where he was burned because certain parts of his body might be burned with certain types of injury.
S8	C	Good. That's good.
S8	EL	What else?
S7	EL	Ok, let's do the next one.
S8	ELAB	We need to know the normal values. What we would normally find.
S7	EL	What is the cause of the deviation from normal?
S8	C	Yeah.
S8	ELAB	I'm going to write that one, plus what is causing it.
S7	ELAB	We need to know what injuries he has and how it is affecting everything.
S8	EL	What labs are important to assess in burns and renal failure?



S8	C	Yeah.
S8	EL	What does it mean?
S7	C ELAB	Yeah. Like if it is high or low and what the significance of that is and how to treat or if we should treat it.
S8	EL	I'm not sure what else we should ask.
S7	ELAB	We need to know what we need to give the patient to correct the labs. Like meds, or something like that.
P	PROC	Go ahead and keep working and move on to step 5.
S7	ELAB	I'll use my book and one of my lab books that will help.
S8	ELAB	Yeah, and I'll use the internet. I know some good websites for medical info

### LARGE GROUP

#### *Lecture portion of class*

The lecture portion of the class provided an opportunity to give the students essential information for their understanding of the content. Lecture content focused around technical information like normal lab values, types of burns, risk factors, treatments, medicinal intervention, and nursing diagnoses related to the care of the burn and renal failure patient.

Approximately 45 minutes were spent covering the material. Emphasis was given to how the information related to the case scenario, and many times, the case itself was used as a reference. For example, when a normal range of laboratory values were given for the students to learn, the instructor would often refer back to the case, point out the labs that were abnormal, and provide the rationale for the variance.

## LARGE GROUP

P	PROC	I would like to pose a scenario and see what your initial reactions are to that.
P	CUE	They are judgment based, much like situations that we find ourselves in.
P	EL	Let's say that you walk into a patient's room and find that they are having low urine output. It is a renal failure patient and you notice that in the last hour only 10cc's. They are on heavy dose antibiotics and the patient is diabetic. Give me some things your are thinking of. What would you do?
S9	ELAB	I'm thinking fluid overload because the patient is getting IV fluids, but is not diuresing much or at all. With all of the fluids, then the patient will run the risk of having too much fluid.
S10	ELAB	Check for edema.
P	C	Yes, we would want to do that.
P	ELAB	And check their lungs.
S13	ELAB	Check their foley.
P	C	Yes.
P	ELAB	That is a potential problem also.
S1	ELAB	Lab values, creatanine, blood sugars.
S2	ELAB	B.U.N.
S4	ELAB	Albumin.
P	C	Excellent.
P	ELAB	Especially someone in renal failure. Those are all important considerations.
P	EL	What would you expect some of these lab values to be?
S5	ELAB	The albumin would be low.
P	EL	Why?
S1	ELAB	It helps to hold pressure intravascularly.
P	C	Excellent.
S10	ELAB	Also the patient is diabetic.
P	C	Go ahead. That's a good point.
S1	ELAB	Diabetes is important to understanding their care also.
S5	C	Yeah.
S5	ELAB	Because I read that that can really be changed from such a traumatic event like a burn.
P	ELAB	The blood sugars have been elevated. When people are in [Diabetic Ketoacidosis] DKA, their sugars are in the 500's. They then go into a metabolic acidosis, they break down ketones and the kidneys can't keep up with filtering out the blood and they spill over into the urine. This relates to fluid status because the albumin is altered with the changing chemistry of the blood. The hypovolemia is caused by the fluid shift.
S11	ELAB	The antibiotics are important also.
S1	ELAB	Some antibiotics are harder to break down than others, so they

		could be hurting the patient.
P	C	Excellent points.
P	ELAB	Some antibiotics are renal toxic especially ones like Gentamycin and Vancomycin so we are not sure whether the renal failure in this case is due to some underlying condition or from maybe an overdosing of renal toxic medications or antibiotics.
P	C	Good discussion.
P	EL	How about another situation. What about a patient who is having a lot of pain?
P	CUE	They are on a Morphine PCA and you go into check on them and they are cyanotic their respirations are lowered and they are unresponsive.
S1	ELAB	They had too much morphine.
S2	ELAB	They overdosed. Gave themselves too much somehow.
S4	ELAB	It decreased their respirations.
P	EL	What would you do?
S2	ELAB	[I would administer] Narcan.
S1	ELAB	Shut the pump off.
S5	ELAB	Provide respirations for them.
S9	ELAB	And they need oxygen.
S3	ELAB	And you would want to call respiratory or call a code
S1	R	I don't know. I don't think I'd call respiratory.
	ELAB	I think there is something I could do. I would do rescue breathing, then if they didn't respond I would call the doctor or respiratory then; after they didn't respond.
P	EL	Any others?
P	C	Those were good.
P	EL	What would you do then?
S1	ELAB	I would monitor them.
S2	ELAB	And check the orders.
S1	ELAB	I would check the dose. The patient got too much and we would need to check the machine.
P	C	Great.
P	RECAP	We have talked about some of the content in the context of these two situations and had some good discussion.
P	C	Good job.
P	PROC	Now, I'd like to revisit last weeks' case and apply some of the material to that, since we went through it so quickly. So we'll start there. Let's start with the first group.
S1	ELAB	We talked about what caused the burns. The actual agents that caused the injury.
S2	ELAB	And also about what types of burns were associated with certain agents, and what are the risk factors for burns. We thought that was important because some of the information that we read in the book, and the stuff that we covered last week reinforced that you may treat burns differently based on the type of agent that caused it.
P	ELAB	This reinforces content information that related to our discussion on risk factors.

P	C	Good.
S3	ELAB	We thought that taking a thorough medical history was one of this patient's priorities. When we looked back through the information, we saw that we needed to know some more about his condition like, if there was anything else causing his problems besides the burns themselves.
P	C	Good evaluation of the situation.
P	EL	What else did you notice?
S4	ELAB	Well, we thought about how it might be important to understand some of the follow up on the nursing diagnoses we chose.
P	EL	Like what?
S4	ELAB	Well, like his diagnosis of altered thought processes. He is likely to be experiencing stress and anxiety from everything that is going on, so we would want to do things like get his family involved, talk him through the situation, and calm him down. Reassure him and meet his needs.
S5	ELAB	And we also thought about how we could improve his self-image, or at least help him to start to see that recovery is in sight.
P	EL	What do you mean by that?
S5	ELAB	Well, you know, he has to realize that he has been injured, but then also, start to realize that there are a lot of things we can do to help him.
P	EL	Like what?
S5	ELAB	Like surgery, grafting, and that sort of stuff.
P	EL	Can anyone else think of anything?
S8	ELAB	Yeah, even simpler than that would just be to communicate with him and reassure him like she said. Sometimes all of the surgery and medicines that we can give people don't seem as reassuring as when someone is right beside them, giving them kind words.
P	C	Wonderful discussion.
P	CUE	Make sure to review pertinent nursing and medical diagnoses relevant to the care of the burn and renal failure client. Also, know the importance of taking a thorough medical history and how to get information that pertains to care for the client. Also the importance of knowing the patient's past medical history, like prior illnesses, or underlying disease, as well as some of the underlying diseases that impact burn and renal failure clients. Know the content that relates to the importance of communication in care for the client. Additionally, recognize the importance of knowing a patient's past medical history that relates to care of burns and renal failure specifically.
S6	ELAB	We concentrated on the patient's respiratory status.
P	EL	And why is that?
S7	ELAB	Well, because his ABG's showed that he was acidotic. We

		thought that his compromised respiratory status had something to do with his labs being off.
S8	ELAB	So, we decided to focus his care on improving his oxygenation.
P	EL	And what were your findings?
S7	ELAB	Well, we would continue his oxygen, and make sure his respirations were adequate; I mean we would want to make sure he was breathing right, then we would want to monitor his labs to see if they could be corrected by some of the interventions we were providing.
P	C REF	Excellent points. His respiratory status is a priority, and you brought out some very good points.
P	PROC CUE	Let's review some of the important aspects of how respiratory status fits into burns and renal failure. Make sure to know ABG values, respiratory assessment, and the complications of burns that result in hemodynamic instability from fluid shifts, etc..
S9	ELAB	We focused on the type of burns and what the treatments are for each.
P	EL	Could you explain a little further?
S10	ELAB	Well, we talked about first through fourth degree burns. So, we wanted to think a bit more about what grade of burns he had, and how our treatments would differ. Also, we described the characteristics of each type of burn. That helped us kind of study for the material that we need to know.
S9	ELAB	The care for his burns would range from type 1 burns to type 3. So, some of the minor ones would just need monitoring and some Silvadene. The others, might need grafting or surgical debridement.
P	C	Great insights. It is evident that you've done some extra reading and are really working hard to integrate this into your thinking of nursing management of burns and renal failure.
P	CUE	Know the types of burns and their categories, and the most common causes of each. Remember the Nursing Diagnoses common to burns. Know the treatments for each type, for example the IV fluids, and first aid appropriate for care. Know how to determine BSA, and fluid replacement needs. Know how to discuss common patient manifestations.
S11	ELAB	We focused on lab monitoring, especially ABG's and electrolytes.
P	C	Ok, good.
P	ELAB	The other group mentioned that in some part also.
P	EL	What else can you mention about the importance of lab monitoring. Maybe outside of the context of ABG's?
S12	ELAB	Well, labs like his Albumin, BUN, and Creatinine are important for the management of his renal failure.
P	EL	In what way?

S12	ELAB	Well, because of his fluid loss, from the burns, a lot of his lab values are off. These labs indicate his renal failure because his fluids are third spacing and this is causing his intravascular volume to be lower.
S13	ELAB	And he can't filter his blood as well because his kidneys aren't being perfused.
P P	C PROC	Great description. It sounds like you are starting to really understand the effects of how burns cause the fluid depletion, and how that leads to renal failure, and so on. Be able to discuss typical lab values and common changes that burns cause to them. Additionally be able to give information of fluid replacement needs for the patient. Discuss assessment priorities, like low urine output, skin care, pain, GCS, and typical diagnoses.
Professor (P) or Student (S#)	Discourse Code	Discourse (November 3, 2003) Large Group
P P	PROC EL	We have a bunch of material to get through, so if you have a few minutes, please look through your objectives. I think I have a good case that represents the material well, and I'll have you work in groups like you did last time. Alright, before we get started, I want to ask a broad question to you. Should people on life-support be allowed to live?
S2	EX	Depends on the situation.
P	EL	Explain what you mean.
S2	EX	Well if they aren't going to get better, I don't see keeping them on life support for too long. I mean, there is no sense in keeping someone alive who obviously won't get better. There are cases where people just don't get better.
S11	ELAB	Parents think that sometimes patients have a chance for rehabilitation. People sometimes just don't get better. Like that lady who has been in the news lately, the doctor's don't think she is going to get better, but the parents keep fighting to keep her alive. They should just let her die, like she wants to.
P	EL	Who gets to decide that?
S9	ELAB	Her sister wants to keep her alive also.
S11	ELAB	Her family thinks that the motions that she is making actually mean something. Because she is brain dead, those are just motions that she doesn't mean to make. She doesn't know that she is doing that. Her life support is keeping her alive. Not her own body. The family knows she doesn't want to live that way.
S11	ELAB	The families of these people should think about that before they put feeding tubes in and everything. I mean here is a lady that is being kept alive by life support, feeding tubes, I.V.'s and stuff, who doesn't have a chance of getting better. It is a very difficult situation.

S13	ELAB	It depends on who is paying for it also. I could see that if they are on life support and have some chance of living, then efforts should continue, but if not, then maybe not. I had an experience with a baby at another hospital who was going to have no chance. The parents wanted everything, but the baby was going to be a vegetable. There has to be a point where you say no more. I mean it is cruel. It bothers me because I don't think that kid will have a good quality of life. I've never been in that situation, but it would be a very hard choice.
P	EL	When should that be decided? Should a physician decide? Another question is what is quality of life? Who determines what quality is?
S4	ELAB	I don't think any one should make that decision without prior involvement. What I mean is I think that there should be legal paperwork that states what a person's wishes are. In the case of a baby, there might not be any paperwork. But, I don't think it should be up to a physician alone. It should involve a collaborative approach.
P	EL	What do you mean that one person shouldn't decide? Explain that a bit further. Why shouldn't a physician decide?
S4	ELAB	Coming from my perspective, I don't think there are people that would consider it a burden to take care of a child like that. I mean, that is their baby, and a lot of people feel that it is their responsibility to take care of their child regardless of how it's born. I think from the medical aspect, we need to include things that determine whether the child can live. We need to educate the parents so that they can make a decision whether to continue or not. It is their choice.
P	EL	What if people decide, regardless of the situation, that it is their responsibility to take care of their child. I mean, if they have the financial resources, and can be taught the technical knowledge, unless they know it already, why can't a child still have some quality of life?
S13	ELAB	I think it depends on the situation. Depending on the severity. I think it is selfish. People are so afraid of death. Sometimes people can't deal with it. You just have to let people go sometimes and face reality. What about the child? You aren't being cruel by letting people go sometimes. I think a lot of people focus on how they feel. They have to not focus on their own feelings so much, and more on the child's needs and what is best for them.
S12	ELAB	I don't think that anyone else but the parents should decide. The parent's need to have all of the options and have as much knowledge as necessary to make the decision on their own. The physician can play a part in providing information to the family, but it should ultimately be up to the parents.
S7	C	I agree with that.
S7	ELAB	Because, everyone is a little different, and no two situations are the same. I mean given the same two people, two patients may have completely different outcomes based on a lot of factors.

S4	ELAB	I think it involves a collaborative effort with a bunch of people. Like the ethics committee that we have in the hospital. That committee has doctors, nurses, social workers, chaplains, and people from the community. I think that it takes an effort on all of those people's part in order and get everyone involved.
P	EL	How do you resolve the issue of letting the parent's decide, while moderating the need to let people go? Is there a conflict there?
S10 S10	R ELAB	I don't think there is one template to follow. Each case is going to be different and no two situations will be the same. In every case, you have to get the family, health care team, and other people involved to educate the parents to allow them to make their own decision.
P	EL	What about a Down's syndrome parent? Should they be allowed to decide?
S12	ELAB	Even in that case, the physicians and nurses shouldn't decide. It is still up to the parents. We have to educate those people, and they will have to make the choice. It is their responsibility.
S4	ELAB	Parent's still have the right to decide even if the parent's can't pay for it, or anything. That is how the system is. You are placing value on someone's life. It is hard to do, but we can't judge those people. I can't put a monetary value on someone's life. Even with no education, or no money, they have the right to decide. It doesn't make a person worth any less because they don't have money.
S8 S8	R ELAB	I don't want to live like that. I don't care what people say. It's not right to have someone without a quality of life just sitting there without any chance of getting better. Sometimes people just need to know that their loved one won't get better, and we need to help them make that decision.
S12	ELAB	We can't push our opinions on people. Our opinion has to remain separate.
S4	ELAB	We are taught to help people come to a decision.
S8	ELAB	People need to be brutally honest. We need to say to people the truth. That their loved one isn't going to get better, and to provide them with all of the facts is the most important thing we can do for them. It is our job. They look to us to help them make a decision.
S12	ELAB	They have to have all of the facts.
S8	ELAB	It was never seriously discussed with the family. The child had no brain activity, and with several failed attempts to get off of the ventilator.
S13	ELAB	Another situation was when a guy came into the ICU when I was working there. The nurses didn't give the family all of the information about his inability to come off of the ventilator. If the family would have had all of the information, they could have made a decision a little easier. The nurses would talk differently to each other than what they would to the family.



		They needed all of the information in order to make a decision.
S10	ELAB	We need to be honest with families. I had a case where a mother came in aborting a baby, and the physician told the mom that it wasn't a good situation, and asked her what she wanted to do. She asked him what would he do? Because the baby was so far pre-term, or underdeveloped, and the mom had so much bleeding, he told her that the baby would be brain dead, and would not live. This mom needed to hear this, because she couldn't have any false hope at this point. She needed to hear the truth, and he did that. I admire him for telling the truth.
P P	C C ELAB	Great discussion. I appreciate your thoughtfulness on these issues. They are difficult ones, and ones that you may be faced with someday. Knowing the medical conditions, and having the compassion to speak the truth to people, is a big responsibility. Thinking about these issues now, is important, before we are called to action.
P	PROC	Let's take out the case and see how it applies to brain and spinal cord injury. I'll pass it around, take a look at it and review your objectives for today in your small groups.

## Small group setting

S11	ELAB	O.K. here is some information that could be useful. He was transported to a trauma facility for care. That is important because he has access to better care than if he were stuck in some rural hospital somewhere.
S13	ELAB	It helps to be able to read through the whole case. I see that he was drinking alcohol and it was late. That sounds like some risk factors for his injuries.
S12	ELAB EL	He is intubated. Was that done in the field?
S13	ELAB	He is in respiratory failure.
S11	ELAB	It leads to respiratory failure before he is intubated. Since they have secured his airway, he is no longer in failure.
S12	EL	How about the complications from the injury?
S12	ELAB	He is bleeding and may have some other internal injury.
S11	ELAB	It looks like he may have internal and external injuries.
S13	ELAB	Here are all of the meds he was given.
S13	PROC	Let's write those down.
S12	EL	I wonder if his alcohol level was checked before going to surgery?
S12	ELAB	That refers to his labs.
S12	PROC	Let's write that.
S11	EL	What about his other injuries? Of the patient who died?
S11	ELAB	There could be something important there. It looks like he may have died from internal injuries and from a head injury.
S12	ELAB	I think that we would want to know that his blood pressure was different from his upper extremities to his lower ones. That

		could mean some serious bleeding. Also, he doesn't have any feeling in his lower legs, and he doesn't have any bladder control. That may signify spinal injury.
S13	ELAB	He has lost spinal function below that level.
S11	ELAB	He is in respiratory acidosis. That is significant. Until the ventilator corrects some of the retained carbon dioxide, he will be in acidosis.
S13 S13	EL ELAB	Do we want to know about what effect the epinephrine would have? That would speak to the treatment we have given.
S12 S12	C ELAB	O.K., write that. That is a good one.
S11	ELAB	We would want to know what is coming out of the catheters, like his NG tube.
S13 S13	C ELAB	Yes. Because that says something also about the treatment we are giving.
S12	ELAB	His bowel sounds are good because he hasn't lost enough blood to compromise his vital organs yet.
S11	ELAB PROC	That says something about his condition being stable. Let's write that.
S13 S13 S13	EL PROC ELAB	What about the diagnostic tests? Let's write that. Because all of the tests, including the lab values are important to tell us his status.
S12	ELAB	A urinalysis is needed because we need to see if he is bleeding internally or if there are any other problems. Plus, that would give us a sense of any underlying disease, like diabetes.
S13	EL	What about the vent settings? Are those normal?
S11 S11 S11	C ELAB C	Yeah, they look pretty good. Especially considering his ABG's. If he is in acidosis, the increased respiratory rate would help to begin to correct that. So they are O.K.
S13	ELAB	We will use R.T. to verify the settings of the vent. Check with lab and our text to check to see if they are correct and what significance they have.
S11	ELAB	Also, use our text to find out the risk factors of this type of trauma, and how to use the nursing process in order to do a thorough assessment of the trauma patient.
P	PROC	Take a few minutes for a break, and then we will meet back here so that I can add some content to reinforce the case. I want to bring some of this in context for you. So, I'll see you back in a few minutes.

## Large Group

*Lecture portion of class*

The lecture portion of the class provided an opportunity to give the students essential information for their understanding of the content.

Lecture content focused around technical information like normal lab values, associated trauma related to head and spinal cord injury, risk factors, treatments, pharmacological intervention, underlying pathology of, and nursing diagnoses related to, the care of clients with acute neurological alterations.

Approximately 45 minutes were spent covering the material.

Emphasis was given to how the information related to the case scenario, and the case itself was used as a reference. For example, when a normal range of laboratory values were given for the students to learn, the instructor would often refer back to the case, point out the labs that were abnormal, and provide the rationale for the variance.

Professor (P) or Student (S#)	Discourse Code	Discourse (November 10, 2003) Large Group
P	EL	What do you think a global problem, or maybe a specific problem of either of the two individuals in the case? Can you discuss any of their problems in the context of some of the content we've covered in the last session?
S1	ELAB	We focused on the risk factors of his being male, having had alcohol, and being at a high-risk age group.
P	C ELAB	That is great. As you remember, males at their ages are at higher risk for injury, especially when alcohol and motor vehicles are involved. Risk factors are important when thinking about brain and spinal cord injury.

	EL	Other risk factors including infections and underlying pathology put patients at-risk for further injury. How about the next group?
S4	ELAB	We looked at the health history and any allergies that he may have had. Also, we looked at any other injuries he may have sustained. We may have to send him to surgery, and we need to know any other problems.
P	C ELAB	Excellent. Other than treating his direct injuries like the bleeding, we have to treat the underlying problems like his fluid shifting, respiratory conditions (loss of ability to breathe or excess fluid problems), coagulations status, and others. A thorough assessment and knowledge of their past medical history is important in management of the injury from trauma.
P	EL	Also, be familiar with many of the medications used in treating these patients, as well as some of the interventions for people with underlying pathology. Next?
S7	ELAB	We focused on the etiology of the trauma. We wanted to know how the accident happened.
P P	C ELAB	Great. Acceleration and deceleration injuries have different effects on patients. Now is a great time to review the different types of herniations that result from brain injury. Herniations are essentially displacement of brain tissue into other areas of the brain because of swelling in the brain. Review the Munro-Kellie hypothesis and how it relates to brain injury and herniations.
P P	C EL	We talked about other types of injuries as they relate to etiology. Tumors, blunt injury, hemorrhage, etc. Good review. Next group?
S9	ELAB	We focused on nursing management of the client. Especially immobility and pain because he has a compromised airway and his neurological status is altered. He has a lot of injuries and that is painful. Psychosocial concerns are important also,

		although maybe later when he wakes up. Some of the different medications are important as well, like Mannitol, Decadron, Demerol.
P P	C C  CUE	Great discussion. That is a great review of some of the important management issues for nursing care of the trauma patient. Review pharmacology, and nursing care that I discussed earlier.
S11	ELAB	We focused on some of the labs and tests that he will need. X-Rays, MRI's, and lab tests like a CBC, Electrolytes, and PT/PTT are important. If he is being prepared for surgery we want to know some of his labs and what would affect him in surgery.
P P	C ELAB	That is good. Many of these tests are common for the pre-operative client. Even in the case of the trauma patient, we have to think through some of the labs and tests he will need in the total context of his care. We have to maintain his spinal traction until we get back some of the X-Rays or other tests that would clear him. Other tests like his Carbon Dioxide levels, Oxygen levels, Temperature, and other Vital Signs are imperative in the management of and treatment of this patient.
P	PROC	Continue to read through the material and apply it to the case represented here. Pull together the content provided in class with the book and let me know if you have any questions. Keep me informed of your progress.
Professor (P) or Student (S#)	Discourse Code	Discourse (November 17, 2003) Large Group
P	PROC	We'll go ahead and get started. Review your syllabus and the objectives for items 3F. It includes altered blood flow, GI perforations, Nutritional deficiencies, cirrhosis, and some of the endocrine disorders. Next week we will follow-up on some content and then after Thanksgiving, you'll come back and take your

		exam. Let's get started. I'd like to ask you a question to get started.
P	EL	Should a chronic alcoholic be allowed a liver transplant?
S2	ELAB	If they sign a contract that promises they will stop drinking.
S4	ELAB	Even if they sign a contract, it won't guarantee that they will stop drinking.
S6	ELAB	It's like those people who get a heart transplant who are in prison for life. How do you decide who gets one?
S3	ELAB	I don't think they should be at the top of the list.
P	EL	So, you see it as a disease? Alcoholism?
S3	ELAB	I have a hard time forgiving people like that. It is their choice to live that way.
P	EL	Why?
S12	EL	Would you not do heart surgery on someone who is obese that needs it? Or a lung transplant for someone who smokes?
S8	EL	Where do you draw the line with alcoholics?
P	EL	Are you saying that we in the medical community shouldn't consider lifestyle? Only consider the need?
S11	ELAB	If I were deciding, I would give it to them.
S13	ELAB	I had a patient once where the family didn't understand the implications of my patient's problem.
P	EL	What makes you say that? What implications does that have?
S2	ELAB	I also see that it would be difficult to control. We don't have the capability now to determine who deserves it and who doesn't.
P	EL	So you think he should get the transplant?
S2	C	Yes.
S2	ELAB	I see it from both ways. He shouldn't have done it, but the way the system is now, he should get it. People aren't always aware of the consequences.
S1	EL	Where do you draw the line? Who gets to determine and based on what criteria?
S10	ELAB	There seems to be a conflict on what we can do, and morally what we should do.
S3	ELAB	If there are conflicting cases where an older person and a younger person have the same

		problems, the younger person should get it. They haven't really had a chance yet.
S1	EL	He may have not gotten the help, but does that mean he deserves to die?
S1	ELAB	Alcoholism is a disease and we have to treat it just like anything else.
S6	ELAB	For people that are obese, there are health promotion, and weight loss centers.
S9	ELAB	This guy never sought help. He is doing this to himself. I mean, these guys should go through detox before they are allowed the transplant.
S4	ELAB	I had a patient who had a block in the carotid. He wasn't going to stop drinking or smoking.
S4	EL	But that doesn't mean he should be allowed to die, does it?
S4	ELAB	I mean everyone has a background of behaviors that we could trace back to some health problem or another.
P	ELAB	Some states are taxing junk food and alcohol so much that it is starting to have an impact.
P	EL	Should this be allowed?
S4	ELAB	The government limits several things like cigarettes, so maybe that's next. Who knows, maybe in a few years that will be a reality.
S5	R	I disagree.
S5	ELAB	I think there is a limit to what the government should allow or disallow. There has to be some individual accountability for ones' own actions. That is the society we live in. That isn't up to the government.
S4	C	Yeah.
S4	EL	But how do we in the medical professions help the public?
S5	ELAB	By trying to educate our clients and promote healthy living.
S4	ELAB EL ELAB	But that only works for some people. What about those without equal access to healthcare? You have to protect those who can't protect themselves as easily as you and I can.
S9	ELAB	It seems like for certain things, like healthcare, the government plays a defined role, but that role is changing. It may be drastically different a few

		years from now from what it is like now. It could be a lot different when our kids get to our age.
P	C	Great discussion.
P	C	These are certainly important issues to discuss. Also, they are relevant to the content that I would like to talk about today.
	CUE	Let's go ahead and get on with the case. Please review the case and proceed on through the six steps that we've used before. Let me know if you have any questions.
P	PROC	

## Small Group

S1	ELAB	O.K. Let's start with how he was transferred to the hospital. I see that he was transferred by ambulance to the E.R. That may be significant because it is evidence of pre-hospital care.
S1	PROC	Let's write that down.
S3	C ELAB PROC	Good idea. Also, I see that his vital signs are listed. Let's include that because we are always wanting to document any change in condition, so in case there are some later, we'll have them.
S2	ELAB	Be sure to include his assessment data. His skin condition makes me think of diabetes. So, there is some underlying disease there. Plus, look at the ketones in his urine. His diabetes is definitely contributing to the problem here.
S2	EL	Where does ammonia come from?
S1	ELAB	I'm not sure.
S1	PROC	Let's put that down and ask that question.
S3	C	O.K.
S3	ELAB	I think it is significant because the level is so elevated. Maybe because of the trauma or because of some other problem. I don't know.
	PROC	Let's include it and ask it later.
S1	EL ELAB	See the orders? I would want to know why they are giving a bolus of fluids. Plus they are adding potassium to his I.V. fluids.
S2	C PROC ELAB	Good point. Let's include that. Plus, look at some of the medications they are giving him. I have heard of some of them. Let's ask a question about the medications. Not only what the medications do, but if



		the doses are appropriate for him.
S3	C ELAB	Great. Look down a little further. His condition has changed a bit. His vital signs are a bit better. His neurological status has improved some and he is starting to follow commands. Some of his labs are corrected, but the ones that haven't changed, probably will take a little longer than the others.
S2	C ELAB	Yeah. Like his ketones. Those usually take quite awhile to clear out of the body. Maybe that is why he is getting so much fluid replacement. As long as he can tolerate the extra fluid, it will help to flush out his system of the excess ketones.
S3	C PROC	O.K. Let's go on and develop some problem statements for the next step.
S2	EL	What does that mean again? How do we do it?
S3	ELAB	I think it is when we try to determine how to answer some of the questions that we've already asked ourselves. Like the I.V. fluids that we just talked about. We see that he is getting the fluids.
S3	EL	Now a question we would want to ask is what role does I.V. fluid replacement have in the management of liver failure?
S2	C ELAB	I see. That's good. O.K. Then maybe for another observation like some of his lab values. His ammonia was elevated so we would want to know what effect liver failure plays in the elevation of serum ammonia levels in the body.
S1	C ELAB	Yeah. That's good. We can say that for most all of the labs. We want to not only know that the levels are up or down, we want to know the significance of the levels and how that relates to his diagnosis.
S2	C ELAB	Good. Let's include his assessment data. Stuff like his skin, lung, and cardiac assessment will be important. Especially because it is affecting so many areas of his body.
S1	C ELAB	Yeah. I see that he is jaundiced. That is important because people with liver failure or hepatitis get jaundiced.
S3	EL	So, we would want to ask what process is involved in the patient's jaundice as it relates to liver failure?

S1	C	Yeah, I think so. That is a good question.
S3	ELAB	Let's include the respiratory treatments that he is getting. He is probably getting those because of his coarse lungs. Maybe he has an infection and has some fluid build-up. So, between the diuretics, the antibiotics, and the respiratory treatments, he will get better.
P	PROC	O.K. Let's bring it back in to the large group. I'd like to go over the content now to bring together some concepts related to care of the client with altered nutrition, liver function, and altered endocrine function.

## Large Group

*Lecture portion of class*

The lecture portion of the class provided an opportunity to give the students essential information for their understanding of the content. Lecture content focused around technical information like normal lab values, associated trauma related to altered liver and endocrine function as well as altered nutrition. Discussion included: risk factors, treatments, pharmacological intervention, underlying pathology of, and nursing diagnoses related to, the care of clients with acute and chronic gastrointestinal alterations.

Approximately 45 minutes were spent covering the material. Emphasis was given to how the information related to the case scenario, and the case itself was used as a reference. For example, when a normal range of laboratory values were given for the students to learn, the instructor would often refer back to the case, point out the labs that were abnormal, and provide the rationale for the variance.

Profess or (P) or Student (S#)	Discourse Code	Discourse (November 24, 2003) Large Group
P	PROC	Let's bring it together now and try to discuss care of the client with altered GI using some of the material from last time, as well as incorporating some of the reading that you

P	EL	did for this week. Can you discuss any of his conditions in the context of some of the content?
S2	ELAB	We focused on the risk factors of his being male, having had a long history of alcohol abuse, and being at high-risk because of some of his lifestyle behaviors.
P P	C ELAB	That is great. As you remember, certain lifestyles, or otherwise said, environmental influences, place people at higher risk for injury, especially when alcohol is involved. Risk factors are an important consideration in investigating the causes of and treatments for GI alterations. Other risk factors including underlying pathology, like diabetes in this case, as well as resultant infections put patients at-risk for further injury.
P	EL	How about the next group?
S5	ELAB	We looked at the patient's history and any underlying condition that he may have already had. We figured that maybe he has not had any real access to healthcare, and that may be playing a part in his worsening condition.
P P	C ELAB	Excellent. Other than treating his diminishing lung status through respiratory treatments and I.V. fluid boluses, we have to treat the underlying problems like his fluid shifting, respiratory conditions (loss of ability to breathe or excess fluid problems), coagulation status, and others. A thorough assessment and knowledge of his past medical history is important in his management.
P	EL	Also, be familiar with many of the medications used in treating these patients, as well as some of the interventions for people with underlying pathology. Next?
S8	ELAB	We focused on his clinical presentation, or the assessment piece. His enlarged liver was a significant finding, as well as some of his lab values that were off. He was anemic jaundiced which was already mentioned. He was prone to infections because of his body's lack of ability to fight off infections related to his diminished immune status.
P	C ELAB	Great. It is especially important to review some of the classic pieces of assessment data when thinking about these types of patients. In the critical care setting, often times, a thorough assessment and sound clinical decision-making can often make the difference in treating your patient adequately and

	C EL	correctly. You have brought up some very good points regarding the assessment of this type of patient. Good review. Next group?
S10	ELAB	We focused on nursing management of the client. Especially early recognition of the problem. We think that by intervening early and getting him to the hospital for treatment, that we would have a better chance of seeing him do better. He has a lot of underlying problems that we will need to eventually address, but his main concerns at this point are his breathing, his neurological status, his diabetes, and his fluid volume status.
P	C	Great discussion.
P	C CUE	That is a great review of some of the important management issues for nursing care of the GI patient. Additionally, review the pharmacology, and nursing care that I discussed earlier as it relates to the care of this patient.
P	EL	Next?
S12	ELAB	We focused on some of the labs and tests that were ordered. Especially the ammonia level. We weren't quite sure where that came from or what it meant. Labs like his glucose level, his renal function tests like his BUN and Creatinine, and other lab tests like a CBC and electrolytes as well. We want to know some of his labs and what would affect him given any treatments that we would provide.
P P	C ELAB	That is good. Many of these tests are common for this type of client. We have to think through some of the labs and tests he will need in the total context of his care. We have to remember that rehydration is imperative to stimulate his renal function. Without adequate fluids, his renal system will shut down. We also have to try to reduce the shock by giving blood products if necessary, which will also help his anemia. We can give products like Albumin or Dextran to help support the cardiovascular system. Potassium replacement and glucose management is imperative as well in the care of the GI patient.
P	PROC	Continue to read through the material and apply it to the case represented here. Pull together the content provided in class with the book and let me know if you have any questions. Keep me informed of your progress.
P	PROC	O.K. then. Now that we have thoroughly analyzed the case, and applied some information in the context of that case,

	EL	I'm interested in knowing what you now think of the question I posed initially? I'll ask again, do you think that an alcoholic should receive a liver transplant?
S4	ELAB  EL	My take on it is that a lot of what we've talked about like the diabetes and other endocrine problems put these people at risk for some of these problems. I mean, if a patient has a chronic malnutrition problem that causes some of the muscle wasting and protein-energy malnutrition that we discussed, it is hard to say that we wouldn't grant someone like this who is in need, a transplant. I mean, was it really his fault?
P	C ELAB	Good point. It is hard to say why people start to drink. He should be responsible for himself, but maybe because he has so many health concerns, isn't educated regarding his health, and maybe that he doesn't have a very good support system. Maybe these things led to his drinking, and he got depressed and started to drink. It is hard to say.
S9 S9  S9	R ELAB  EL	I disagree. He should be held accountable just like all of the rest of us. Just like I said before. We all have to be responsible for ourselves. We in the medical community have to educate those people and try to get them to take responsibility for themselves so that they can make healthy lifestyle choices. Otherwise, where do you draw the line? Who gets the care and who doesn't?
S1	ELAB	Maybe a way to address it is to initiate a change in the healthcare system. Maybe we have to come up with a way to address peoples' health care problems in a more comprehensive way. What I mean is that we should have a more comprehensive way to document the care of each patient so that we can get a better picture of the care that is needed when a situation comes up like this. We would have the supporting documentation in order to make sound decisions, and then they may not be as difficult, as black-and-white as this case is.
S10	ELAB	Maybe we need to be looking at it just as we are now. Maybe we in the medical profession are doing it right. Maybe those who are medically in need are the ones who truly need it most, regardless of how it happened. There are a bunch of ways that people get sick, and each person is different. For us to say that one person deserves it over another is confusing the issue of what our purpose is. We are

		supposed to be providing equal care regardless of a person's background. If we look at providing care to those who need it, the ethical issues aren't as difficult to solve. They aren't really an issue then.
S5	ELAB	We can implement complex interventions like the PPN and the TPN, IV fluids, and we can order a lot of complex tests like CBC's, and renal function tests, and even provide things like transplants to those who need it most and the quickest. I think management of these types of patients will be enhanced as new technology comes about from new research. What won't go away is the reasoning behind people's problems. People are always going to be sick. I don't know if I want some insurance company saying that I can or can't get treatment based on some concern. I mean, they are starting to do that now. I wonder if we wouldn't be better off just by redefining our whole system to treat those in need, just as we are trying to do now.
P	EL C RECAP PROC	Any other comments? Those are great comments regarding the ethical considerations that we face in the context of those patients who are in need of medical attention, like this case represents. Continue to read through the material before next week, and apply it to the case that I've provided here. Please email me or call if you have any questions regarding the content, or if there is any confusion as to how it is represented in the case.

## APPENDIX K

## PROFESSOR CODING RESULTS BY TOPIC AND SESSION

	Code	Topic 1			Topic 2		Topic 3			Totals	
		Session 1A	1B	2	3A	3B	4	5A	5B		6
<b>Initiation (Word Count)</b>	EL	4 (50)	3 (63)	15 (80)	8 (190)	0	4 (50)	7 (66)	0	6 (75)	EL-47 (574)
<b>Response (Word Count)</b>	CUE	1 (164)	0	4 (266)	0	0	1 (9)	1 (15)	0	1 (20)	CUE-8 (474)
	REP	0	0	0	0	0	0	0	0	0	REP-0
	REF	1 (10)	0	1 (15)	0	1 (45)	0	0	0	0	REF-3 (70)
<b>Evaluation (Word Count)</b>	PROC	5 (181)	5 (149)	4 (193)	1 (58)	2 (80)	1 (39)	2 (85)	1 (38)	3 (142)	PROC-24 (965)
	RECAP	0	0	1 (23)	0	0	0	0	0	1 (25)	RECAP-2 (48)
	C	2 (6)	3 (11)	14 (46)	0	1 (11)	5 (31)	1 (9)	0	7 (36)	C-32 (150)
	ELAB	0	2 (69)	5 (142)	0	1 (44)	4 (288)	1 (18)	0	2 (166)	ELAB-15 (727)
	XP	0	0	0	0	0	0	0	0	0	XP-0
<b>Totals By Session</b>		<b>13 (411)</b>	<b>13 (192)</b>	<b>44 (765)</b>	<b>9 (248)</b>	<b>5 (180)</b>	<b>15 (417)</b>	<b>12 (193)</b>	<b>1 (38)</b>	<b>20 (464)</b>	<b>131 (3008)</b>

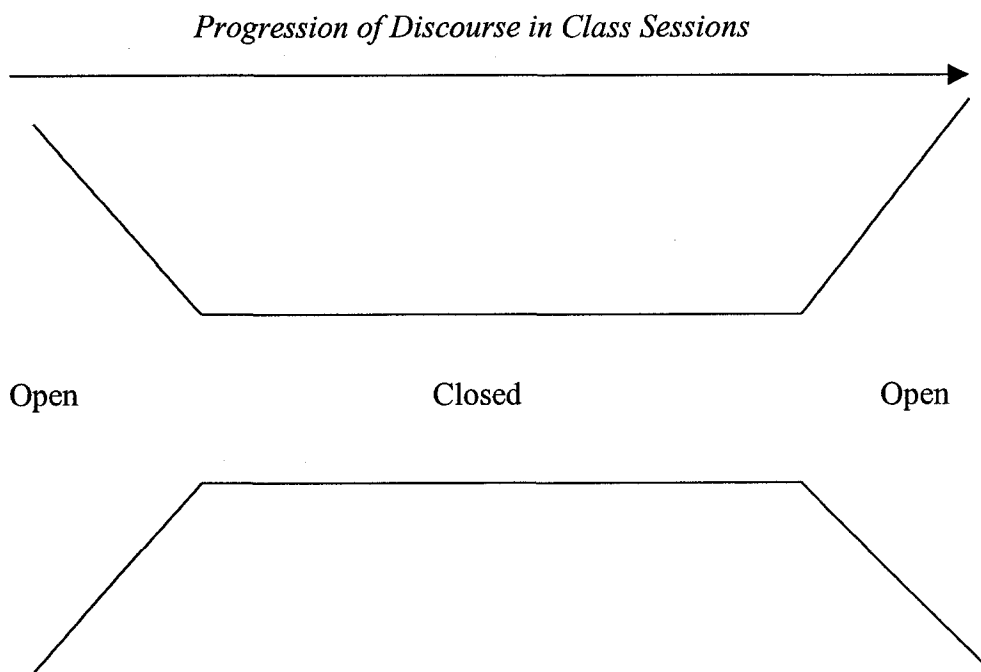


## APPENDIX L

## HENNING AND LOCKHART'S (2003) DISCOURSE RESPONSE CLASSIFICATION

Classification	Abbr.	Definition	Example
<b>Initiation</b> Elicitation	EL	The teacher elicits student participation by asking a question, leaving a sentence unfinished, calling a student by name, saying the number of the question to be answered outloud, etc.	Professor: "Judy, explain your position." Student: "The normal laboratory value is 3.2"
Cue	CUE	Certain information is highlighted or pointed at in order to elicit a particular response. The teacher is trying to focus student attention on a particular aspect of the question through use of strategies and modeling.	Professor: "Consider your assessment data as you are thinking about burn management." Student: "I see he has third-degree burns."
<b>Response</b> Repetition	REP	The teacher repeats what the student said to either confirm, emphasize the speaker's point, acknowledge another example in a list, or to question the students' answer (depending on the tone)	Student: " I think he has internal bleeding." Professor: "Internal bleeding?" (pause)
Reformulate	REF	The teacher restates a student response to make a better fit with the teacher's purpose for the lesson.	Student: "His airway is compromised." Professor: "So, what your saying is, you would call the physician and prepare the patient for intubation?"
Procedure	PROC	The teacher gives instructions or directions that have to do with how the class functions but are only indirectly concerned with learning the content of the class.	Professor: "Go ahead to step 2. List what you know about the case."
Recap	RECAP	The teacher summarizes previous statements in order to draw students into a common understanding.	Professor: "Those are great comments regarding the ethical considerations we face...like this case represents."
Elaboration	ELAB	The teacher elaborates on the topic under discussion by giving additional examples or introducing a new perspective. A specific student response is not incorporated into an elaboration, which differentiates it from a reformulation.	Professor: "Remember from the reading the part about analyzing his acid/base balance? You calculate acidosis first by looking at his pH."
Explanation	XP	The teacher gives an explanation in order to introduce a new concept relevant to the discussion. An explanation does not provide more examples or further information about concepts . An explanation improves the coherence of existing ideas by bridging differences with new information.	Professor: "Remember the discussion about albumin? I'd like to discuss now how fluid volume status is important to the understanding of burn care."
<b>Evaluation</b> Confirmation	C	The teacher confirms a student's attempt to answer a question.	Professor: "Yes. I agree with that."
Rejection	R	The teacher rejects a student's attempt to answer a question.	Professor: "Not quite" or "Not really"

APPENDIX M:  
HENNING'S (IN PRESS) BOW TIE MODEL



**APPENDIX N: LARGE AND SMALL GROUP SEQUENCE WITH ASSOCIATED PROCESSES AND DISCOURSE**

**Session 1A: September 8, 2003. Setting: Large Group**

**Topic: Burns and Renal Failure**

Professor	PROC		C/ PROC		C	PROC	REF					PROC	EL		EL		REF	EL	EI	CUE	PROC
Word Count	138		4 / 8		2	7	10					9	11		22		7	5	12	164	19
Student #		1		2				3	1	4	2			3		5					
Group #		1		1				1	1	2	1			1		2					
Word Count		2		4				11	3	13	8			21		2					
Stepien, et al. 6-Steps	1																				
Nursing Process	1																				

**Session 1B: September 8, 2003. Setting: Small Group**

**Topic: Burns and Renal Failure**

Professor		EL/ PROC	C/ ELAB																		C	PROC	EL		PROC	EL	PROC
Word Count		38 / 24	7 / 34																		3	20	22		74	3	20
Student #	7			7	7	7	8	7	8	7	7	8	8	8	7	7	8	7	8	7				7			
Group #	3			3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3				3			
Word Count	27			17	4	7	10	6	18	17	12	6	7	19	6	22	17	30	5	11				31			
Stepien, et al. 6-Steps	2																										
Nursing Process	1																										



**Session 2: September 15, 2003. Setting: Large Group**  
**Topic: Burns and Renal Failure**

Professor				EL AB		C	EL		EL		EL	EL	EL	C	C U E		EL		EL		C	R E F	P R O C	EL	C U E			C	C U E		C	E L A B	EL		EL			C	P R O C		
Word Count				13		5	5		2			6		2		107		4			5		2	15	17	6	22		2	80		2	9	18		3			2	70	
Student #	1	2		3			4		4	5		5		5		8		6		7	8		7			9		10	9		11					12		12	13		
Group #	1	1		1			2		2	2		2		2		3		2		3	3		3			4		4	4		5					5		5	5		
Word Count	14	60		45			22		50	26		31		8	45		7		25	11		48			14		54	35		9					17		39	14			
Stepien, et al. 6-Steps																																									
Nursing Process	6																																								
	5																																								

**Session 3A: November 3, 2003. Setting: Large Group**  
**Topic: Brain and Spinal Cord Injury**

Professor	PROC EL					EL								EL		EL											EL		EL													
Word Count	58 9					4				5					22		19											24		12												
Student #			2		2	11		9	11	11	13		4		4		13	12	7	4		10			12	4	8	12	4													
Group #			1		1	5		4	5	5	5		2		2		5	5	3	2		4			5	2	3	5	2													
Word Count			4		43	55		8	57	50	111		61		92		86	55	37	54		52			35	76	55	13	10													
Stepien, et al. 6-Steps	1																																									
Nursing Process	2, 3																																									
	1																																									

Session 3B: November 3, 2003. Setting: Small Group  
 Topic: Brain and Spinal Cord Injury

Professor						C	ELAB PROC																								
Word Count					11		44 35																								
Student #	8	12	8	13	10			11	13	12	13	11	12	11	13	12	11	12	13	11	13	12	11	13	12	11	13	12			
Group #								5																							
Word Count																															
	56	8	25	80	109			38	31	9	5	21	17	10	13	20	31	50	8	23	21	8	16	12	17	11	24	34			
Stepien, et al. 6-Steps						2, 3, 4, 5																									
Nursing Process	2, 3, 4																														

Professor							PROC																								
Word Count							45																								
Student #	13	11	13	11																											
Group #	5																														
Word Count																															
	8	29	30	33																											
Stepien, et al. 6-Steps	2, 3, 4																														
Nursing Process	2, 3, 4, 5																														

**Session 4: November 10, 2003. Setting: Large Group**  
**Topic: Brain and Spinal Cord Injury**

Professor	EL	C	ELAB	EL	C ELAB EL	C ELAB EL	C CUE	C ELAB PROC																	
Word Count	42	3	47	5	1 79 1	3 73 2	21 9	3 89 39																	
Student #		1		4		7		9		11															
Student				Rs Ex		Rs		Rs Ex		Rs Ex															
Group #																									
Word Count		1		2		3		4		5															
		20		41		16		59		48															
Stepien, et al. 6-Steps	6																								
Nursing Process	6																								

**Session 5A: November 17, 2003. Setting: Large Group**  
**Topic: Gastrointestinal Alterations/Liver Failure**

Professor	PROC	EI						EI		EI				EI											ELAB EL	
Word Count	53	19						8		1				16											18 4	
Student #			2	4	6	3		3		12	8		11	13		2		2	1	10	3	1	6	9	4	4
Group #			1	2	2	1		1		5	3		5	5		1		1	1	4	1	1	2	4	2	2
Word Count			11	14	22	12		17		22	8		10	16		24		30	15	17	30	29	13	25	50	23
Stepien, et al. 6-Steps	1		2, 3																							
Nursing Process			1																							





Session 6: November 24, 2003. Setting: Large Group  
 Topic: Gastrointestinal Alterations/Liver Failure

Professor	PROC EL	C EX EL	C EX EL	C EX EL	C CUE	C ELAB	PROC EL	C ELAB										EL C RECAP PROC							
Word Count	38 15	68	82	68	42	108	87	63										3 4 25 46							
Student		2	5	8	10	12		4		9	1	10	5												
Group #		1	2	3	4	5		2		4	1	4	2												
Word Count		29	40	58	74	73		78		70	101	116	136												
Stepien, et al. 6-Steps	6																								
Nursing Process	5																								