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# Survival of the Fittest: The Role of Linguistic Modification in Nursing Education

Brenda Strauch Moore
*University of Nevada, Las Vegas*, bmoore@hbu.edu

# SURVIVAL OF THE FITTEST: THE ROLE OF LINGUISTIC MODIFICATION IN NURSING EDUCATION

By

Brenda Moore

Bachelor of Science in Nursing
University of Alabama
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Master of Science in Nursing
Michigan State University
2009

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**Brenda Moore**

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Michele Clark, Ph.D., Committee Chair

Carolyn Yucha, Ph.D., Committee Member

Jennifer Kawi, Ph.D., Committee Member

LeAnn Putney, Ph.D., Graduate College Representative

Kathryn Hausbeck Korgan, Ph.D., Interim Dean of the Graduate College

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Abstract

This project's long term goal was to improve English-as-a-Second-Language (ESL) nursing student retention. Improving the quality of multiple choice exams is a first crucial step. ESL students find multiple-choice exams to be one of the most challenging aspects of nursing school. One reason for this is the presence of linguistic errors in exam questions. Linguistic errors include: irrelevant question content, poor sentence structure, and culturally biased words or phrases. Non-ESL students are less affected because exams are written in their native language. Linguistic modification, as part of best practices in item writing, removes these types of errors. The U.S. Department of Education indicated that ESL students gained 6% points on linguistically modified mathematics exams in comparison to non-modified exams. The specific aim of this study was to compare exam scores of ESL to non-ESL nursing students on a standard multiple-choice exam compared to a linguistically modified exam. Current research highlights the needs of ESL nursing students along with the general role of linguistic modification. However, no identified quantitative studies evaluate the role of linguistic modification in nursing education. This study was unique in that it compared four subgroups of nursing students using an experimental method. Utilizing stratified randomization, nursing students were assigned to one of four subgroups. Two controls groups, ESL, and non-ESL students completed a standard exam of 50 questions. Two experimental groups, ESL and non-ESL students, took the same exam but with 50 linguistically modified questions. There were 67 ESL students that took the experimental (linguistically modified) exam. Sixty-eight (68) ESL students completed the control (standard) exam. There were 252 non-ESL students that took the experimental exam and 257 non-ESL students that

completed the control exam. Confounding variables were identified as GPA and program type (BSN and ADN). A 2x2 ANCOVA model was used for statistical analysis. The observed mean for the ESL students on the experimental exam was 69.94. The non-ESL students demonstrated an observed mean of 72.08 on the experimental exam. The observed mean for the ESL students on the control exam was 69.34 and non-ESL students 71.61. The combined means for both the experimental and control exam was 71.84 for the non-ESL students and 69.64 for the ESL students. The difference in observed means between the experimental exam and control exam for the ESL students indicate a 0.6% increase in the mean score. The non-ESL students had a 0.48% increase in mean score between the experimental and control exams. Students completed the experimental exam in 10% less time than the students that completed the control exam. The BSN students had a combined 3% increase in mean score over the ADN participants.

This research demonstrates several benefits from linguistic modification to nursing education. Students perceive linguistically modified exam questions to be clearer than non-modified questions, linguistic modification resulted in higher exam scores for ESL and non-ESL students, and finally linguistic modification resulted in decreased test completion time.

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Table of Contents

List of Tables

List of Figures

# Chapter One

## Introduction

As the nation diversifies, a growing need exists for culturally diverse nurses; however, the students best suited to fill this need are failing to complete nursing programs successfully. Nevertheless, enrollment of English-as-a-Second-Language (ESL) students is increasing (Bosher & Bowles, 2008). Though this is a promising trend in an era in which greater numbers of nurses and diverse faculty members are needed, attrition rates for ESL-nursing students are significantly higher than those of non-ESL students (Klisch, 2000). The reasons for attrition are complex; financial, family responsibilities, and academic success all play a role. Choi (2005) explained part of this phenomenon when she reported that ESL-nursing students suffer from more stress and anxiety and have greater rates of depression than non-ESL students. Stress, anxiety, and depression can be attributed to high expectations from family, financial sacrifice, and cultural adjustment. All of these factors may influence the high attrition rates for ESL-nursing students.

Lack of academic success is another well-documented reason for high attrition rates for ESL-nursing students (Abedi & Sato, 2008; Bosher, 2009; Choi, 2005). One explanation for this phenomenon is related to the student's struggle to understand and comprehend exam questions and answer options in a multiple-choice exam (Lujan, 2008). Multiple-choice questions frequently contain linguistic errors that negatively impact ESL students. For example, questions that contain irrelevant language complexity or culturally specific terms result in lower exam scores for ESL students (Abedi, Courtney, Mirocha, Leon, & Goldberg, 2005; Bosher, 2009). To allow ESL-nursing

students an equal opportunity to be successful in nursing programs, exam questions should be written using best practices in item writing. Best practices include alignment, importance, differentiation, and fairness (Sutherland, Schwartz, & Dickison, 2012).

Alignment reflects the degree to which exam questions relate to the concept being tested (Sutherland et al., 2012). Importance suggests that all concepts being tested should be important to nursing practice; items that assess trivial knowledge do not address the understanding or knowledge of the students in areas important to practice (Oermann & Gaberson, 2014; Sutherland et al., 2012). Differentiation includes three distinct areas: cognitive level of the item, variance of the distractors, and valid and invalid moderators. The cognitive level of the item should differ throughout the exam resulting in items of varying difficulty. The distractors will also affect the difficulty of the item; therefore, the plausibility of each distractor should vary so that it appears as an appropriate choice "to at least some examinees" (Sutherland et al., 2012, p. 37). Valid moderators are words and phrases that clearly and succinctly state the question. An invalid moderator refers to unnecessary or irrelevant wordiness that prevents a test-taker from demonstrating understanding (Abedi, 2006; Haladyna, Downing, & Rodriguez, 2002; Sutherland et al., 2012). Fairness is reflected in items that are clearly written and applicable to all test-takers regardless of ESL status. This applies to the item and all distractors (Bosher, 2009; Sutherland et al., 2012).

Linguistic modification, an element of both differentiation and fairness, eliminates linguistic errors leading to high quality multiple-choice exams that fairly and accurately evaluate all students. Linguistic modification is, therefore, a critical

component of best practice in exam development to create test items that accurately reflect student knowledge (Abedi & Sato, 2008; Bosher, 2009).

In researching the unique needs of the ESL-nursing students, only qualitative research was found. These studies highlight the needs of ESL-nursing students along with the general role of linguistic modification (Abedi & Sato, 2008; Bosher & Bowles, 2008; Choi, 2005; Lujan, 2008; Lampe & Tsaouse, 2010; Scheele, Pruitt, Johnson, & Xu, 2011). However, this researcher was unable to find quantitative studies that evaluate the role of linguistic modification in nursing education, in particular for ESL-nursing students and multiple-choice exams. This study was unique in that it compared four subgroups of nursing students using an experimental and control exam to identify the relationship between linguistic modification and exam scores. The four subgroups included a control group of ESL and a control group of non-ESL students and an experimental group of ESL and an experimental group of non-ESL students.

**Research Problem**

Culturally diverse ESL students are entering nursing programs in greater numbers each year (Bosher & Bowles, 2008). All students pass identical rigorous standards to enter these programs; yet attrition rates for ESL students range from 15% to as high as 85% (Gilchrist & Rector, 2007). Overall, nursing programs in the United States report attrition rates up to 50% for all students. Internationally, documented rates indicate attrition at approximately 30% (Abele, Penprase, & Ternes, 2013). In general, the United States has a higher overall attrition rate than other countries.

Communication involves both written and spoken language; therefore ESL students face difficulties on two fronts: verbal communication and written course

documents including examinations (Chamberlain, 2007). Research has shown that multiple-choice exams are one of the most difficult aspects of nursing school for ESL students (Bosher, 2009; Klisch, 2000; Lampe & Tsaouse, 2010). Considering that nursing student knowledge in the United States is primarily evaluated by multiple-choice exams, clear, concise item writing is essential to impact ESL and non-ESL-nursing student retention positively. Research has shown, however, that multiple-choice exam questions are frequently poorly written, contain grammatical errors, and include cultural bias (Bosher, 2009; Abedi & Sato, 2008; Lampe & Tsouse, 2010). To assist in improving exam questions, linguistic modification should be considered for all test items (Abedi & Sato, 2008). As an element of best practices, linguistic modification will improve readability and clarity of exam items for all students. This is significant because Abedi et al. (2005) found that linguistic modification, of the three techniques evaluated, resulted in higher exam scores for ESL students.

If students are failing nursing programs because of poorly written test items it is vital to develop multiple-choice exams that fairly and accurately evaluate all learners; it would be unethical to do less. Therefore, this research was designed to evaluate the role of linguistic modification in developing valid, inclusionary, and equitable multiple-choice exam questions. Subsequently, a clear understanding of the role of linguistic modification may lead to a practical solution to address the high attrition rates overall and specifically that of ESL-nursing students.

Evaluation in nursing education is focused on academic achievement of both didactic content and clinical practice. This research study specifically centered on evaluation of didactic knowledge using multiple-choice exams. Most nursing programs

use multiple-choice exams throughout their curriculum for both formative and summative student evaluation (Oermann & Gaberson, 2014). It is not surprising that multiple-choice exams are used. These exams have several advantages; they test a broad group of objectives, are compatible with statistical analysis, and can assess several cognitive levels (Twigg, 2012). In addition, multiple-choice exams mimic the format of required standardized exams that students commonly take at the end of a program and to establish licensure (Penn, 2008).

Frequently students must successfully complete course related exams after which they must pass a standardized exam such as the Health Education Systems Incorporated (HESI) test. Successful students must then pass another multiple-choice exam, the National Council Licensure Examination for Registered Nurses (NCLEX-RN®). It is unlikely that the NCLEX-RN® exam will be changed from its multiple-choice format. As a result, multiple-choice exams should not be eliminated from academia; however, research has found that items in these exams are frequently flawed (Bosher, 2009; Klisch, 2000; Lamp & Tsaouse, 2010; Lujan, 2008; Olson, 2012). Flaws due to linguistic errors in multiple-choice exams commonly include errors in grammar, mistakes in sentence structure, needlessly difficult terms, and culturally biased words and phrases (Abedi & Sato, 2008). Bosher (2009) and Abedi and Sato (2008) found that these types of linguistic errors result in multiple-choice questions that are needlessly difficult and, because of grammatical errors and cultural bias, negatively impact ESL students' success. Well-written questions that follow best practices in item writing do not include these types of linguistic errors (Sutherland et al., 2012).

Because multiple-choice exam performance is related to English proficiency, a valid exam should be well written, utilizing best practices in item writing (Griffin & Novotny, 2012). Questions that adhere to best practices produce fair and equitable evaluations. Therefore, it would be unethical and unfair to produce and administer an evaluation that lacks these qualities. According to Abedi (2006), well-written exams benefit all students and lead to accurate assessments for both ESL and non-ESL students.

To address the problem of poor item writing, which is present in both publisher-generated questions found in test banks and teacher-written questions, multiple-choice exam questions should be linguistically modified (Lampe & Tsaouse, 2010). This researcher posits that a quantitative study was necessary to assess the effectiveness of linguistic modification on a large population of nursing students and to understand the effect linguistic modification has on exam scores for all students, regardless of native language.

Even though a clear need for research on linguistic modification was evident and recommended by several researchers, to date this researcher was able to identify only four studies that relate to linguistic modification (Abedi et al., 2005; Bosher, 2008; Klisch, 2000; Lujan, 2008; Malu & Figlear, 2001; Scheele et al., 2011; U.S. Department of Education [U.S. Dept. of Ed.], 2012). Two of the four studies focused on middle school students; the two remaining studies had a total participant group of six nursing students. Thus, a gap in the literature is clearly evident.

New knowledge can be gained with a study on how linguistic modification changes student test scores on a sample of nursing students in their final semester. Therefore, through stratified randomization, four subgroups were created for this study. A

control group of ESL and a control group of non-ESL students took a 50-question exam using standard unmodified questions. An experimental group of ESL and an experimental group of non-ESL students took the same 50-question exam with linguistically modified questions. The content of the two exams addressed medical-surgical nursing topics. Specialty areas such as pediatrics, obstetrics, critical care, and mental health were not included. Comparisons were made between groups using mean exam scores. Knowledge gained from this research can lend support to the role of linguistic modification in nursing education. This knowledge has the potential to affect both ESL and non-ESL student achievement on all required exams.

**Specific Aim of Research**

Because of the lack of quantitative research regarding how linguistic modification affects student scores on multiple-choice exams, this study was designed to address the need for quantitative results. The specific aim of this study was to compare exam scores of ESL to non-ESL-nursing students on a standard multiple-choice exam compared to a linguistically modified exam. Findings of the research could potentially lead to the modification of course evaluation measures so that these measures are free of linguistic errors. These changes may result in improved retention rates for ESL and non-ESL-nursing students potentially leading to better outcomes for culturally diverse patients.

Three hypothesis statements align with this research study. First, both the ESL and non-ESL students will demonstrate higher scores on the linguistically modified exam in comparison to the standard exam. Second, the non-ESL students will score higher than the ESL students on both the linguistically modified exam and the standard exam. Third, ESL students will demonstrate a greater increase in mean scores on the linguistically

modified exam in comparison to that of the non-ESL students. The rationale and support of the hypothesis statements are fully described in Chapter 3.

**Significance of the Study**

This study is significant to nursing education because it supports the belief that student evaluation should be fair, valid, and equitable to all examinees regardless of minority, ESL, or international status (Sutherland et al., 2012). As well, culturally diverse nurses are better prepared to deliver culturally specific care (Donnelly, McKiel, & Hwang, 2009; Melillo, Dowling, Abdallah, Findeisen, & Knight, 2013; Olson, 2012). Minorities represent 25% of the United States population, yet only 9% of the nursing work force is from diverse cultures (Sullivan Commission, 2004). Therefore it is important that the nursing workforce is bilingual and culturally diverse with a focus on improving communication between patients and health care workers (Olson, 2012). Clear communication improves patient outcomes and is integral to safe and effective health care (The Joint Commission, 2010). Subsequently, a greater number of culturally diverse, bilingual nurses may positively impact patient outcomes. Therefore, this research is significant to nursing education centered on the concept of fair and equitable evaluation of all students with the added potential benefit of improved patient outcomes.

**Limitations**

One potential limitation of this study was that participants may have recorded inaccurate demographic information. To limit these errors, clear instructions were given along with assurances of anonymity and security. It is possible to have had confusion as to ESL status; this was addressed using a very clear definition on the 5x7 cards at the onset of the data collection event.

The quality of linguistic modification was also a potential limitation. Although linguistic modification is well defined by Abedi and Sato (2008) and Bosher (2009), to ensure quality, a guide was used to develop items and the items were reviewed by experienced faculty who are knowledgeable in the linguistic modification process and good item writing. The items were also evaluated by an expert in the field and, finally, pilot tested.

The inclusion sample was another potential limitation. Students in the final semester of a nursing program have been successful with multiple-choice exams. However to use a sample of students at a junior level would provide academic inconsistency; programs start with different courses and progress at a different pace. Students near the end of their final semester should have been equally exposed to the medical-surgical nursing content included in the research. It is possible that progression in an ADN program and BSN program differ in the final semester. Subsequently students who have not had equal coverage of all topics may be participating in the research.

**Definition of Terms**

*Attrition rates:* Attrition rates are percentages of students who have left nursing programs prior to program completion.

*Best practices:* For the purposes of this research, best practices in item writing is an evidence-based technique used to create exam questions that align with the topic being evaluated, vary in difficulty, include concepts important to nursing practice, and support fairness to all examinees.

*Cultural bias:* Cultural bias is defined as words or phrases that represent dominant American culture which may be unfamiliar to all examinees.

*Culturally diverse:* For the purposes of this research, culturally diverse individuals refers to individuals born outside of the United States who speak English-as-a-second-language.

*Distractors:* Distractors are the answer options available in multiple-choice questions. In general, three of four options will be distractors with one correct answer. The distractors are the incorrect response and designed to distract the examinee from the correct answer.

*English-as-a-Second-Language:* ESL status has been identified by the U.S. Department of Education as an individual who is not proficient in English. The U. S. Department of Education uses the term English Language Learner (ELL) in place of ESL (U.S. Department of Education, n.d.). The Texas Education Agency has defined an individual as ESL if his or her primary language is other than English (Bilingual, 2012). Scheele et al. (2011) further defined ESL students by their early education and home life. These definitions have been condensed and are part of establishing ESL status during data collection. For the purposes of this research, an individual was considered an ESL participant if he or she indicated that their primary language was other than English, or they considered English as a *second* language, or kindergarten through sixth grade education occurred outside the United States *and* the language spoken at home with family members is not English.

*Fairness:* For the purposes of this research, fairness reflects the readability and clarity of test items for all examinees regardless of ESL or international status.

*HESI®:* The Health Education Systems Incorporated (HESI®) test is an exam used by nursing programs to mimic the NCLEX® and it is frequently utilized as an exit evaluation.

*Importance:* For the purposes of this research, importance highlights the need that only essential content is tested. Test items should confirm knowledge that is necessary, meaningful, and non-trivial, therefore important to nursing practice.

*Linguistic errors:* A linguistic error is a broad category that includes errors in grammar, needlessly difficult terms, excess irrelevant content, and words or phrases that are specific to dominant American culture.

*Linguistic modification:* Linguistic modification is the practice of reducing needless linguistic complexity of exam questions to include only the content relevant to the topic being assessed. Linguistic modification does not simplify the question; instead the practice removes terms that are culturally bias, improves grammar, and eliminates wordiness (Abedi & Sato, 2008).

*Moderators (valid and invalid):* Moderators are factors that affect item difficulty. A valid moderator is a factor that aids in the measurement of a student's knowledge. For example, all answer options in a multiple-choice question are the same length and equally plausible. An invalid moderator distracts the examinee from demonstrating their knowledge. For example a multiple-choice question with grammar errors would slow down the test-taker and causing them to needlessly re-read the question (Sutherland et al., 2012).

*NCLEX-RN® :* NCLEX-RN® is the National Council Licensure Examination for Registered Nurses. This exam is taken by all nursing students who have graduated from

an accredited nursing program. Success on this exam allows individuals to be considered a registered nurse (RN).

*Test banks.* Test banks generally come in two types: questions that are written by teachers and maintained within a nursing program and questions developed by text book publishers that are available for faculty use.

**Summary**

The United States is a diverse country with an equally diverse patient population. Yet the percentage of culturally diverse nurses is comparatively low. To change nursing demographics, a greater number of culturally diverse students need to be successful in nursing school.

Linguistic modification creates clear understandable questions and is an essential practice in developing high quality multiple-choice exam items. High quality items offer an equal opportunity to all students regardless of ESL status. This research was designed to offer support to the role of linguistic modification as a method to create multiple-choice exam items that result in fair, equitable, and unbiased student evaluation in nursing education. Linguistic modification offers an opportunity for students from diverse cultures to survive nursing school and become our nation's critically needed nurses of the future.

# Chapter Two

## Literature Review

This literature review considers multiple studies that examine the role of linguistic modification as applied to English-as-a-Second Language (ESL) nursing students. After reviewing multiple data bases, this researcher found limited research on linguistic modification. The seminal work has been done by Dr. Jamal Abedi, Dr. Edynn Sato, and Dr. Susan Bosher. Literature is available that discusses the problems faced by ESL students; however research addressing possible solutions to these problems is limited. The body of this chapter describes issues pertaining to ESL nursing students and testing. These issues include (a) attrition; (b) language; (c) multiple-choice tests; (d) the concept of linguistic modification; and (e) best practices in item writing. The final section is a description of the conceptual framework using the context, input, process, and product (CIPP) evaluation model.

### Attrition

A major potential source of diverse, bilingual nurses is the minority population in the United States. A subset of the minority population consists of persons whose primary language is other than standard English. In nursing programs, students who speak English-as-a-Second Language constitute a consistently increasing percentage of total students (Bosher, 2009; Choi, 2005; Guhde, 2003). However, ESL nursing students demonstrate inadequate academic achievement.

Scheele et al. (2011) addressed a subset of ESL students, specifically Asian nursing students. The findings indicate that communication is the greatest barrier to success and the most likely cause of attrition. Recommendations from the research

include extending testing time and eliminating questions from test banks that discriminate against students from diverse cultures.

ESL students have specific needs that are not commonly shared by non-ESL students. Multiple researchers have uncovered widespread themes shared by these students. ESL students need (a) an advisor or mentor who has a special interest in the group; (b) English language enhancement; (c) nursing exam policies that reduce testing bias; (d) social support; (e) faculty development to enhance cultural competence; and (f) retention strategies that focus on ESL students (Choi, 2005; Donnelly et al., 2009; Klisch, 2000; Scheele et al., 2011).

A retrospective study involving 327 students sought to identify pre-nursing courses that acted as predictors of failure in a BSN program. Abele et al. (2013) performed a multiple variable logistic regression; after analysis, only one variable was indicated as a predictor. As a student's grade in "Introduction to Lifespan Development Psychology" (PSY 225) increased, the odds of successfully completing the BSN program increased. This particular course was developed by the nursing faculty and is intended to teach human development across the life span. The course mimics the nursing approach to application of learned principles and critical thinking strategies. The study was limited to a specific university and may not apply to nursing students in general; however, it supports the concept that nursing has a unique approach to evaluation. Out of all pre-nursing courses only the course taught and delivered in the same style and manner as used in typical nursing courses predicted student success or failure.

Needs of ESL nursing students are vast; however, testing and evaluation issues present a considerable hurdle to many students. Several researchers (Abedi & Sato, 2008;

Bosher, 2009; Sutherland et al., 2012) suggest that many of the evaluation concerns can be resolved through use of linguistic modification and best practices in item writing.

**Language and Multiple-Choice Exams**

Due to limited exposure to standard English (SE), ESL students struggle with communication and specifically written language (Scheele et al., 2011). Written SE is used extensively during lectures, clinical instruction, and evaluations. Multiple-choice exams, composed entirely of SE are the most common method of evaluation in nursing programs and the primary approach of the National Council Licensure Examination (NCLEX®) (Bosher, 2009). The exams are intended to assess student understanding and evaluate a student's ability to use critical thinking strategies. However, research has shown that multiple-choice exams are one of the most difficult aspects of nursing school for ESL students (Bosher & Bowles, 2008). Chamberlain (2007) conducted a qualitative study focusing on the experience of 10 ESL baccalaureate nursing students. Primary findings indicated that ESL students perceive communication, "the language of nursing," and exams to be a stressful element of nursing school (p. 1).

Considering that attrition rates for ESL students may be as high as 85% and that student knowledge is primarily evaluated by multiple-choice exams, clear concise item writing is essential to impact ESL student retention (Olson, 2012). Poor item writing in test construction significantly hinders academic achievement for ESL students. An element of poor item writing includes linguistic errors. Linguistic errors include use of words or phrases that add unnecessary linguistic complexity to exam questions. In practice, this is seen as errors in grammar, needlessly difficult or unfamiliar words, and culturally biased terminology (Abedi & Sato, 2008; Sutherland et al., 2012). Bosher

(2009) reviewed 673 multiple-choice test questions and found an average of 2.2 linguistic errors per question. Lampe and Tsouse (2010) evaluated 73 publisher-generated exam questions and found that 100% of the questions required re-writing to correct linguistic errors.

Poor item writing may not be restricted to publisher and teacher designed exams. ESL students are 10% to 15% less likely to pass the NCLEX® on the first try compared to non-ESL students. Even though the creators of the NCLEX® include multiple steps to ensure fairness including linguistic modification, the exam is still written in SE, the native language of non-ESL students and a foreign language for ESL students. Additionally, English proficiency is still an issue for ESL students along with "some degree of bias" present in some questions (O'Neill, Marks, & Liu, 2006, p. 18).

Sanner and Wilson (2008) identified additional issues with multiple-choice testing. A qualitative study involving three ESL nursing students was conducted through three successive interviews. All three of the students identified that difficulty with reading comprehension was related to their academic struggles. One of the three students related that additional help with multiple-choice test-taking strategies, as part of remediation, would have been helpful.

Klisch (2000) reviewed ESL nursing student retention strategies for a small private university from the perspective of cost effectiveness. The findings indicated that decreasing test bias by removing confusing structural forms and U.S. cultural references is essential to ESL student retention and academic achievement. Klisch stated that the purpose of testing is to assess the "examinee's knowledge of nursing content, not to test reading speed or familiarity of U.S. dominant culture" (p. 26). Choi (2005) also

completed a literature review and concluded that to aid in ESL nursing student retention all education material should be assessed for cultural relevancy and accuracy. Additionally, educational content should be "inclusionary, nonbiased, and historically accurate" (p. 266).

Lujan (2008) found that Mexican American nursing students spent a significant amount of time translating test questions that used nonmedical or unfamiliar terms. In addition, words designating a gender or referring to a very specific topic, such as skiing, should be considered problematic for ESL students and removed from test questions. Lujan states "the article reports the experience of 134 Mexican American nursing students" (p. 327); however there is no indication of how the experience was measured, what tools were used, or specific results from the group of students. Lujan included a case study reflecting the experience of a single student who participated in several test-taking strategy sessions. The student did not demonstrate an improvement in test scores; however, Lujan reports that the student had a general increase in confidence toward testing. Scheel et al. (2011) also recommended eliminating test bank questions that discriminate against students from diverse cultures. The needs of ESL nursing students are vast; however, testing and evaluation issues present a considerable hurdle for many students. Several researchers (Abedi & Sato, 2008; Bosher, 2009; Sutherland et al, 2012) concur that many of the evaluation concerns can be resolved through the use of linguistic modification and best practices in item writing.

**Linguistic Modification**

Linguistic modification is an element of best practices in item writing that allows change to occur in sentence structure and content (Sutherland et al., 2012). This function

supports improved readability of sentences leading to an enhanced understanding of written language. The influence of linguistic modification in educational settings is closely tied to the prevalence of multiple-choice exams in American academic settings and the increasing presence of ESL students (Bosher & Bowles, 2008).

According to Abedi and Sato (2008), the process of linguistic modification is fundamentally to reduce or eliminate unnecessary linguistic complexity in exam questions. This process corrects errors in grammar, removes irrelevant content, and eliminates culturally biased words and phrases (Abedi & Sato, 2008; Bosher, 2009). Both Abedi and Sato (2008) and Bosher (2009) agree that it is important that key terms and vocabulary are not removed from questions that have been modified. The goal of linguistic modification is not to simplify a concept; rather the goal is to make the concept clear to the reader.

The use of unnecessary words or wording with unnecessary difficulty adds a level of difficulty to a question that is unrelated to the content or intent of the question (Abedi & Sato, 2008; Bosher, 2009; Sutherland et al., 2012). For example, the phrase "treatments for AIDS has been found to be the most effective" can be changed to "…treatment for AIDS is the most effective" (Bosher, 2009, p. 265). Culturally bias words represent idioms or slang words that are frequently used in a local culture; however these words may not be familiar to all test-takers (Abedi & Sato, 2008; Bosher, 2009). Sutherland et al. (2012) adds that, as part of best practices in item-writing, culturally specific words should be avoided in exam questions. As an example, the phrase "assess the scraped knuckle" should be changed to "assess the finger joint abrasion" thereby avoiding the slang terms "scrape" and "knuckle."

As part of grammar, semantics and syntax also needs to be addressed. Semantics refers to the meaning of words and syntax to the rules that dictate sentence structure. As an example, the phrase "the client works as a tailor" can be difficult to understand because of the required understanding of a tailor's profession. A linguistically modified phrase would be "the client sews clothing as a profession." This modification does not change the meaning, only offers clarification. Sentence structure can be challenging when nouns are used as verbs. As an example, the verb "suspect" is easier to understand than the noun suspicion. Verbs communicate directly, whereas nouns tend to lack clarity (Bosher, 2009). The following question is an example of an original question followed by the same question linguistically modified. The correct answer is indicated by an asterisk.

*Original*

> A chronically ill, bedfast patient cared for in the home by family members has a stage II pressure ulcer over the coccyx. To prevent further tissue damage, the home care nurse instructs the family members that it is most important to
>
> a. change the patient's bedding at least every day.
> b. record the size and appearance of the ulcer weekly.
> c. provide the patient with a high-calorie, high-protein diet.
> d. change the patient's position at least every 2 hours.*
>
> (Lewis et al., 2007)

*Linguistically modified*

A chronically ill patient is cared for at home by family members. The patient is on bed rest and has a stage II pressure ulcer over the coccyx. To prevent further tissue damage, what is the most important instruction for the nurse to give to the family?

a. Change the patient's bedding at least every day.
b. Record the size and appearance of the ulcer weekly.
c. Provide the patient with a high-calorie, high-protein diet.
d. Change the patient's position at least every 2 hours.*

Several changes have been made to affect the clarity of the item. First, the original question has two sentences, the modified item has three sentences. Bosher (2009) and Abedi and Sato (2008) found that a greater number of short sentences were easier for ESL students to understand than longer complex sentences. Second, the word bedfast is replaced with a more familiar term, bed rest. Third, to decrease wordiness, home care nurse is minimized to nurse since the type of nurse is not necessary to answer the question. Finally, the level of complexity has been changed from two complex sentences to three clear sentences, in addition the item ends with a question. ESL students find that exam items that end in a question format are easier to understand than sentence completion items (Bosher, 2009).

As part of best practices in item-writing, Sutherland et al. (2012) include these same elements under the heading of differentiation and fairness. As the goal of testing is to separate the proficient students from the non-proficient students, it is essential that

testing evaluates nursing knowledge and that items that compose a test reflect this principle (Sutherland et al., 2012).

The role of linguistic modification and its application to exam questions is supported by three identified studies. Bosher and Bowles (2008) report ESL nursing students found that, after linguistic modification of nursing pathophysiology questions, 84% of the modified questions were found to be clearer than the original questions. This was a small qualitative study with five ESL nursing students.

Abedi et al, (2005) compared the usefulness of English dictionaries to linguistically modified questions as an accommodation for eighth-grade ESL students on a science test. A group of 72 ESL students participated in the research. The mean score for the linguistically modified questions was 13.27, whereas the mean score for use of the English dictionary group was 11.52. The findings indicate that linguistic modification significantly outperformed the use of the English dictionaries as an accommodation for ESL students.

A study similar to the research in this study was completed by the U.S. Department of Education (2012). Research was conducted to assess the effect of linguistically modified math questions on academic achievement of seventh and eighth graders. A sample group of 4,617 students were randomized into two subgroups. A group of 2,307 students completed the linguistically modified item set while 2,310 students completed the original non-modified item set; comparisons were made between the two groups. Analysis was conducted to compare the performance of English Language Learners (ELL) and English proficient students. ELL students were defined in this study as Spanish speakers who are not proficient in English. The study found a statistically

significant 6 percentage-point gain on math achievement for the ELL students, effect size 0.20, p= 0.00, and no statistically significant change for the English proficient students (U.S. Department of Education, 2012). This research adds additional support for the proposed study.

Essentially, linguistic modification is a process of change. More specifically, linguistic modification is change in written language resulting in improved clarity by the reader. This process results in clear multiple-choice questions that can be understood by all test-takers (Abedi, 2008). Considering the predominance of multiple-choice exams used for nursing student evaluation, linguistic modification is therefore a beneficial process to apply to exam questions within nursing education.

Noticeably missing in the research are quantitative studies of nursing student with a significant number of participants. In addition quantitative research examining the relationship between ESL students and linguistic modification is under represented in the literature. Without sufficient quantitative research, the true gravity and prevalence of the situation and the applicability of linguistic modification is unclear. An understanding of the impact of linguistic modification and its role is vital for nursing education.

**Best Practices in Item-Writing**

The purpose of student evaluation is to distinguish proficient students from non-proficient students. Because the purpose of an evaluation is to provide information about the understanding or knowledge of the content of an examinee, it is imperative that item writers follow principles of best practice to create well-written, fair exams that accurately evaluate test takers. Dr. Karen Sutherland, a principle content developer for NCLEX-RN® , along with Jason Schwartz and Dr. Philip Dickison, have developed four principles

that demonstrate best practices in test item writing. These principles are supported by Abedi and Sato (2008), Bosher (2009), Haladyna et al. (2002), Oermann and Gaberson (2014), and Twigg (2012). The four principles include (a) alignment; (b) importance; (c) differentiation; and (d) fairness. This section of the chapter will address each of these principles.

**Alignment**

Alignment is perceived on multiple levels. Fundamentally, alignment relates to the domain under evaluation. The domain is understood as the construct, concept, or objective being evaluated (Abedi & Sato, 2008; Sutherland et al., 2012). Many schools use a blueprint to highlight the domain under evaluation (Sutherland et al., 2012). The test blueprint lists the objectives covered in the exam and the number of questions the students can expect for each objective. The blueprint, as a first step in alignment, allows students to have a clear understanding of the content to be evaluated and permits the teacher to make a valid judgment in test analysis (Oermann & Gaberson, 2006). At the level of the examination, alignment relates to the extent that the exam follows the blueprint. As an example, there should be agreement between the number of items or questions per objective. Alignment for the specific item refers to how well the item corresponds to the intent of the question or the specific knowledge to be measured (Sutherland et al., 2012). Strong alignments to the concept or objectives from the blueprint are essential in evaluating a student's proficiency in the skill or content being evaluated (Abedi & Sato, 2008). The following question illustrates the concept of alignment at the item level. It is an example of strong alignment to the objective "Identify

foods that are high in protein content." In the example question, an asterisk indicates the correct answer.

Which of these breakfast items would be best for a client who requires a diet high in protein?

a. Spinach omelet *

b. Melon slices

c. Jelly-filled doughnut

d. Bagel with butter

Alignment to the statement is strong; however the distractors seem too easy. Best practice would be to list alternate distractors or adjust the key (correct response) to a less well-known protein containing food (Sutherland et al., 2012, p. 36). An item that is too easy will not differentiate proficient from non-proficient students. The following question highlights poor alignment with the objective "identify foods high in calcium content."

Which of the following conditions requires an increased intake of high-calcium foods?

a. Paget's disease

b. Osteoporosis

c. Pregnancy *

d. Primary hypertension

While this question is more difficult than the first, difficulty does not take the place of alignment and this question does not align well with the objective (Sutherland et al., 2012, p. 36). The item writer needs to keep the concept or the objective in mind while writing each question; otherwise conclusions regarding the examinees cannot be drawn

from an exam composed of poorly aligned questions. Therefore item writers must treat alignment as a critical goal and first step in the item writing process.

**Importance**

Importance is the second principle in item writing. Oermann and Gaberson (2006) state that all items should test content that is meaningful and important. Testing topics that are trivial, or with the intent of "checking to see if they did the reading," is a waste of the teachers' and students' time. Following the alignment principle will help with importance; however a question that aligns well may not necessarily be important. Item writers need to understand the specific content that is essential and that knowledge of the content needs confirmation. The following question illustrates good alignment with the objective "Identify foods high in iron content."

Which of these foods has the highest iron content?

a. 8 oz. of beef liver *
b. 8 oz. of beef sirloin
c. 8 oz. of beef roast
d. 8 oz. of beef hamburger

The item writer has chosen to assess the student's ability to differentiate the iron content of multiple types of beef; how important is this? Is it more important to determine if the student understands that beef products have more iron than non-beef products? Item writers need to avoid questions that ask for trivial knowledge, such as this, and instead focus on essential information. The following question aligns well with the objective and avoids testing trivia.

Which of these foods has the highest iron content?

a. 8 oz. of beef liver *

b. 8 oz. of chicken breast

c. 8 oz. of salmon

d. 8 oz. of soy protein

This question demonstrates good alignment to the task statement and illustrates content that is important and meaningful. Use of the informal "so what" question will help an item writer decide if the content is meaningful or trivial. If an item writer or a reviewer looks at a questions and asks "so what," the item likely needs revision, if not the content is important and essential. For example, one might ask "how useful are questions related to leprosy in the United States?" By contrast, asking "should there be questions that refer to treatments for hypertension?" Clearly, questions related to hypertension would be both important and meaningful. Questions referring to hypertension would test essential information that is both pertinent and relevant. As items are being written, the principle of importance must remain at the forefront. By following this principle, item writers will avoid esoteric items and distractors; instead they will remain focused on essential, meaningful questions (Haladyna et al., 2002; Sutherland et al., 2012).

**Differentiation**

Differentiation includes three sub-groups; varying the cognitive level of the item, varying the distractors, and valid and invalid moderators. It is important to vary the difficulty of the item because a question that all students answer correctly or all students answer incorrectly is meaningless. Very difficult or very easy questions do not help distinguish students who know the content from the students who do not (Oermann &

Gaberson, 2006; Sutherland et al., 2012). Therefore, item writers need to vary the difficulty of the questions. Commonly, average-to-difficult items are the best choice to differentiate the proficient students from the non-proficient students (Twigg, 2012).

In high-stakes or large-scale tests, such as the NCLEX-RN®, questions are pilot tested to evaluate difficulty ratings. Only the questions that pilot test well are allowed into the actual exam (Sutherland et al., 2012). Educators who write their own questions need to analyze the item data carefully to determine which questions perform well and which need to be rewritten. To rewrite questions and change the difficulty level, item writers can change the cognitive level of the question and/or vary the distractors (Sutherland et al., 2012). Bloom's taxonomy is another tool that can be used to help differentiate the cognitive level of a given item (Twigg, 2012). Bloom's taxonomy lists knowledge as the first cognitive level, which asks the most direct questions. Following knowledge is comprehension, application, analysis, synthesis, and evaluation. A question at the knowledge level will request that the examinee define or identify information. The following question is written at the knowledge level.

Identify a symptom of peripheral arterial occlusive disease.

a. Bilateral ankle edema at the end of the day.
b. Lower leg pain after walking one block.*
c. Chest pain with coughing and deep breathing.
d. Anxiety regarding dizziness and falling.

This same topic can be used in a more difficult question. The next question is written at the application level. Application-level questions are expected to be more

difficult than knowledge-level questions and frequently expect the student to apply knowledge in a setting (Haladyna et al., 2002; Sutherland et al., 2012; Twigg, 2012).

Which comment by the client indicates a possible need to discuss cholesterol lowering medication?

a. "My ankle is swollen at the end of the day."

b. "My lower leg hurts after walking one block." *

c. "I think I'm wheezing after I run one mile."

d. "I'm very nervous about losing my balance and falling."

In the second question, the examinee is expected to apply their knowledge of a disease process, view as a clinical manifestation, and anticipate a potential medication regimen. In the first question the student is simply expected to recall memorized information. Varying the cognitive level of a question affects the difficulty of an item. Best practices recommend that items be evaluated for difficulty during item analysis and that average-to-difficult questions compose the majority of the test (Sutherland et al., 2012; Twigg, 2012).

Varying the distractors will also affect item difficulty. All of the distractors should seem plausible to some of the examinees, however if all of the distractors are appealing, the question will be too difficult and once again lack value (Sutherland et al., 2012). As an example, if a question inquired about a specific antibiotic and all of the distractors were antibiotics from varying classifications, it would be a difficult question. However, if the distractors were from a range of medication classifications, the question would be easier. As with cognitive level, varying the distractors will affect difficulty level. Item writers need to use good judgment and understand that the more similar the

distractors the more difficult the question and adjust the distractors as appropriate (Haladyna et al., 2002; Oermann & Gaberson, 2014).

Valid moderators enhance a test item's ability to accurately evaluate an examinee's knowledge. An example of a valid moderator would be distractors of equal length and items with only one correct answer. By comparison, invalid moderators slow down the reader, increase the likelihood of misinterpretation, and detract from the examinees ability to demonstrate knowledge and understanding (Abedi & Sato, 2008; Sutherland et al., 2012). Invalid moderators include, but are not limited to, unfamiliar or needlessly difficult terminology, wordiness, poor grammar, and information presented in an awkward sequence (Abedi & Sato, 2008; Bosher, 2009; Sutherland et al., 2012). Invalid moderators are elements identified and corrected by linguistic modification (Abedi & Sato, 2008; Bosher, 2009). Large scale exams, such as the NCLEX-RN® use professional editors to avoid use of invalid moderators. However, educators may not have resources that include professional editors. In this case, a special awareness is needed to avoid these "content-irrelevant factors" that prevent accurate assessment of student knowledge of the content (Sutherland et al., 2012, p. 37). The following question is an example of an invalid moderator as part of the question stem. The question has two words in the stem that may slow a test-taker and distract from the intent of the question along with the limiting the student's ability to demonstrate understanding.

Which action by the student nurse will cause the RN to hurriedly intercede to reinforce safe patient care?

a. The student nurse is assisting an elderly patient to ambulate in the hallway.
b. While bathing a patient, the student nurse rubs lotion on the patients back.
c. During bathing, the student nurse vigorously massages the patient's lower legs. *
d. During morning care, the student nurse encourages the patient to express him or herself.

The terms "intercede" and "hurriedly" are needlessly difficult. The intent of the question is to evaluate an examinee's understanding that too vigorously massage the lower leg is unsafe patient care and that the action must stop. Best practice would indicate that the terms intercede and hurriedly should be replaced with similar, however familiar words (Haladyna et al., 2002). The following re-written question has the same intent with valid language.

To ensure safe patient care, the RN should instantly stop the student nurse from performing which of the following actions?

a. The student nurse is assisting an elderly patient to ambulate in the hallway.
b. While bathing a patient, the student nurse rubs lotion on the patients back.
c. During bathing, the student nurse vigorously massages the patient's lower legs. *
d. During morning care, the student nurse encourages the patient to communicate.

**Fairness**

Fairness is the final principle of best practices in test item writing. Examinations should be applicable to all examinees regardless of minority status, country of origin, or primary language. Use of language that is inclusionary and familiar to all test-takers is a fundamental element of linguistic modification (Abedi & Sato, 2008; Bosher, 2009). Because fairness is such a fundamental principle, the NCLEX-RN® and NCLEX-PN® undergo a fairness or bias review by a non-nurse reviewer to locate content that appears to offer an advantage or disadvantage to a testing group or sub-group. The exams also undergo a "differential item functioning review" which uses statistical data for the same purpose (Sutherland et al., 2012, p. 38). Educators who write their own items need to be sensitive to words and phrases that are local slang, idioms, or regional colloquialisms. As an example, the following question includes a slang word in the distractors that may be unfamiliar to all examinees.

The nurse has completed patient teaching for a low sodium diet. The patient has made the following choices: which choice requires additional teaching?

a. A 4 oz. can of Vienna sausages. *
b. A 6 oz. can of low sodium chicken soup.
c. A 4 oz. serving of vanilla pudding.
d. A 12 oz. can of diet soda.

The above is an example of a question that is otherwise well written for a beginning nursing student, except for the slang or colloquial terms. Both Vienna sausages and soda may be unfamiliar to some examinees. To maintain the principle of fairness, these two phrases should be replaced with canned pork sausage and carbonated beverage.

The changes clarify the question and remain consistent with the intent. Once an item writer becomes sensitive to slang words or phrases, best practice indicates that to remain fair, the words and phrases should be removed and replaced with appropriate terminology (Sutherland et al., 2012).

The final elements of fairness are the trick questions and outliers. Trick questions are items that examinees, without the knowledge, will get right, and those individuals with the knowledge will get wrong. These questions tend to contain elements that give clues to the correct answer or the correct answer is so obvious that higher performing students will likely avoid the option (Haladyna et al., 2002; Sutherland et al., 2012). Outliers are distractors, correct or incorrect, that distinguish themselves from the other distractors. These may appear significantly longer than the other distractors or distance themselves by content. For example, the question may ask for a clinical manifestation – three of the distractors are symptoms and one is a lab value. Because it is different from the other distractors, the lab value would be the outlier. Examinees respond to outliers differently; some may see them as the obvious correct answer, others may assume the outlier is the wrong answer (Haladyna et al., 2002; Sutherland et al., 2012). Either way, outliers influence examinees to make decisions based on assumptions instead of their knowledge.

The goal of student evaluation is to distinguish students who understand the content from students who do not. To do this fairly and accurately, it is essential that best practices in item writing principles be identified and followed. The principles addressed in this section are designed to give guidance to item writers enabling them to compose well-written exams that accurately and fairly evaluate examinees.

## Conceptual Framework

The purpose of a conceptual framework is to give guidance and structure to a process. The structure of this research is essentially evaluation; therefore an evaluation model is an appropriate conceptual framework. The context, input, process, and product model (CIPP) was developed by Stufflebeam in 1971. The original intent of the model was to focus on program improvement, however over time the model has been updated to be used for a variety of evaluation processes (Frye & Hemmer, 2012). This section of the chapter offers a description of the model and its applicability to linguistic modification, nursing students, and student evaluation. In addition, each element of model, context, input, process, and product is reviewed and applied to nursing research.

Singh (2004) found that the CIPP model is both flexible and robust in its application to nursing education evaluation. The model examines weakness and strengths of a program, discovers needs of the target population, uncovers options and identifies evidence of positive or negative results (Bourke & Ihrke, 2012). These attributes of the CIPP model align well with the overarching theme of ESL nursing student retention. The components of the model also support ESL nursing students, linguistic modification, and best practices in evaluation. Subsequently the CIPP model is an appropriate foundation to use to structure and guide research.

Context is the first component in the CIPP model. Context identifies the stakeholders and evaluates their needs (Bourke & Ihrke, 2012). Context is also used to determine the obstacles to meeting stakeholder needs (Frye & Hemmer, 2012). Because attrition affects the students and their nursing program, both are stakeholders. Within the context phase, the needs of the stakeholders are assessed through record analysis of the

documented attrition rate. It is well-documented in the literature that ESL student attrition is significantly greater than non-ESL students (Abedi & Sato, 2008; Bosher, 2009; Choi, 2005). Obstacles that hinder student success rests with communication, primarily, written communication in the form of multiple-choice exams that do not demonstrate best practices in item writing (Abedi, Courtney, Mirocha, Leon, & Goldberg, 2005; Bosher, 2009).

Input is the second component in the CIPP model. Input is designed to identify how the needs of the stakeholders can be met. In addition, this component clarifies procedures for implementing the process of meeting their needs along with the feasibility of the process (Bourke & Ihrke, 2012; Frye & Hemmer, 2012). ESL students require clear comprehensible examinations that evaluate their understanding of nursing content. To meet this need, linguistic modification, as an element of best practice in item writing, is applied to multiple-choice exam questions. This process is designed to clarify multiple-choice exams leading to an accurate and fair evaluation process. For the purposes of this study, a well-designed and researched guide by Abedi and Sato (2008) was used to develop the linguistically modified questions. A panel reviewed the modified questions for content validity, followed by an expert review leading to a pilot study resulting in a set of linguistically modified questions. This procedure was feasible from both a time and resource perspective.

Process, the third phase of the CIPP model, evaluates the procedure and asks the question "is the procedure or process being done?" (Gaberson &Vioral, 2014). This evaluation step is fulfilled during data collection. At this point in the study, the linguistically modified exam and original exam have been developed and data collection

started. This phase allowed that the exams developed during input and implemented during data collection would provide accurate and applicable information for analysis in the product phase.

Product is the final component to the CIPP model. Product evaluation is a combination of information that describes and analyzes the outcomes and compares them to the context, input, and process components (Bourke & Ihrke, 2012). The product component looks at the data and answers the questions: "Was there a positive or negative outcome?" "What are the short-term and long-term outcomes of the process?" and "Were the intended outcomes of the program realized?" (Frye & Hemmer, 2012, p. 296). To meet the product component, the statistics of the research were analyzed. Statistical analysis answered the questions related to the study and clarified if linguistic modification resulted in higher exam scores for ESL students.

The CIPP model was well-suited to the process of linguistic modification. Context helped identify the ESL students as the stakeholders and assess their needs with multiple-choice exams. Input clarified the process of linguistic modification and highlighted the procedure for implementation. Process evaluates the progression of the procedure through data collection. Product merges the statistics into a clear representation of the outcome of linguistic modification. By utilizing the CIPP model, the research maintained a firm foundation that is well grounded and supported within a conceptual framework.

**Summary**

The population of the United States continues to diversify. Increased diversification of the general population results in enhanced diversification of the patient population that embodies the health care system. Safe patient care for culturally diverse

persons is a consequence of excellent communication between the patient and the health care team. The most effective communication is spoken in the patient's own language. Culturally diverse, bilingual nurses are therefore integral to the health care team and safe patient care (The Joint Commission, 2010).

Culturally and linguistically diverse nurses may positively impact patient outcomes. However attrition rates for ESL nursing students is significantly greater than non-ESL students. This places the potential for more ESL nurses at risk. To improve retention rates, a variety of considerations were addressed; financial, family, and communication were all viewed as problematic. However, written communication was recognized as the greatest factor affecting ESL student attrition (Bosher, 2009). Written communication is the primary method of nursing student evaluation through the process of multiple-choice exams. That said, ESL students find multiple-choice exams to be one of the most difficult elements of nursing school (Bosher & Bowles, 2008). Bosher and Bowles (2008), along with Abedi and Sato (2008), found frequent linguistic errors in multiple-choice test questions leading to identification of the specific errors and the method of linguistic modification to eliminate the errors. Sutherland et al. (2012) highlighted the importance of using linguistic modification as part of best practices in item writing to offer clear concise questions to all test-takers.

The CIPP conceptual framework is an appropriate tool to use to give guidance and structure to research focused on ESL nursing students and language. The specific elements of the CIPP model – context, input, process, and product – address each element of the research. Context and input focus on the target population, their needs, and the role of best practices. Process and product speak to implementation of the research, data

collection, and analysis of the results. Overall, the CIPP model was an appropriate framework to use to identify a need, guide the research, and analyze the results.

The combination of the essential need for diverse bilingual nurses and the high attrition rate of ESL nursing students indicate a need to address the role of linguistic modification and student achievement on evaluation. By utilizing the CIPP model and linguistic modification of multiple-choice exams, a clear picture was created through research that supports the integral role of linguistic modification on multiple-choice exams.

# Chapter Three

## Methodology

This chapter details the methodological techniques designed to compare exam scores of ESL to non-ESL nursing students on a standard multiple-choice exam compared to a linguistically modified exam. Included are sections describing the following: (a) research design; (b) hypothesis; (c) sample; (d) data collection procedures; (e) instruments; (f) procedure of linguistic modification; and (g) data analysis. The chapter concludes with ethical considerations.

### Research Design

The research design was an experimental, post-test-only control group design. The posttest-only control-group design is an experimental approach that has three elements: (a) random assignment to the experimental or control group; (b) administering a treatment to the experimental group and no treatment to the control group; and (c) administering the post test (Gall, Gall & Borg, 2007). The research was designed to align with the three elements in this manner: (a) stratified random sampling was used to assign participants to the experimental or the control group; (b) the control was the original exam, without treatment, and the treatment of linguistic modification was applied to the experimental exam; and (c) all participants completed one of the two exams.

There are two alternate research designs that include random assignment and a control group: pretest-posttest control group, and Solomon four-group. Pretest-posttest control group design would be inappropriate due to the potential adverse effects of knowledge gained from a pretest on the posttest results. Additionally, a second data collection event was not feasible due to attrition and cost. The Solomon four-group

design uses a pretest intervention and evaluates the effect of both pretest "sensitization" and a relationship between the pretest and the experimental results (Gall et al., 2007, p. 421). Due to the pretest aspect of the Solomon four-group design and potential negative effects on the posttest results, the Solomon four-group design was not a good match. A design in which a question is presented in a standard form and again in a modified form to the same participant, is likely to suffer from invalidity due to interaction of pretesting with the posttest data (Gall et al., 2007).The posttest-only design aligns with the research on four criteria: (a) it is experimental; (b) random assignment was utilized; (c) two treatments were involved, control and experimental; and (d) observation measurements were made of both groups. The posttest-only design has limited risk to internal validity and no risk external validity (Gall et al., 2007).

**Research Hypothesis**

Three hypothesis statements align with this research, two main effects and one interaction effect. The first main effect is that both ESL and non-ESL students will demonstrate higher scores on the linguistically modified exam in comparison to the standard exam. The rationale for this statement is supported by the understanding that linguistic modification will reduce unnecessary linguistic complexity in multiple-choice exam items (Abedi & Sato, 2008; Bosher & Bowles, 2008; Haladyna et al., 2002). A reduction in item complexity will result in clear, comprehensible multiple-choice questions for all test-takers resulting in improved exam scores (Abedi & Sato, 2008; Sato, Rabinowitz, Gallagher, & Huang, 2010).

The second main effect is that non-ESL students will score higher than the ESL students on both the linguistically modified exam and the standard exam. Linguistic

modification will add clarity to multiple-choice exam items. However, questions are still written in English, which benefits the native speaker (non-ESL student). Even with diligent application of linguistic modification, questions may yet contain bias. Subsequently non-ESL students will struggle less than ESL students (O'Neill et al., 2006).

The interaction effect notes that ESL students will demonstrate a greater degree of change in exam scores on the linguistically modified exam in comparison to that of the non-ESL students. Research has shown that linguistic modification improves exam scores for ESL students (Abedi et. al, 2008; Sato et al., 2010). In addition, linguistic modification improves clarity of questions and improves ESL student understanding (Bosher & Bowles, 2008; Lujan, 2008). Subsequently, a greater change will be noted for ESL students in comparison to non-ESL students on the linguistically modified exam.

**Sample**

Approval from the University of Nevada Las Vegas (UNLV) Institutional Review Board (IRB) was obtained prior to recruitment and data collection. The participants were drawn from a convenience sample of nursing students from programs in Texas, Nevada, and Minnesota. The largest group of participants was drawn from southeast Texas. Texas was an appropriate choice due to diversity within the cities and counties. Several nursing programs participated from the Houston and Galveston area. The U.S. Census Bureau reports large group demographics as Whites 31%, Hispanic 42%, African American 20%, and Asian 7%. The data include the city of Houston and Harris County Texas. Specific to ESL status, the Houston Independent School District reports 30% of the total student population is considered ELL (Department of Research and Accountability Houston

Independent School District [HISD], 2012). Three nursing programs in the Las Vegas Nevada area participated in the research. Clark County, which includes the city of Las Vegas, has similar statistics to the Houston area: Whites 47%, Hispanics 30%, African Americans 11%, and Asians 9% (State & County Facts, 2012). Once again similar to Houston, Clark County School District reports that 23% of students are ELL (Annenberg Institute of School Reform [CCSD], 2012).

Two independent variables were identified: exam type – control (standard) or experimental (linguistically modified), and student type – ESL or non-ESL. The dependent variable is mean exam score. Using a 2x2 factorial analysis of covariance (ANCOVA), G Power 3.1, an alpha of .05, desired power at .80, an expected effect size of .25 (U.S. Department of Education, 2012)., and two covariates (GPA and program type), the minimum sample was 180.

A convenience sample of nursing students, using stratified randomization, were assigned to one of four subgroups. A minimum sample group of 180 was evenly distributed into four subgroups of at least 45 participants each. This approach adequately represented each subgroup (Gall et al., 2007). The subgroups were ESL students as the control group (standard exam), ESL students as the experimental group (linguistically modified exam), non-ESL students as the control group (standard exam), and non-ESL students as the experimental group (linguistically modified exam). All individuals within the convenience sample of nursing students were invited to participate; the exclusion criterion was applied during data analysis. The inclusion criterion included nursing students in the final semester of an accredited associate's degree (ADN) or bachelor's degree (BSN) nursing program. The students had to have completed the majority of their

course work and be within two months of graduation. This approach supported equality among students regardless of program. Exclusion criteria included all RN to BSN students, Licensed Vocational (LVN) or Licensed Practical (LPN) nurses, paramedics, and second degree BSN students. Individuals who have completed a college degree or who are working in the medical field may have had an advantage over the inclusion group.

To encourage participation, the researcher visited or sent an electronic invitation to potential participants. The students were informed that the research allows practice of NCLEX-RN® style questions and offers a report of their performance for self-evaluation. Finally the participants were provided with $10 as compensation for their time.

**Data Collection Procedure**

Dates for data collection were made with participating nursing programs for a time and location conducive to student participation. The participants would be completing an exam; subsequently, a classroom setting was used. At the onset of data collection, participants completed consent forms and were given instructions. The researcher answered all inquiries. The participants answered a set of four questions on a 5x7 index card to determine their ESL status. The cards were collected in no specific order and sorted into two groups, ESL and non-ESL; this determination was made by their response to the questions indicating ESL status. Every-other student was given the linguistically modified exam envelope or the control exam envelope. The same process was used for non-ESL students. In addition to the exam, the envelope contained a demographics page, stamped envelope to be self-addressed, and a Scantron® for exam answers. The participants were asked to complete the demographics sheet in unison; if

they chose to have their scores mailed to them the self-addressed envelope was also completed at this time. Once all documents were completed and returned to the envelope, the respective exams and Scantrons® were removed. The participants were then oriented to the exam, Scantron®, and final page of the exam booklet containing the perception questions.

The participants were instructed that they had as much time as needed to complete the exam. After they finished the multiple-choice exam they were directed to complete two perception questions. When completed, all materials were placed back into the envelope by the participant and returned to the researcher. Analyses to determine mean score was done with Parscore® testing software. To protect confidentiality, all participants had an assigned code number which was used to link the exam score to the individual. The researcher placed the code on the outside of the envelope and on all documents prior to data collection. The code indicated one of the four subgroups and was given to the participants as indicated by ESL status. For example, code EE001 indicated an ESL student, experimental exam, number one. NC001 indicated a non-ESL student, control exam, number one. The other two codes were EC001, indicating ESL student and control exam, and finally NE001, non-ESL and experimental exam. The list of codes was secured in a password protected database.

**Instrument**

The control (standard) exam was composed of 50 questions retrieved from *Medical-Surgical Nursing: Assessment and Management of Clinical Problems, 7th edition* (Lewis, Heitkemper, Dirksen, O'Brien, & Bucher, 2007). The questions were not altered or adjusted. Permission was granted by the publisher to use the questions as part of this

research. The control groups took a 50-item exam of original questions. The experimental groups took a 50-item exam using linguistically modified questions. The questions were matched sets, the same between the two exams, except for the linguistic modification applied to the experimental set. The subject matter of the exams was general medical-surgical nursing topics. The questions were at a level senior students in their final semester should have been familiar with; specialty subjects such pediatrics, obstetrics, and mental health were not included.

**Linguistic Modification Procedure**

Four steps were used to develop the linguistically modified (experimental) exam. First, the researcher linguistically modified the original questions using a guide developed by Abedi and Sato (2008). Second, a four-person panel of nursing faculty, with item-writing experience, reviewed the questions for face validity and content consistency (Oermann & Gaberson, 2014). The panel compared the original to the linguistically modified questions to evaluate for consistency of difficulty level and appropriateness of content. Because both the original and linguistically modified questions were part of the research, both the original questions and the modified questions needed to appear valid to the panel members. Linguistic modification should not change the intent of the question, instead offer clarity to the examinee (Abedi & Sato, 2008). The researcher incorporated suggestions from the panel members and updated the questions as appropriate.

The third step required the assistance of Dr. Susan Bosher. Dr. Bosher is an expert in the field of linguistic modification and multiple-choice questions. She evaluated the updated modified questions for appropriate linguistic modification and offered

feedback for improvement. Following Dr. Bosher's review, the fourth and final step was a pilot study to assess the questions. The instruments for the pilot study were a matched set of 60 questions for the original (control) exam and linguistically modified (experimental) exam. The pilot study included 60 questions, allowing the elimination of the 10 lowest performing questions. Results from the pilot were used to rank each question with the best performing matched sets becoming part of the research. Questions were evaluated according to difficulty and discrimination index. An appropriate difficulty index is between .30-.70 and discrimination index of >.20 (Oermann & Gaberson, 2014). Questions that did not meet the difficulty or discrimination index were removed. The Kuder-Richardson formula (K-R 20) was used to assess the reliability of the final 50 question control and experimental exams; a K-R value of >.60 is optimal (Oermann & Gaberson, 2014).

The pilot study included 73 nursing students from two BSN cohorts from a southeast Texas University. The data was used to establish a reliable set of questions for the experimental and control exam. In addition, the percentage of ESL students was determined to be approximately 10% of each class. This information was instrumental in determining the overall number of students for participation. Considering the 10% indicator, it was determined that approximately 900 students would be needed to reach the required 90 ESL participants.

**Data Analysis**

Mean exam scores were generated by Parscore® testing software for each of the four subgroups. The scores were then used for comparison. Using SPSS® statistical software, a 2x2 factorial ANCOVA statistic identified differences between groups.

ANCOVA is used to control for initial differences prior to making within-groups or between-groups comparisons (Gall et al., 2007). The proposed research was intended to find differences between groups based on response to a linguistically modified exam compared to a control exam. It is important to control for initial differences between the groups prior to comparison. To draw conclusions from the research, pre-existing variables need to be controlled. GPA as well as program type may influence mean scores. Student GPA scores vary greatly and may affect exam scores. BSN and ADN programs also vary in regard to length, prerequisites, and requirements for graduation. To make the groups as equal as possible, GPA, and program type were controlled with ANCOVA prior to comparison (Gall et al., 2007).

**Ethical Considerations**

All participants signed a consent form and had an opportunity to ask questions. Assurances were given regarding name and score confidentiality. Neither the results nor identities of participants were communicated with their respective nursing programs. Participation was completely voluntary; students could withdraw from data collection at any time. Students received a small monetary compensation for their time along with snacks and water. All names and corresponding codes were available solely to the researcher.

**Summary**

The purpose of this study was to compare exam scores of ESL to non-ESL nursing students on a standard multiple-choice exam compared to a linguistically modified exam. The experimental design described in this chapter was suited to discover the role of linguistic modification in nursing education. This research will enable nursing

faculty to realize the effect of linguistic modification on exam scores of ESL and non-ESL nursing students, resulting in an opportunity to develop fair and accurate multiple-choice exams.

# Chapter Four

## Findings of the Study

This chapter presents the findings of the study and includes a results section and a summary. The results section includes a description of the following: (a) sample; (b) discussion of the variables; (c) reliability and validity of the tool (experimental and control exam); (d) hypothesis statements; (e) student perceptions; and (f) discussion on how the study addresses the research question. The summary provides a review of the findings.

The following research question was used to guide the study: "What is the effect of linguistic modification on exam scores for ESL and non-ESL final semester nursing students?" Three hypothesis statements were developed to understand the effect of linguistic modification.

1. Both the ESL and non-ESL students will demonstrate higher scores on the linguistically modified exam in comparison to the control exam.

2. Non-ESL students will score higher than ESL students on both the experimental exam and the control exam.

3. ESL students will demonstrate a greater increase in mean scores on the linguistically modified exam in comparison to non-ESL students.

### Description of the Sample

This section describes the sample, discusses the variables, presents the reliability and validity of the experimental and control exams, evaluates the hypothesis statements, and addresses the research question. Statistical analysis is included for each hypothesis statement.

To understand the effect of linguistic modification on exam scores for ESL and non-ESL students, multiple final semester nursing students were recruited from several nursing programs throughout Texas, Minnesota, and Nevada. To begin the process, each program dean was contacted via e-mail. After initial contact, documentation was sent to the program's IRB committee. Alternatively the dean approved data collection by reviewing the UNLV IRB documents. Once permission was granted, recruitment materials were sent to the potential participants electronically through the assigned faculty members. Data collection dates and times were set through the specific program faculty. Data collection started in July of 2014 and was completed by February of 2015. By the end of data collection, participants had been recruited from 2 programs in Minnesota, 4 programs in Nevada and 15 programs in Texas.

During data collection the students were randomized into four subgroups. The total number of participants from all subgroups was 790. Within this group, 144 (18%) were identified as ESL students. Of the 790 individuals participating in the study, 150 were eliminated using predetermined exclusion criteria described in chapter three. The criteria excluded all RN to BSN students, LVNs, LPNs, paramedics, and second degree nursing students. In addition to removing the excluded participants, four individuals were removed as outliers (see Figure 1). Outliers were identified using a scatter plot; individuals with scores less than 50 were removed from the data set. The removal of outliers is a standard practice (Hinkle, Wiersma, & Jurs, 2003). Additionally, removal of extraordinarily low performers eliminates test-takers who may have given a sub-optimal effort.

The final number of participants included in the analysis is 644. Of this group 135 were ESL students. The total sample of 644 divides into the following number of students per subgroup: ESL students completing the experimental exam (EE) n=67, ESL students completing the control exam (EC) n=68, non-ESL students completing the experimental exam (NE) n=252, and non-ESL students completing the control exam (NC) n=257. Each of the four subgroups had at least 45 participants; the minimal number for statistical significance estimated during the study design to measure a moderate effect (Gall et al., 2007).

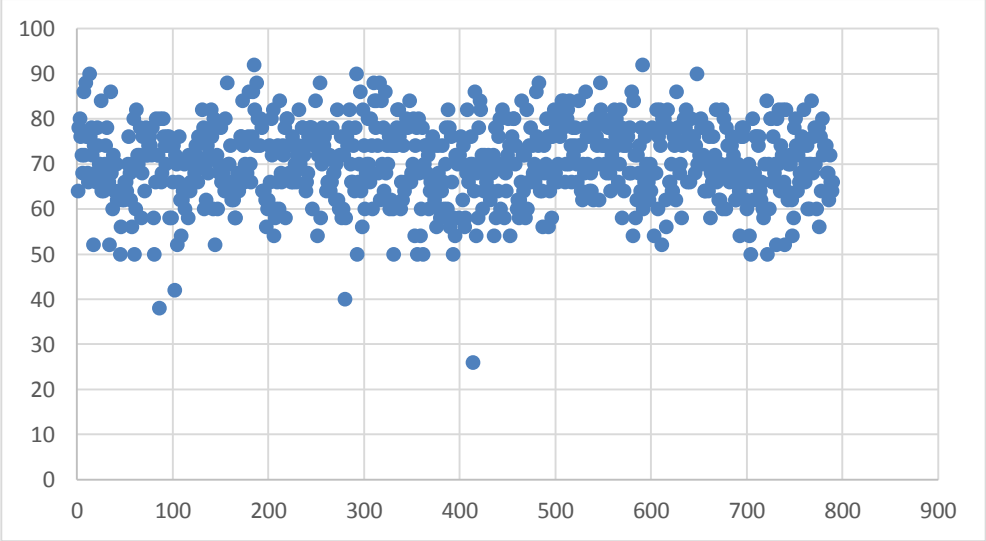



*Figure 1.* Scatterplot indicating outliers.

The demographics for the four subgroups were very similar. For example, the percentage of BSN participants for all subgroups ranged from 74.6% to 80.2%, ADN participants ranged from 19.8% to 26.5%. The one demographic that was different between groups was the percentage of males. The EE subgroup had 7.5% males, whereas the EC subgroup had 23.5%. The NC and NE groups each had 11% male participants

(see Table 1). This difference follows from the use of stratified randomization of a convenience sample. The number of participants born in the United States (US born) changed significantly between the ESL and non-ESL populations. Well over half of the ESL students were born outside of the U.S. while 90% of the English speaking students were born in the U.S. This result is expected given the nature of the study.

Table 1

*Demographic Information by Subgroup*

| Data | EE (n=67) | % | EC (n=68) | % | NE (n=252) | % | NC (n=257) | % |
|---|---|---|---|---|---|---|---|---|
| BSN | 50 | 74.6 | 50 | 73.5 | 202 | 80.2 | 206 | 80.2 |
| ADN | 17 | 25.4 | 18 | 26.5 | 50 | 19.8 | 51 | 19.8 |
| Male | 5 | 7.5 | 16 | 23.5 | 28 | 11.1 | 29 | 11.3 |
| Female | 62 | 92.5 | 52 | 76.5 | 224 | 88.9 | 228 | 88.7 |
| US born | 29 | 43.3 | 24 | 35.3 | 238 | 94.4 | 244 | 94.9 |
| Non-US born | 38 | 56.7 | 44 | 64.7 | 14 | 5.6 | 14 | 5.1 |

*Note.* EE=ESL students and experimental exam, EC=ESL students and control exam, NE=non-ESL students and experimental exam and NC=non-ESL students and control exam.

In addition to ESL status, other demographic information included self-reported values for student age, GPA, and years living in the U.S. Within the ESL and non-ESL groups, the subgroup means were similar. As shown in Table 2, the student's ages ranged from 24.5 to 25.6 and their GPAs from 3.14 to 3.2. Students in the ESL group were slightly older and had a slightly lower GPA than their non-ESL counterparts. The number of years students had lived in the United States was consistent between the EE and EC subgroups as well as the NE and NC subgroups.

The participants were allowed an unlimited amount of time to complete the multiple-choice exam. However each participant's total time to complete the exam was recorded. The EE subgroup mean time was 40.28 minutes, the EC mean time was 44.77 minutes. This represents a reduction of 10% on the experimental exam (linguistically modified) for the ESL participants. The NE subgroup mean time to complete the exam was 36.19 minutes and the NC group 39.74 minutes, representing a 9% reduction in time on the experimental exam for the non-ESL participants (see Table 2).

Table 2

*Demographic Means by Subgroup*

| Data | EE ($n$ = 67) | EC ($n$ = 68) | NE ($n$ = 252) | NC ($n$ = 257) |
|---|---|---|---|---|
| Age | 25.6 | 25.5 | 24.5 | 24.9 |
| GPA | 3.15 | 3.14 | 3.2 | 3.3 |
| Yrs. in US | 15.5 | 14.2 | 23.7 | 24.3 |
| Minutes | 40.28 | 44.77 | 36.19 | 39.74 |

*Note*. EE=ESL students and experimental exam, EC=ESL students and control exam, NE=non-ESL students and experimental exam and NC=non-ESL students and control exam. Time=number of minutes to complete the exam.

Country of birth and ethnicity was asked of each participant. Thirty one (31) countries were represented by the students involved in the research. The majority of ESL individuals listed the U.S. as their country of birth with Mexico and the Philippines as the second most common. Predictably, the majority of non-ESL students listed the U.S. as their country of birth with Nigeria as the second most common (see Table 3).

Table 3

*Country of Birth by Subgroup*

| Data | EE ($n$ = 67) | EC ($n$ = 68) | NE ($n$ = 252) | NC ($n$ = 257) |
|---|---|---|---|---|
| Argentina | 1 | | | |
| Bolivia | | 1 | | |
| Cameroon | 3 | 1 | | |
| Canada | | | | 1 |
| China | 1 | | | |
| Colombia | 1 | 1 | | |
| Egypt | | 1 | | |
| Ethiopia | | 1 | | |
| Eritrea | 1 | | | |
| Gambia | 1 | | | |
| Germany | | | | 2 |
| Honduras | | 1 | | |
| India | 1 | 3 | | |
| Italy | | 1 | 1 | |
| Japan | 1 | | | |
| Kenya | 1 | 1 | | 1 |
| Korea | 1 | | | |
| Mexico | 9 | 9 | 1 | 1 |
| Netherlands | 1 | | | |
| Nigeria | 2 | 6 | 5 | 2 |
| Pakistan | 2 | 2 | | |
| Philippines | 8 | 10 | 3 | 3 |
| Slovenia | | 1 | | |
| Somali | 1 | | | |
| Spain | | | 1 | |
| Taiwan | 1 | | | |
| Thailand | 1 | | | 1 |
| Trinidad | | | 1 | |
| UK | 1 | 1 | 2 | 1 |
| USA | 29 | 24 | 238 | 245 |
| Vietnam | 1 | 3 | | |

The EE subgroup ethnicity was 40% Hispanic and 27% Asian. The EC subgroup ethnicity was 40% Hispanic and 35% Asian. The NE and NC group ethnicity was 56% and 60% White and 20% and 16% Hispanic respectively. Considering that Texas census data lists White at 44% and Hispanic at 38%, and that most of the students were from

Texas, these ethnicity statistics were anticipated (United States Census Bureau [Census], 2013). Information on participant ethnicities can be found in Table 4.

Table 4

*Ethnicity by Subgroup*

| Data | EE (n=67) | % | EC (n=68) | % | NE (n=252) | % | NC (n=257) | % |
|---|---|---|---|---|---|---|---|---|
| African American | 8 | 12 | 13 | 19 | 22 | 9 | 26 | 10 |
| American Indian | | | | | | | 1 | |
| Asian | 27 | 40 | 24 | 35 | 24 | 9 | 25 | 10 |
| Hispanic | 30 | 45 | 27 | 40 | 50 | 20 | 42 | 16 |
| Pacific Islander | | | 1 | 2 | | | | |
| Other/Mixed | 2 | 3 | | | 14 | 6 | 10 | 4 |
| White | | | 3 | 4 | 142 | 56 | 153 | 60 |

*Note*. American Indian includes Alaskan Native, Pacific Islander includes Native Hawaiian.

One trend appeared when comparing the scores of the BSN students to the ADN students. This research showed that, in all subgroups, the BSN students scored higher than the ADN students. The observed mean exam score for the BSN participants was 72.17; the observed mean exam score for ADN participants was 69.37, a score 3% higher. Overall this suggests that the BSN students had a 3% higher score than the ADN students (see Table 5).

Table 5

*Mean Scores of BSN and ADN by Subgroup*

| Data | EE | EC | NE | NC | Group mean |
|---|---|---|---|---|---|
| BSN | 71.92 (*n*=50) | 70.88 (*n*=50) | 72.33 (*n*=202) | 72.27 (*n*=202) | 72.17 |
| ADN | 67.53 (*n*=17) | 68.33 (*n*=18) | 71.08 (*n*=50) | 68.40 (*n*=55) | 69.37 |
| Total | 67 | 68 | 252 | 257 | |

*Note.* BSN = baccalaureate science nursing, ADN = associate degree nursing

**Analysis**

The current study utilized an ANCOVA analysis to examine the relationship between the independent variables of student type (ESL and non-ESL) and test type (experimental and control) on the dependent variable of mean score. Additionally, GPA and program type were acknowledged as potential confounding variables and were entered into the model as covariates. GPA was chosen because students with a higher GPA may be expected to score higher on multiple-choice tests. Program type is described as a four-year baccalaureate degree (BSN) and an associate, two-year degree (ADN). Students in a BSN program may have been exposed to more academic courses and a greater number of multiple-choice exams than the ADN students and therefore may have scored higher.

Homogeneity of variance assumes that both groups had equal error variances and was assessed using Levene's test (Hinkle et al., 2003). The results of Levene's test were not significant ($p = .562$), indicating that the assumption was met. Additionally, effect of

the covariates in the model was assessed. The ANCOVA results revealed a significant relationship between the dependent variable and both program type [F (1, 638) = 17.83, p = .000] and GPA (F (1,638) = 38.03, p =.000), indicating that each of the covariates had a significant influence on the outcome variable.

**Hypothesis One**

Hypothesis one states: Both the ESL and non-ESL students will demonstrate higher scores on the linguistically modified exam in comparison to the control exam. For ESL and non-ESL students, the observed mean for the experimental test was 71.63 and the observed mean for the control test was 71.14. However, no significant effect of test type on mean score was observed after controlling for the covariates in the ANCOVA model [F (1,638) = .39, p = .534]. This indicates that the hypothesis was not supported and that there was no significant difference between the scores on the two test types after controlling for the covariates. Mean exam scores by student and test type are presented in Table 6.

**Hypothesis Two**

Hypothesis two states: The non-ESL students will score higher than the ESL students on both the linguistically modified exam and the standard exam. The combined mean score for both the experimental and control exams for the non-ESL students was 71.84 while the combined mean score for ESL students was 69.64. The results of the ANCOVA demonstrated statistical significance for student type [F (1,638) = 4.26, p = .039] after controlling for the covariates. This indicates that, after removing the effects of the confounding variables, there was a significant difference in mean scores between ESL

and non-ESL students. As such, the hypothesis is supported. Mean exam scores by student and test type are presented in Table 6.

**Hypothesis Three**

Hypothesis three states: ESL students will demonstrate a higher mean score on the linguistically modified exam in comparison to that of the non-ESL students. The ANCOVA model demonstrated that there was no significant interaction effect between student type and test type [F (1,638) = .01, p = .932]. As such, ESL students did not demonstrate a significantly different increase in mean scores on the experimental test over the control test compared to the non-ESL students. This indicates that the hypothesis is not supported (see Table 6). The adjusted means are displayed on Table 7.

Table 6

*Mean Exam Scores by Student Type and Test Type*

| | Experimental Exam | | Control Exam | | Total | |
|---|---|---|---|---|---|---|
| Student type | *n* | *M (SD)* | *n* | *M (SD)* | *n* | *M (SD)* |
| ESL | 68 | 69.94 (7.37) | 67 | 69.34 (8.7) | 135 | 69.64 (8.0) |
| Non-ESL | 252 | 72.08 (7.68) | 257 | 71.61 (8.4) | 509 | 71.84 (8.0) |
| Total | 320 | 71.63 (7.66) | 324 | 71.14 (8.53) | 644 | 71.38 (8.11) |

*Note*. *n* = number of participants, *M* = mean score, *SD* = standard deviation

Table 7

*Adjusted Mean and Standard Error for Student Scores after Controlling for the Influence of GPA and Program Type.*

| Variable | *M* | *SE* |
|---|---|---|
| Score | 70.93 | .38 |

*Note*. *M* = Mean score, *SE* = standard error

**Validity and Reliability**

Content validity was determined by a panel of four experienced faculty and one item writing expert. Using data from the pilot study the experimental and control exam were refined from 60 questions to 50. The final 50 questions became the experimental and control exams.

Reliability of the research exams exam is determined after student scores are calculated (Oermann & Gaberson, 2014). The Kuder-Richardson formula (K-R 20) was used to assess the reliability of the 50 question control and experimental exams for each subgroup; a K-R value of >.60 is optimal. The K-R value on the experimental exam was 0.45 and 0.44 for the NE and EE subgroup respectively. This indicates that the experimental exam may be less reliable than desired. The K-R for the control exam was 0.56 and 0.54 for the EC and NC subgroups. This indicates a reliability index closer to the optimal. Oermann and Gaberson (2014) identified homogeneity of content as a factor affecting reliability. Homogeneity of content refers to the actual course content that was covered prior to an exam. Content that is organized and related to the test items results in a greater homogeneity, which in turn leads to greater reliability. Because the content of

the research exams was not a recent topic for the students it may have impacted their scores and the K-R of both the experimental and control exams.

**Student Perception**

To understand if students perceived a difference between the experimental and control exams, they were asked to evaluate two statements regarding clarity and difficulty. The first statement was: The exam questions were clear and easy to understand. The second statement was: The content of the exam was difficult. They were asked to rate these statements using a Likert scale. The findings indicate that the students who completed the experimental exam perceived the questions to be clearer and easier to understand than the students who completed the control exam (see Figure 2). Additionally the students who took the experimental exam reported it to be slightly less difficult than the students who completed the control exam (see Figure 3). However, students in both groups perceived the exam to be somewhat difficult. Sixty-five percent (65%) of the students who completed the experimental exam agreed that it was difficult and 64.2% of the students who took the control exam agreed that it was difficult.

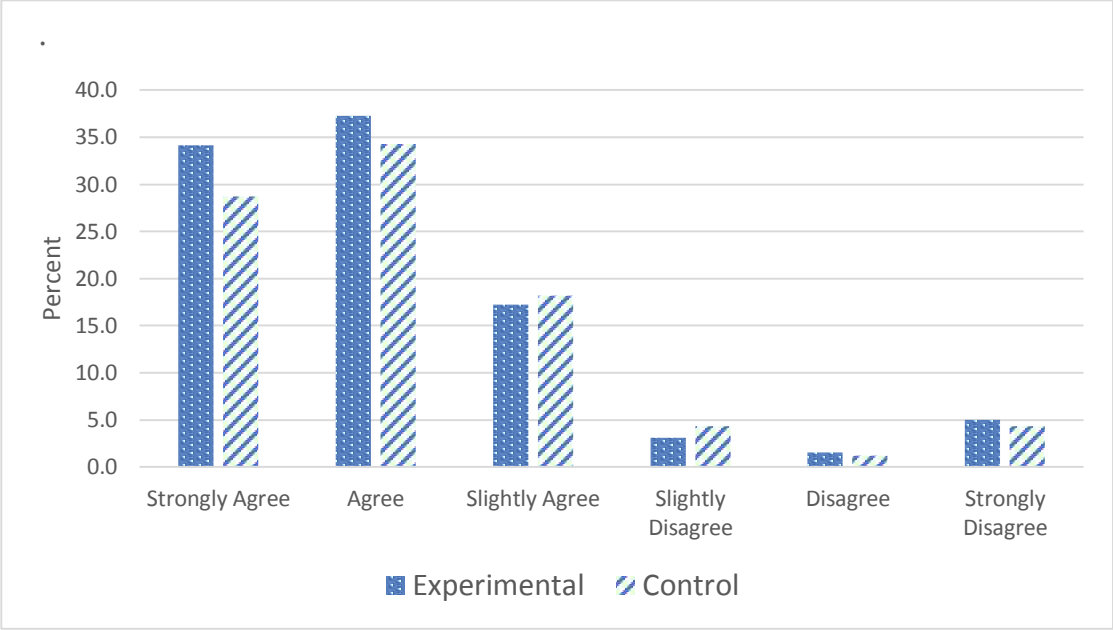



*Figure 2.* Responses to statement: Exam questions were clear and easy to understand.

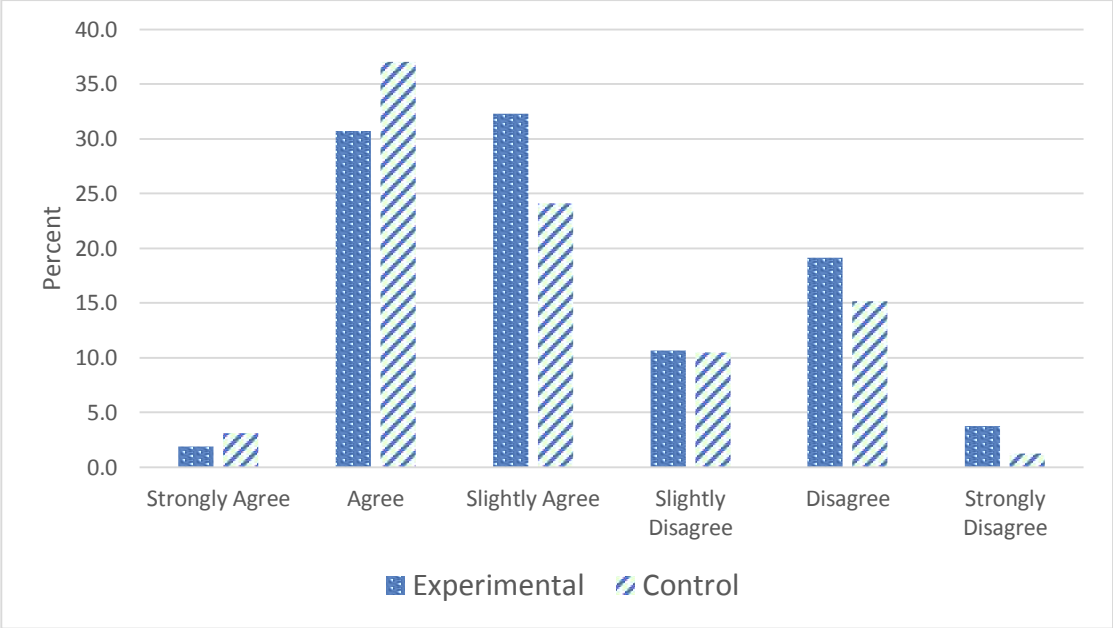



*Figure 3.* Responses to statement: The content of the exam was difficult.

## Summary

This research answers the question, does linguistic modification of multiple-choice questions have an effect on student mean scores? Both the ESL and non-ESL students had slightly higher scores on the linguistically modified exam compared to the control exam. Although the difference in means was not statistically significant, linguistic modification did made a difference for all students. The students perceived the linguistically modified exam to be clearer and easier to understand than the control exam while reporting a similar level of difficulty. Both the ESL and non-ESL students completed the linguistically modified exam in approximately 10% less time than the control exam. Reduction in the amount of time required to complete an exam could play a significant role in test taking when time limits apply.

# Chapter Five

## Summary, Discussion, and Recommendations

This chapter will summarize the research study, discuss the findings, and describe the study limitations. Additionally implications for nursing education will be highlighted along with recommendations for further research. The chapter ends with a concluding summary.

### Summary of the Research Study

The overarching purpose of this research was to explore a potential method to improve ESL student retention in nursing programs. Because multiple-choice exams are the predominate tool used to evaluate nursing students, these exams have a large influence on whether an ESL student completes a nursing program. Therefore, the aim of this research was to compare exam scores of ESL to non-ESL-nursing students on a linguistically modified exam compared to a standard multiple-choice exam. To evaluate the influence of linguistic modification on multiple-choice questions, an experimental, post-test only research study was designed. Analysis consisted of a 2x2 ANCOVA model controlling for GPA and program type (BSN and ADN).

Multiple-choice exams may contain linguistic errors such as poor grammar and culturally biased language. Therefore two exams were developed: (a) a linguistically modified exam that became the experimental exam; and (2) the original exam that became the control exam. Both exams were composed of the same questions, however the experimental exam questions were linguistically modified. The control exam questions came directly from the publisher. The answer options were not changed or modified for either exam.

It was hoped that the findings of the research could potentially lead to the modification of course evaluation measures so that these measures are free of linguistic errors. These changes may result in improved retention rates for both ESL and non-ESL-nursing students. This is a significant goal because, with a greater number of ESL nurses, outcomes for culturally diverse patients may potentially improve.

Students were recruited from 17 nursing programs from three states within the United States. After exclusions, the total number of participants was 644. Of this group 135 were ESL students and 509 were non-ESL students. ESL status was determined by self-identification. At the time of data collection students were placed into one of four groups. Group placement was determined using stratified randomization.

Exam scores were determined using Parscore® testing software and then entered into Excel. From Excel, data was entered into SPSS for data analysis. Demographic data was collected on each student regarding age, gender, and program type, country of birth, years in the United States (U.S.), GPA, and ethnicity. Students were excluded from data analysis if they currently held a nursing license (LVN or RN). Additionally, paramedics were excluded because of their healthcare expertise. Four individual results were excluded as outliers since the results were significantly lower than the mean score.

**Discussion of Findings**

Dr. Susan Bosher (2009) found that ESL students perceived linguistically modified questions to be clearer than non-modified questions. The results of this research supports this finding. A clear majority of students that completed the linguistically modified exam also perceived the questions to be clearer and easier to understand than the control exam. The U.S. Department of Education (2012) reports that linguistic

modification resulted in statistically significant higher scores for ELL students when compared with test scores for students using an English language dictionary. This research also found higher mean scores on a linguistically modified exam in comparison to the control exam. Statistical significant was not realized for the interaction effect, however all students demonstrated higher mean scores.

Both the ESL and non-ESL students demonstrated higher mean scores on the linguistically modified exam in comparison to the control exam. However the difference was not great enough, even after controlling for the confounding variables, to demonstrate a statistical difference. It was anticipated that the non-ESL students would score higher than the ESL students on both the linguistically modified exam and the standard exam. This was expected because both the experimental and control exams were written in the native language of the non-ESL students. Statistics indicated that, after removing the effects of the confounding variables, a significant difference in mean scores between ESL and non-ESL students did occur.

It was expected that ESL students would demonstrate a higher mean score on the linguistically modified exam in comparison to that of the non-ESL students. In this study, the mean scores demonstrated a greater difference for the ESL students however the difference was not large enough to be statistically significant. Although ESL students did not demonstrate a significant different increase in mean scores on the experimental test over the control test compared to the non-ESL students, an improvement in scores was demonstrated.

The purpose of linguistic modification of multiple-choice exam questions is to decrease linguistic errors. This process eliminates wordiness and improves clarity of

questions. A critical finding in this study demonstrated that ESL and non-ESL students took significantly less time to finish the linguistically modified multiple-choice exam. This research demonstrated that students finished the experimental exam in approximately 10% less time than the control exam. This supports the use of linguistic modification as a tool to create concise and clear multiple-choice exams. The effect of linguistic modification on a timed exam was not part of the study, however this research indicates that linguistic modification had an effect on completion times for both ESL and non-ESL students. This increased amount of time allows ESL students to process the question instead of trying to understand the question. This can significantly impact an ESL students' academic success leading them to have more time to process and reflect on each exam questions.

BSN nursing students generally complete their degree in approximately four years at a university. ADN students usually accomplish their degree in two years at a community or junior college. This research found that both ESL and non-ESL BSN students scored 3% higher than the ADN students. This is particularly evident in the ESL student group that completed the experimental exam. The reason is unclear and beyond the scope of this research, however more experience in academic courses, exposure to a greater number of multiple-choice exams, and more competitive admissions criteria may be contributing factors. However despite the factors that contribute to this outcome, in this study the BSN students performed better than the ADN students. It is yet to be determined if the BSN students are better prepared in the medical-surgical topics.

The students were asked about their perception of the exam clarity and difficulty. The majority of the students perceived the linguistically modified exam to be clearer than

the control exam. However, only a slight majority of the students perceived the linguistically modified exam to be slightly less difficult than the control exam. These results demonstrate that students perceive a linguistically modified exam to be clearer and easier to understand without changing the perceived difficulty of the exam.

**Study Limitations**

Several limitations may have influenced the results of the study. Self-identification of ESL status may have been a limitation. Better questions may be available that identify students with limited English proficiency which may refine the student groups more clearly. In addition some students may have been uncomfortable addressing ESL status because of sensitive immigration issues.

Another limitation of the study was time. The participants were allotted as much time as they needed by the researcher, however their faculty or curriculum applied unexpected time limitations. For example, at the start of one data collection event the faculty announced "when you finish get into your presentation groups," subsequently the room became very noisy as students finished and started to discuss their upcoming project. This created a difficult testing environment for the students who were still working.

Scores were very low in general. Several students commented "it's been a long time since we learned this content." An instructor at a community college stated: "I wonder how they will do on the GI content, that topic starts next week." These types of comments were unanticipated. The expectation was that all final semester students would have been exposed to the same content, however this may have not been the case. Once again this demonstrates the importance of homogeneity of content.

A further limitation was student exhaustion. On several occasions the students had just finished a long day of classes or a classroom exam. Several students commented that another day may have been better. An additional limitation may have been the perception that the research exam "did not actually count" so concentration and effort may have been minimal. Finally, students in their final semester have been successful with multiple-choice tests. Subsequently ESL and non-ESL students who may have struggled with multiple-choice tests may no longer be in the program and therefore not part of the study.

**Implications for Nursing Education**

This research has demonstrated several factors that support the use of linguistic modification. Mean exam scores were higher for both the ESL and non-ESL students on the experimental (linguistically modified) exam as compared to the control exam although the statistics make this a marginal claim. However, linguistic modification decreases reading load by shortening the questions and decreasing the need to re-read thereby allowing students to finish the exam in less time. This is important for both ESL and non-ESL students, they should not be spending valuable exam time deciphering the question. Finally, students perceive the linguistically modified exam to be clearer and less difficult to complete. Linguistic modification may not remove all the barriers to retaining ESL nursing students but its benefits indicate that it should be utilized by all faculty: it is an appropriate approach to student evaluation and is supported by this research.

**Recommendations for Future Research**

An ESL student who participated in the research commented "this kind of research should be done earlier in the program when there are still lots of us ESL students

left." This clarifies the point that final semester nursing students have obviously been successful with multiple-choice exams because they have reached the last semester of their programs. Additionally exam scores were very low. This factor may have been influenced by the specific program curriculum and timing. The content may have been entirely unfamiliar or exposure was up to a year earlier. Because of these two factors, research going forward could be conducted at the end of the first semester that included fundamental concepts. The experimental and control exams would be centered on nursing fundamentals instead of medical surgical topics. Additionally a collaborative relationship would be established with participating nursing programs that would confirm that the exam content be realistic and valid. Another approach could be to measure the effect of linguistic modification on exams given to graduate nurses preparing to take the NCLEX-RN® exam after completing a review course. In a situation like this, all students would have had a similar and recent exposure to content.

Analysis of ESL and non-ESL BSN student results may lead to a greater understanding of the specific needs for this group. As previously discussed, their exam scores were higher than that of ADN students. This may have occurred because of the competitive nature of BSN programs, greater exposure to multiple-choice testing, or their specific curriculum that covered all medical surgical topics by the final semester. Subsequently further research and analysis is warranted.

Student perception of exam question clarity and difficulty was a small element of the research. Expanding this topic to a homogenous group of students (a single nursing program, fundamental level) may delineate differences between ESL and non-ESL

students. In addition this approach may also uncover other concerns such as language limitations of first generation college students.

**Summary**

As the United States grows more heterogeneous, the makeup of our health care population will mirror this diversity. To care for these culturally diverse patients, culturally diverse nurses are needed. Unfortunately ESL nursing students who may fill this need as nurses are failing out of nursing programs. To address the low retention rate of ESL students, student evaluation must be addressed. Evaluation in nursing programs is primarily accomplished with multiple-choice tests and multiple-choice tests frequently contain linguistic errors that may affect ESL student success. Linguistic modification is a process that addresses and helps eliminate linguistic errors from multiple-choice exams resulting in clear, concise, and valid exams.

This research analyzed data from 644 final-semester BSN and ADN nursing students. Of this group, 135 self-identified as ESL and 509 as non-ESL. The participants each completed one exam, either an experimental (linguistically modified) exam or a control (original questions generated by a publisher) exam. The questions were a matched set; the questions were the same between the two exams except the experimental exam was linguistically modified whereas the control contained the original wording. Each of the two exams included 50 questions of medical-surgical topics.

Statistics indicate that the students who completed the linguistically modified exam had a higher mean score than the students who completed the control exam, however this result was not statistically significant. The non-ESL students had a higher mean score on both the linguistically modified and control exam than the ESL students.

The ESL students demonstrated a greater difference between the linguistically modified exam and control exam than the non-ESL students although this difference was not statically significant. BSN students outperformed ADN students by 3% on both exams. The linguistically modified exam was perceived as clearer and easier to understand. The participants judged the linguistically modified exam as only slightly less difficult than the control exam. Students completed the linguistically modified exam in 10% less time than the students taking the control exam.

Even though linguistic modification alone does not address all issues associated with ESL student retention, it does demonstrate a measureable reduction in test completion time, which could play a significant factor during timed exams. Linguistic modification is a vital process that all faculty could use to create more equitable multiple-choice exams. This practice results in valid evaluation tools that assess student knowledge without discrimination or bias.

Appendix A

UNLV IRB Notice

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

**Biomedical IRB – Exempt Review**
**Deemed Exempt**

**DATE:** April 7, 2014

**TO:** **Dr. Michele Clark,** Nursing

**FROM:** Office of Research Integrity – Human Subjects

**RE:** Notification of IRB Action
Protocol Title: Survival of the Fittest: The Role of Linguistic Modification in Nursing Education
Protocol # 1403-4770

---

This memorandum is notification that the project referenced above has been reviewed as indicated in Federal regulatory statutes 45CFR46 and deemed exempt under 45 CFR 46.101(b)2.

**PLEASE NOTE:**
Upon Approval, the research team is responsible for conducting the research as stated in the exempt application reviewed by the ORI – HS and/or the IRB which shall include using the most recently submitted Informed Consent/Assent Forms (Information Sheet) and recruitment materials. The official versions of these forms are indicated by footer which contains the date exempted.

*Any* changes to the application may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**. When the above-referenced project has been completed, please submit a **Continuing Review/Progress Completion report** to notify ORI – HS of its closure.

If you have questions or require any assistance, please contact the Office of Research Integrity - Human Subjects at IRB@unlv.edu or call 895-2794.

Office of Research Integrity – Human Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047
(702) 895-2794 • FAX: (702) 895-0805

Appendix B

UNLV Informed Consent

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

**INFORMED CONSENT**

**Department of Nursing**

---

**TITLE OF STUDY: Survival of the Fittest: The Role of Linguistic Modification in Nursing Education**

**INVESTIGATOR(S): Brenda Moore and Michele Clark, PhD**

For questions or concerns about the study, you may contact **Brenda Moore at 281-649-3689** or **Michele Clark, PhD at 702-895-5978.**

For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794 or via email at IRB@unlv.edu.**

---

**Purpose of the Study**
You are invited to participate in a research study. The purpose of this study is to compare mean exam scores of ESL to non-ESL nursing students on a standard multiple-choice exam compared to a linguistically modified exam.

**Participants**
You are being asked to participate in the study because you fit these criteria: All senior level nursing students in the final semester of an accredited associate level or bachelor level nursing program. You would not be able to participate if you are an RN to BSN student, students that are also licensed vocational nurses (LVN) or licensed practical nurses (LPN), paramedics and second degree BSN students.

**Procedures**
If you volunteer to participate in this study, you will be asked to do the following: Answer 50 multiple choice questions covering medical surgical content, answer demographic and opinion questions.

**Benefits of Participation**
There will be direct benefits to you as a participant in this study. You will have an opportunity to participate in nursing research, practice HESI and NCLEX style questions, and if requested receive a report of your performance.

**Risks of Participation**
There are risks involved in all research studies. This study may include only minimal risks. You may be uncomfortable answering demographic questions and stressed answering multiple-choice questions.

**Cost /Compensation**
There will not be a financial cost to you to participate in this study. The study will take approximately 75 *minutes* of your time. You will be compensated for your time with $10. All participants that



***Deemed exempt by the ORI-HS and/or the UNLV IRB. Protocol 1403-4770***
***Exempt Date: 04-07-14***

Appendix C

HBU Letter of Authorization

HBU
HOUSTON BAPTIST UNIVERSITY

Office of Research Integrity – Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at Houston Baptist University.

Dear Office of Research Integrity – Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas ("UNLV") researcher/research team, Dr. Michele Clark and Brenda Moore to conduct the research project entitled Survival of the Fittest: The Role of Linguistic Modification in Nursing Education at Houston Baptist University.

The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity – Human Subjects.

Sincerely,

Renee Schumann
Facility's Authorized Signatory

March 31, 2019
Date

Renee Schumann, PhD, RN
Printed Name and Title of Authorized Signatory
Dean, School of Nursing + Allied Health

Facility Authorization 7-2010

# Appendix D

## Houston Community College IRB Notice

HCC
HOUSTON COMMUNITY COLLEGE

Institutional Review Board

Brenda Straugh Moore
University of Nevada, Las Vegas
1803 Waterside Dr.
Missouri City, TX 77459

June 24, 2014

Dear Ms Moore:

This is to inform you that your research proposal

"Survival of the Fittest: The Role of Linguistic Modification in Nursing Education"

has been reviewed and is approved. All data collection and analysis are subject to the legal and procedural requirements of Houston Community College and other local, state and federal regulations. Approval by the HCC Institutional Review Board does not mean that HCC implicitly or explicitly endorses research projects.

Please review the contents of this letter. Then sign the enclosed acceptance statement and return a copy to me by mail or by email to irb@hccs.edu

The effective dates are July 1, 2014 through June 30, 2015. Extensions may be granted, but must be requested in writing.

This research will be conducted at HCC with the cooperation of Jolley Joseph, Team Captain of the HCC ADN Program. You will be responsible for the coordination of the research with her and Coleman College.

If you have further questions, please contact me.

Cordially,

Martha Obum, PhD
Chair, HCC IRB
Houston Community College

cc: Dr. Charles Cook, Vice Chancellor of Academic Affairs
Dr. Betty Young, President, Coleman College
Dr. Jolley Joseph, Team Captain

P.O. Box 667517, Houston, TX 77266-7517 T: 3.713.718.8525 F: 713.718.7031 hccs.edu/irb

Appendix E

Del Mar IRB Notice



/ /
Date Submitted

Del Mar College
Institutional Review Board

File Number

## Exempt Protocol Summary Form

Survival of the Fittest: The Role of Linguistic Modification in Nursing Education
Title of Research Project

Michele Clark PhD University of Nevada Las Vegas (UNLV) School of Nursing 770-895-5978 michele.clark@unlv.edu
Principal Investigator/Project Director | Department | Phone Extension | Email address

Brenda Moore RN PhDc | UNLV School of Nursing | 281-649-3689 | bmoore@hbu.edu
Co-investigator/Student Investigator | Department | Phone Extension | Email address

none
Co-investigator/Student Investigator | Department | Phone Extension | Email address

Anticipated Funding Source: UNLV

Projected Duration of Research: 1 months Projected Starting Date: September 2014

Other organizations and/or agencies, if any, involved in the study: none

Exempt under code (see definitions on page one – check one) 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ 6 ☐

**SUMMARY ABSTRACT: Please supply the following information below:**

**BRIEF description of the participants:** The participants are ADN or BSN nursing students in their final semester of nursing school

**Location:** Data collection will take place at Del Mar College School of Nursing in a classroom designated and reserved by staff or faculty. Brenda Moore will travel to Del Mar College to complete data collection.

**Procedures for data collection:**

Recruitment will be completed via e-mail and mailed save-the-date cards. Faculty or staff will be asked to forward the electronic recruitment flyer to the students along with distributing the save-the-date cards.

Recruitment information on the flyer and save-the-date card includes: this is a study to examine student performance on two different types of multiple choice exams. Benefits include: an opportunity to practice HESI and NCLEX style questions in a testing environment, participate in nursing research, obtain an evaluation of performance and receive $10 compensation for time.

1. At the onset of data collection, participants will complete consent forms and be given instructions about completing the research forms and the exam. The researcher will answer all inquiries.
2. The participants will be instructed to answer a set of four questions on a 5x7 index card to determine their ESL status.
3. The cards will be collected in no specific order and randomly sorted into two groups, ESL and non-ESL, the determination of ESL and non-ESL status is made by self-identification on the index card.

Appendix F

UT Tyler IRB Notice

THE UNIVERSITY OF TEXAS AT TYLER
3900 University Blvd. • Tyler, TX 75799 • 903.565.5774 • FAX: 903.565.5858

Office of Research and
Technology Transfer

Institutional Review Board

July 7, 2014

Dear Ms. Moore,

Your request to conduct the study: *Survival of the Fittest: The Role of Linguistic Modification in Nursing Education*, IRB #Sum2014-134 has been approved by The University of Texas at Tyler Institutional Review Board as a study exempt from further IRB review. This approval includes the attached written informed consent to use for signatures, but please ensure that participants are knowledgeable about their rights as research subjects regarding the voluntary nature of this study. Research assistants must be knowledgeable about research ethics and confidentiality, and any co-investigators have completed human protection training within the past three years, and have forwarded their certificates to the IRB office (G. Duke).

For any UT Tyler student participants, please indicate in the recruitment script and on the consent form that this study has also been approved by the UT Tyler IRB. This approval also includes the condition that research data are kept in separate locked files than identifiers, and that laptops and electronic storage devices are not ever in a location where theft, e.g., a locked car, is possible.

**Please review the UT Tyler IRB Principal Investigator Responsibilities, and acknowledge your understanding of these responsibilities and the following through return of this email to the IRB Chair within one week after receipt of this approval letter:**

- Prompt reporting to the UT Tyler IRB of any proposed changes to this research activity
- **Prompt reporting to the UT Tyler IRB and academic department administration will be done of any unanticipated problems involving risks to subjects or others**
- Suspension or termination of approval may be done if there is evidence of any serious or continuing noncompliance with Federal Regulations or any aberrations in original proposal.
- Any change in proposal procedures must be promptly reported to the IRB prior to implementing any changes except when necessary to eliminate apparent immediate hazards to the subject.

Best of luck in your research, and do not hesitate to contact me if you need any further assistance.

Sincerely,

Gloria Duke, PhD, RN

Gloria Duke, PhD, RN

EQUAL OPPORTUNITY EMPLOYER

# Appendix G

## Texas A & M International University IRB Notice

Coronado, Jennifer M <jcoronado@tamiu.edu>
Wed 10/29/2014 11:06 AM
**To:**
Brenda S Moore;
**Cc:**
Institutional Review Board <irb@tamiu.edu>;
Torregosa, Marivic B <mtorregosa@tamiu.edu>;
You replied on 10/29/2014 11:46 AM.

Dear Brenda,

Please proceed with your research.

Best wishes,

Jennifer

*Jennifer M. Coronado, Ph.D.*
Associate Professor of Curriculum and Instruction
IRB Chair
College of Education
Texas A&M International University
(956) 326-2673

# Appendix H

## UT Texas at Austin Dean Research Notice

**From:** Timmerman, Gayle M
**Sent:** 7/26/2014 5:23 AM
**To:** Brenda S Moore
**Subject:** Research study

Brenda:

We would be happy to have you recruit our students in your study. Please be aware the final semester here is very intense so the response rate may be less than if you sampled students the semester before graduation rather than the last semester. Please send additional details as to the recruitment methods.

Best wishes,

Dr,Timmerman

Sent from my iPad
Gayle M. Timmerman PhD, APRN, CNS, FAAN

Associate Dean for Academic Affairs
The University of Texas at Austin, School of Nursing
512-471-9087

# Appendix I

## UTMB Research Notice

Wisnewski, Charlotte A. <cwisnews@UTMB.EDU>
Wed 4/9/2014 8:51 AM
**To:**
Moore Brenda Strauch <bmoore@hbu.edu>;
**Cc:**
Wisnewski, Charlotte A. <cwisnews@UTMB.EDU>;
Brenda, We are working on the calendar due to our testing schedule, but it will probably be October 1st 3-5 pm for data collection and Sept 24 for explanation, 2:30 . I did not realize Michelle was your dissertation supervisor. She was former faculty here and I have seen her once or twice in Las Vegas. Dr. Wisnewski

***Charlotte A. Wisnewski, PhD, RN, BC, CDE, CNE***
***Undergraduate Program Director,***
***Associate Professor***
*Distinguished Teaching Professor*
UTMB, 301 University Blvd, 4.233
Galveston, TX 77555-1132
713-206-4582 (Cell); 409-772-8235 (Office); 409-772-3770(Fax)
cwisnews@utmb.edu

Working together to work wonders

Appendix J
San Jacinto Community College IRB Notice

## Institutional Review Board Application

## Recommendation for Approval

Dear Dr. Hellyer:

The San Jacinto College informal Institutional Review Board (George González and Michael Moore) has reviewed the attached proposal titled The Role of Linguistic Mortification in Nursing Education which was submitted by Brenda Moore.

Upon review and discussion, it has been determined that the proposal will not pose any harm to students, faculty, staff, or members of the San Jacinto College community and that the College will benefit from the knowledge gained as a result of this research.

Therefore, the Institutional Review Board is recommending approval of the named and attached proposal. Please review the proposal and feel free to ask any questions you may have.

Thank you.

George F. González, Jr., M.S.

Director of Research and Institutional Effectiveness

10-2-2014
Date

Michael Lee Moore, M.B.A.

Director of Grants Management

10/2/14
Date

Appendix K

Saint Catherine University IRB Notice

*St. Catherine University IRB* *Approval Notification*

To: Brenda Moore
From: John Schmitt, IRB Chair
Subject: Protocol #299
Date: 10/06/2014

Thank you for submitting your research proposal to the St. Catherine University Institutional Review Board (IRB) for review. The primary purpose of the IRB is to safeguard and respect the rights and welfare of human subjects in scientific research. In addition, IRB review serves to promote quality research and to protect the researcher, the advisor, and the university.

On behalf of the IRB, I am responding to your request for approval to use human subjects in your research. Two members of the St. Kate's IRB have read and commented on your application **# 299: Survival of the Fittest: The Role of Linguistic Modification in Nursing Education** as an expedited level review, and we have reviewed you responses to questions posed by the investigators.. As a result, the project was approved as submitted.

If you have any questions, feel free to contact me or email via the Mentor messaging system. Also, please note that all research projects are subject to continuing review and approval. You must notify our IRB of any research changes that will affect the risk to your subjects. You should not initiate these changes until you receive written IRB approval. Also, you should report any adverse events to the IRB. **Please use the reference number listed above in any contact with the IRB.**

This approval is effective for one year from this date, 10/06/2014. If the research will continue beyond one year, you must submit a request for IRB renewal before the expiration date. When the project is complete, please submit a project completion form. These documents are available in the St. Catherine University Mentor IRB site.

We appreciate your attention to the appropriate treatment of research subjects. Thank you for working cooperatively with the IRB; best wishes in your research!

Sincerely,

John Schmitt, PhD
Chair, Institutional Review Board
jsschmitt@stkate.edu

Appendix L

Stephen F. Austin University IRB Notice

STEPHEN F. AUSTIN STATE UNIVERSITY

Institutional Review Board for the Protection of Human Subjects in Research
P.O. Box 13018, SFA Station • Nacogdoches, Texas 75962-3046
Phone (936) 468-5490 • Fax (936) 468-1573

TO: Brenda Moore & Michele Clark
Nursing
University of Nevada Las Vegas

RE: Project Title: Survival of the Fittest: The Role of Linguistic Modification in Nursing Education
Case # AY2015-1073

TYPE OF RESEARCH: Project Type: Dissertation

FROM: Pauline M. Sampson, Chair, IRB-H

DATE: October 6, 2014

I would like to thank you for submitting your project entitled "Survival of the Fittest: The Role of Linguistic Modification in Nursing Education" to the IRB for review. It has been reviewed and has been **Approved**, based on the following review criteria:

> CFR §46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Your project has approval through **October 6, 2015**, should you need additional time to complete the study you will need to apply for an extension prior to that date. The IRB should be notified of any planned changes in the procedures during the approval period, as additional review will be required by the IRB, prior to implementing any changes, except when changes are necessary to eliminate immediate hazards to the research participants. The researcher is also responsible for promptly notifying the IRB of any unanticipated or adverse events involving risk or harm to participants or others as a result of the research.

All future correspondence regarding this project should include the case number **AY2015-1073.**

Appendix M

Lone Star Community College IRB Notice


September 8, 2014

Brenda Moore
IRB Protocol 2014230

Dear Ms. Moore:

The research project application for your protocol titled, *"Survival of the Fittest: The Role of Linguistic Modification in Nursing Education"*, has been reviewed by the Lone Star College System (LSCS) Institutional Review Board (IRB). The outcome of the review is as indicated below:

Approved: Expedited 45 CFR 46.102 (2)(i)

*This approval will be valid for 12 months after the date of this letter.* If the study extends beyond this period it will be subject to continuing review and will require the submission of a supplemental application at that time.

Please note that any changes to the protocol or procedures for this project after the initial review must be promptly submitted to the LSCS IRB for review. In addition, any adverse events should be reported to the LSCS IRB Office as soon as possible.

The LSCS IRB requests that you share the results of this research project with the IRB office when you have completed it. The data from your study could be very useful to grant writers and to others in the LSCS system. You will be given complete credit for its authorship.

**This letter constitutes the official written response of the LSCS Institutional Review Board.** Thank you, and best of luck on your study!

April M. Odell
Administrator, Institutional Review Board

5000 Research Forest Drive
The Woodlands, TX 77381-4356
832.813.6500 LoneStar.edu

Appendix N

College of Southern Nevada IRB Notice

To: Brenda S. Moore

Fr: Richard Hinckley, Chair

Date: July 31, 2014

Re: IRB approval of student research: Survival of the Fittest: The Role of Linguistic Modification in Nursing Education

The CSN Institutional Review Board has reviewed your description of the proposed survey and the interaction with the students.

The Board determined that your proposed research project will have a *de minimus* impact on the survey participants, and qualifies for informal approval. The Board approves your research as exempt from formal review.

If your project changes in any substantial way, please notify me of the change to determine its impact on this approval.

Thank you for submitting your research project for review.

RLH/tvd

Appendix O

Nevada State College IRB Notice

NSC IRB <nirb@nsc.edu>
Mon 7/7/2014 7:05 PM
**To:**
michele.clark@unlv.edu;
Brenda S Moore;
**Cc:**
Sherrilyn Coffman <Sherrilyn.Coffman@nsc.edu>;
You replied on 7/7/2014 9:28 PM.

Good afternoon Dr. Clark and Ms. Moore,

Your materials have been reviewed by the IRB chair and Dean of the School of Nursing. This email will serve as authorization for you to conduct the research project, *Survival of the Fittest: The Role of Linguistic Modification in Nursing Education*, at Nevada State College.

We have reviewed the protocol presented by the researcher, as well as the associated risks to our facility. We accept the protocol and authorize the research to proceed. Please notify us if any changes are made to the protocol.

Please let me know if you have any questions.

Warm regards,

Josi dos Santos
IRB Administrator

# Appendix P

## Texas A & M University Corpus Christi IRB Notice


OFFICE OF RESEARCH COMPLIANCE
Division of Research, Commercialization and Outreach

| Human Subjects Protection Program | Institutional Review Board |
|---|---|

| | |
|---|---|
| APPROVAL DATE: | August 26, 2014 |
| TO: | Dr. Michele Clark |
| CC: | Ms. Brenda Moore |
| FROM: | Office of Research Compliance<br>Institutional Review Board |
| SUBJECT: | Initial Approval |

| | |
|---|---|
| Protocol Number: | 85-14 |
| Title: | Survival of the Fittest: The Role of Linguistic Modification in Nursing Education |
| Review Category: | Qualifies for Exemption |

**Approval determination was based on the following Code of Federal Regulations:**

Eligible for Exemption (45 CFR 46.101)

Criteria for exemption has been met (45 CFR 46.101) - The criteria for exemption listed in 45 CFR 46.101 have been met (or if previously met, have not changed).

(2)Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Provisions:

Comments: The TAMUCC Human Subjects Protections Program has implemented a post-approval monitoring program. All protocols are subject to selection for post-approval monitoring.

This research project has been granted the above exemption. As principal investigator, you assume the following responsibilities:

1. Informed Consent: Information must be presented to enable persons to voluntarily decide whether or not to participate in the research project unless otherwise waived.
2. Amendments: Changes to the protocol must be requested by submitting an Amendment Application to the Research Compliance Office for review. The Amendment must be approved before being implemented.
3. Completion Report: Upon completion of the research project (including data analysis and final written papers), a Completion Report must be submitted to the Research Compliance Office.
4. Records Retention: All research related records must be retained for three years beyond the completion date of the study in a secure location. At a minimum these documents include: the research protocol, all questionnaires, survey instruments, interview questions and/or data collection instruments associated with this research protocol, recruiting or advertising materials, any consent forms or information sheets given to participants, all correspondence to or from the IRB or Office of Research Compliance, and any other pertinent documents.

Appendix Q

UT San Antonio Research Notice

Dear Brenda

Please see below Dr Cantu can help you recruit students

Sent from my iPhone

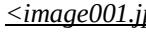
Begin forwarded message:

**From:** "Cantu, Adelita G" <CantuA2@uthscsa.edu>
**Date:** August 5, 2014 at 10:15:49 AM CDT
**To:** "Decker, Ilene M" <DeckerI@uthscsa.edu>
**Cc:** "Rice, Janis Needham" <RICEJ@uthscsa.edu>
**Subject: Re: Nursing Research at UT San Antonio**

Hi

See the e-mail trail below. This researcher would like to recruit 4th semester students and would like to collect data in September. Please advise on the best way to proceed in getting info out to students and setting up data collection date

Ilene

Ilene Decker, PhD, RN
Associate Dean for Academic Affairs
William and Berneice Castella Distinguished Professor
School of Nursing,
UTHSCSA-MSC 7944
7703 Floyd Curl Drive
San Antonio, TX 78229-3900
Phone (210) 567-5899
FAX: (210) 567-3813


# Appendix R

## UT Austin Research Notice

Timmerman, Gayle M <gtimmerman@mail.nur.utexas.edu>
Thu 9/11/2014 9:47 AM
**To:**
Brenda S Moore;
**Cc:**
Goldstein, Leigh A <lgoldstein@mail.nur.utexas.edu>;
You replied on 9/12/2014 5:23 PM.

Brenda:

Good news. I just spoke with the instructor for the Friday class. 10/3 would work and she is willing to give you some time in class to do it, which will increase your participation rate greatly. There is a potential of 57 students in the class. The instructor is Dr. Leigh Goldstein. If you came at 10:30am and waited for the guest speaker and discussion to finish, you could start right in after (by 11a for sure). Dr. Goldstein would like information about your study ahead of time to share with the students. I am copying her on this email so you have her contact information.

You should plan to park in the Trinity Garage on MLK and Trinity. Class is in 1.110.

Sorry it took so long to move forward on this. I thought your study sounded very interesting.

Dr. Timmerman

# Appendix S

## Elsevier Content Permission

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Yours sincerely
Jennifer Jones
Rights Associate
Global Rights Department

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Jennifer Jones

Rights Associate

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Appendix T

ESL Status Card

Name_____

Please Print Very Clearly

1. What is your primary language? _____
2. Do you consider English as a *second* language? _____
3. In what country did you attend k-6$^{th}$ grade/primary school? _____
4. What language do you speak at home with parents and family? _____

Appendix U

Demographic Questions

# Demographics

**Please answer all questions**.

1. What is your program type (ADN or BSN)? _____
2. What is your GPA? _____
3. What is your age? _____
4. In what country were you born? _____
5. How many years have you lived in the United States? _____
6. What is your gender? _____
7. What is your ethnicity? ☐ White ☐ Hispanic / Latino ☐ Asian ☐ Black /African American ☐ American Indian /Alaskan Native ☐ Native Hawaiian /Pacific Islander ☐ Other _____
8. Are you a Licensed Vocational Nurse (LVN/LPN) or paramedic? _____
9. Have you earned a *previous* college degree? _____
    a. If yes, type of *previous* degree (AA/S, BS, MS etc...)_____
    b. Location of *previous* college/university: City_____ State_____ Country_____
10. Are you currently a Registered Nurse (RN) in the United States and now completing a bachelor's degree in nursing? _____

**********  STOP**********

**Please wait for the next instruction**

Appendix V

Perception Statements

After you have completed the exam, please answer the following questions.

1. The exam questions were clear and easy to understand.
    a. Strongly disagree
    b. Slightly disagree
    c. Disagree
    d. Agree
    e. Slightly agree
    f. Strongly agree

2. The content of the exam was difficult.
    a. Strongly disagree
    b. Slightly disagree
    c. Disagree
    d. Agree
    e. Slightly agree
    f. Strongly agree

Additional Comments:

_____

_____

_____

# Appendix W

## Multiple-Choice Exam – Control

Mark only one answer on the scantron form for each question unless otherwise directed. Make any erasures neat and complete.

1. A patient admitted with severe dehydration has a urine output of 380 ml over the next 24 hours and elevated blood urea nitrogen (BUN) and creatinine levels. A finding that the nurse would expect when reviewing the patient's urinalysis is
   A. proteinuria.
   B. bacteriuria.
   C. high specific gravity.
   D. tubular casts

2. A patient with severe heart failure develops elevated BUN and creatinine levels. The nurse plans care for the patient based on the knowledge that collaborative care of the patient will be directed toward the goal of
   A. preventing hypertension
   B. replacing fluid volume
   C. diluting nephrotoxic substances
   D. maintaining cardiac output.

3. A 72-year-old patient hospitalized with pneumonia is disoriented and confused 2 days after admission. Which assessment information obtained by the nurse about the patient indicates that the patient is experiencing delirium rather than dementia?
   A. The patient was oriented and alert when admitted.
   B. The patient has a history of increasing confusion over several years.
   C. The patient is disoriented to place and time but oriented to person.
   D. The patient's speech is fragmented and incoherent.

4. A 62-year-old patient is brought to the clinic by a family member who is concerned about the patient's increasing sleep disturbances and inability to solve common problems. To obtain information about the patient's current mental status, which question should the nurse ask the patient?
   A. "What day of the week is it today?"
   B. "Where were you born?"
   C. "Do have any feelings of sadness?"
   D. "How positive is your self-image?"

5. When teaching the spouse of a patient who is being evaluated for Alzheimer's disease (AD) about the disorder, the nurse explains that
   A. the most important risk factor for AD is a family history of the disorder.
   B. a diagnosis of AD can be made only when other causes of dementia have been ruled out.
   C. new drugs have been shown to reverse AD dramatically in some patients.
   D. the presence of brain atrophy detected by MRI confirms the diagnosis of AD in patients with dementia.

6. When screening patients at a community center, the nurse will plan to teach ways to reduce risk factors for osteoarthritis to a
   A. 24-year-old man who participates in a summer softball team.
   B. 36-year-old woman who is newly diagnosed with diabetes mellitus.
   C. 56-year-old man who is a member of a construction crew.
   D. 49-year-old woman who works on an automotive assembly line.

7. The health care provider prescribes methotrexate (Rheumatrex) for a 28-year-old woman with stage II moderate rheumatoid arthritis (RA). When obtaining a health history from the patient, the most important information for the nurse to communicate to the health care provider is that the patient has
   A. a history of infectious mononucleosis as a teenager.
   B. a family history of age-related macular degeneration of the retina.
   C. been trying to have a baby before her disease becomes more severe.
   D. been using large doses of vitamins and health foods to treat the RA.

8. A patient seen at the health clinic with a severe migraine headache tells the nurse about having four similar headaches in the last 3 months. The patient says, "I am afraid to make social plans because I never know when I will have these headaches." The most appropriate nursing action at this time is to
   A. refer the patient for counseling to assist with stress reduction.
   B. ask the patient to keep a diary with details about headaches.
   C. encourage the patient to learn muscle-relaxation techniques to minimize headache frequency.
   D. teach the patient about the effectiveness of the triptan drugs in treating migraine headaches.

9. A patient with a systemic bacterial infection has "goose pimples," feels cold, and has a shaking chill. At this stage of the febrile response, the nurse would expect to find
   A. skin flushing.
   B. rising body temperature.
   C. decreasing blood pressure.
   D. muscle cramps.

10. The nurse is admitting a diabetic patient who is scheduled for a laparotomy and possible release of adhesions. When planning interventions to promote wound healing, the nurse will be most concerned about
   A. maintaining the patient's blood glucose in a normal range.
   B. ensuring that the patient obtains an adequate amount of dietary carbohydrates.
   C. administration of antipyretics to keep the temperature less than 103° F.
   D. applying a dry, sterile dressing to the surgical incision daily.

11. A chronically ill, bedfast patient cared for in the home by family members has a stage II pressure ulcer over the coccyx. To prevent further tissue damage, the home care nurse instructs the family members that it is most important to
   A. change the patient's bedding at least every day.
   B. record the size and appearance of the ulcer weekly.
   C. provide the patient with a high-calorie, high-protein diet.
   D. change the patient's position at least every 2 hours.

12. When developing a health teaching plan for a 65-year-old patient with all these risk factors for coronary artery disease (CAD), the nurse will focus on the
   A. family history of heart disease.
   B. low activity level the patient reports.
   C. increased risk associated with the patient's ethnicity.
   D. high incidence of cardiovascular disease in older people.

13. A patient is admitted to the ED after an episode of severe chest pain, and the physician schedules the patient for coronary angiography and possible percutaneous coronary intervention (PCI). The nurse prepares the patient for the procedure by explaining that it is used to
    A. determine whether there are any structural defects in the chambers of the heart.
    B. locate any coronary artery obstructions and administer thrombolytic agents.
    C. measure the amount of blood being pumped from the heart with each contraction.
    D. visualize any coronary artery blockages and dilate any obstructed arteries.

14. When caring for a patient with ACS who has returned to the coronary care unit after having a PCI, the nurse obtains these assessment data. Which data indicate the need for immediate intervention by the nurse?
    A. Chest pain level 8 on a 10-point scale.
    B. Heart rate 100 beats/min
    C. Blood pressure (BP) 104/56 mm Hg
    D. Pedal pulses 2+

15. In developing a teaching plan for a patient who has stable angina and is started on sublingual nitroglycerin (Nitrostat), the nurse identifies an expected patient outcome of
    A. stating that nitroglycerin is to be taken only if chest pain develops.
    B. listing the side effects of nitroglycerin as gastric upset and dry mouth.
    C. identifying the need to call the emergency medical services (EMS) if chest pain persists 5 minutes after taking nitroglycerin.
    D. recognizes that taking the nitroglycerin is important to decrease the ongoing atherosclerosis of the coronary arteries.

16. A program of weight loss and exercise is recommended for a patient with impaired fasting glucose (IFG). When teaching the patient about the reason for these lifestyle changes, the nurse will tell the patient that
    A. the high insulin levels associated with this syndrome damage the lining of blood vessels, leading to vascular disease.
    B. although the fasting plasma glucose levels do not currently indicate diabetes, the glycosylated hemoglobin will be elevated.
    C. the liver is producing excessive glucose, which will eventually exhaust the ability of the pancreas to produce insulin, and exercise will normalize glucose production.
    D. the onset of diabetes and the associated cardiovascular risks can be delayed or prevented by weight loss and exercise.

17. A 1200-calorie diet and exercise are prescribed for a patient with newly diagnosed type 2 diabetes. The patient tells the nurse, "I hate to exercise! Can't I just follow the diet to keep my glucose under control?" The nurse teaches the patient that the major purpose of exercise for diabetics is to

    A. increase energy and sense of well-being, which will help with body image.
    B. facilitate weight loss, which will decrease peripheral insulin resistance.
    C. improve cardiovascular endurance, which is important for diabetics.
    D. set a successful pattern, which will help in making other needed changes.

18. Glyburide (Micronase, DiaBeta, Glynase) is prescribed for a patient whose type 2 diabetes has not been controlled with diet and exercise. When teaching the patient about glyburide, the nurse explains that
    A. glyburide stimulates insulin production and release from the pancreas.
    B. the patient should not take glyburide for 48 hours after receiving IV contrast media.
    C. glyburide should be taken even when the blood glucose level is low in the morning.
    D. glyburide decreases glucagon secretion.

19. During a visit to an elderly patient with chronic heart failure, the home care nurse finds that the patient has severe dependent edema and that the legs appear to be weeping serous fluid. Based on these data, the best nursing diagnosis for the patient is
    A. activity intolerance related to venous congestion.
    B. disturbed body image related to massive leg swelling.
    C. impaired skin integrity related to peripheral edema.
    D. impaired gas exchange related to chronic heart failure.

20. While admitting an 80-year-old patient with heart failure to the medical unit, the nurse obtains the information that the patient lives alone and sometimes confuses the "water pill" with the "heart pill." The nurse makes a note that discharge planning for the patient will need to include
    A. transfer to a dementia care service.
    B. referral to a home health care agency.
    C. placement in a long-term-care facility.
    D. arrangements for around-the-clock care.

21. A 52-year-old patient has a new diagnosis of pernicious anemia. After teaching the patient about pernicious anemia, the nurse determines that the patient understands the disorder when the patient states,
    A. "I will need to have cobalamin ($B_{12}$) injections regularly for the rest of my life."
    B. "I will stop having a glass of wine with dinner."
    C. "The numbness in my feet will go away once my hemoglobin level returns to normal."
    D. "My diet should include more red meat or liver."

22. A patient with sickle cell anemia is admitted to the hospital with a sickle cell crisis. While caring for the patient during the crisis, it is important for the nurse to
    A. limit the patient's intake of oral and IV fluids.
    B. evaluate the effectiveness of opioid analgesics.
    C. encourage the patient to ambulate as much as tolerated.
    D. teach the patient about high-protein, high-calorie foods.

23. The health care provider orders transfusion with packed RBCs for a patient who is hospitalized with severe anemia. The most important action by the nurse to prevent a transfusion reaction when administering the blood is to
    A. verify the patient identification according to hospital policy.
    B. administer the blood as soon as it arrives on the nursing unit.
    C. initiate the blood transfusion at a rate of no more than 2 ml/min.
    D. stay with the patient during the first 15 minutes of the transfusion.

24. The nurse has identified a nursing diagnosis of acute pain related to inflammatory process for a patient with acute pericarditis. The most appropriate intervention by the nurse for this problem is to
    A. force fluids to 3000 ml/day to decrease fever and inflammation.
    B. teach the patient to take deep, slow respirations to control the pain.
    C. position the patient in Fowler's position, leaning forward on the overbed table.
    D. remind the patient to ask for the opioid pain medication every four hours.

25. The nurse establishes the nursing diagnosis of ineffective therapeutic regimen management related to lack of knowledge concerning long-term management of rheumatic fever when a patient recovering from rheumatic fever says,
    A. "I will need to have monthly antibiotic injections for 5 years or longer."
    B. "I will call the doctor if I develop excessive fatigue or difficulty breathing."
    C. "I will need to let my dentist know that I have had this rheumatic fever."
    D. "I will be immune to further episodes of rheumatic fever after this infection."

26. The community health nurse involved in programs to prevent rheumatic fever knows that the most important intervention to decrease the incidence of the disease is
    A. teaching people to seek medical diagnosis and treatment for streptococcal pharyngitis.
    B. providing prophylactic antibiotics to people with a family history of rheumatic fever.
    C. immunizing susceptible groups of people with streptococcal vaccine.
    D. promoting hygienic measures to prevent the transmission of streptococcal infections.

27. Heparin is prescribed for a patient who has dilated cardiomyopathy has been admitted to the hospital with fatigue and orthopnea. Which statement is appropriate for the nurse to use in patient teaching about anticoagulation therapy?
    A. "Heparin will help prevent blood clots from forming in your heart chambers."
    B. "Heparin is used to improve the circulation to the muscles in your arms and legs."
    C. "Heparin has been prescribed to stop blood clots from traveling to your lungs."
    D. "Heparin makes it easier for your heart to pump and will decrease your symptoms."

28. The nurse obtains the following information about hypertension risk factors from a patient with prehypertension. The risk factor that will be most important to address with the patient is that the patient
    A. gets no regular aerobic exercise.
    B. is 5 pounds over the ideal weight.
    C. has a low dietary fiber intake
    D. drinks wine with dinner once per week

29. The nurse teaches a patient who is taking labetalol (Normodyne) for treatment of hypertension to change position slowly because this drug
    A. blocks the renin-angiotensin-aldosterone system (RAAS).
    B. paralyzes the smooth muscle of blood vessels.
    C. decreases sympathetic nervous system activity.
    D. prevents the movement of calcium into the cardiac cells.

30. A patient has a large bowel obstruction that occurred as a result of a fecal impaction. During nursing assessment of the patient, a finding by the nurse that is consistent with a large bowel obstruction includes
    A. metabolic alkalosis.
    B. referred pain to the back.
    C. bile colored vomiting.
    D. abdominal distension.

31. An 86-year-old patient lives alone and is on a fixed income. The patient is taking once-daily doses of metoprolol (Lopressor) and furosemide (Lasix) to control BP. The patient is able to tell the nurse the names of the medications and when they are to be taken but does not always take the medications regularly, so BP is not well controlled. The most appropriate action by the nurse will be to
    A. discuss the patient's possible confusion with a family member.
    B. ask the patient about whether the cost of the medications is too high.
    C. offer the patient teaching about long-term effects of hypertension.
    D. assist the patient with an easier dosing schedule to improve compliance.

32. Laboratory testing is ordered for a patient during a clinic visit for routine assessment of hypertension. When monitoring for target organ damage, the nurse will be most concerned about
    A. blood urea nitrogen (BUN) of 15 mg/dl (5.4 mmol/L).
    B. serum hemoglobin of 14.7 g/dl (135 g/L).
    C. serum creatinine of 2.6 mg/dl (230 mmol/L).
    D. serum potassium of 3.8 mEq/L (3.2 mmol/L).

33. A 42-year-old patient recently developed abdominal distention, weight loss, steatorrhea, and flatulence. A diagnosis of adult celiac disease is made, and treatment is initiated. The nurse determines that teaching about the treatment of the disease has been effective when the patient says,
    A. "I must take folic acid for the rest of my life."
    B. "I will avoid dietary wheat, rye, barley, and oats."
    C. "I will be sure to take all of the ordered antibiotics."
    D. "I should eat only very low-fat or fat-free foods."

34. Aspirin is ordered for a patient who is admitted with a possible stroke. Which information obtained during the admission assessment indicates that the nurse should consult with the health care provider before giving the aspirin?
    A. The patient has atrial fibrillation.
    B. The patient has dysphasia.
    C. The patient states, "I suddenly developed a terrible headache."
    D. The patient has a history of brief episodes of right hemiplegia.

35. The health care provider recommends a carotid endarterectomy for a patient with carotid atherosclerosis and a history of transient ischemic attacks (TIA). The patient asks the nurse to describe the procedure. Which response by the nurse is appropriate?
    A. "The diseased portion of the artery in the brain is removed and replaced with a synthetic graft."
    B. "A catheter with a deflated balloon is positioned at the narrow area, and the balloon is inflated to flatten the plaque."
    C. "A wire is threaded through an artery in the leg to the clots in the carotid artery and the clots are removed."
    D. "The carotid endarterectomy involves surgical removal of plaque from an artery in the neck."

36. Which information about a patient who has just been admitted to the hospital with nausea and vomiting will require the most rapid intervention by the nurse?
    A. The patient has been vomiting several times a day for the last 4 days.
    B. The patient is lethargic and difficult to arouse.
    C. The patient's chart indicates a recent resection of the small intestine.
    D. The patient has taken only sips of water.

37. Which of these nursing actions should the RN working in the emergency department delegate to a nursing assistant who is helping with the care of a patient who has been admitted with nausea and vomiting?
    A. Assess for signs of dehydration.
    B. Ask the patient what precipitated the nausea.
    C. Auscultate the bowel sounds.
    D. Assist the patient with oral care after vomiting.

38. The family member of a patient who has suffered massive abdominal trauma in an automobile accident asks the nurse why the patient is receiving famotidine (Pepcid). The nurse will explain that the medication will
    A. decrease the risk for nausea and vomiting.
    B. prevent aspiration of gastric contents.
    C. inhibit the development of stress ulcers.
    D. lower the chance for H. pylori infection.

39. After discussing care of upper respiratory infections (URI) and prevention of secondary infections with a patient who has a URI, the nurse determines that additional teaching is needed when the patient says
    A. "I will drink lots of juices and other fluids to stay hydrated."
    B. "I will watch for changes in nasal secretions or the sputum that I cough up."
    C. "I can take acetaminophen (Tylenol) to treat discomfort."
    D. "I can use my nasal decongestant spray until the congestion is all gone."

40. A nursing diagnosis of body image disturbance related to loss of control of personal care is identified for a patient with a total laryngectomy and radical neck dissection. The nurse evaluates that an expected outcome for the problem has been met when the patient
    A. wears clothing that minimizes the disfigurement caused by surgery.
    B. lets the spouse provide hygiene and stoma care.
    C. asks that only family members be allowed to visit.
    D. learns to remove and clean the laryngectomy tube independently.

41. When the nurse is caring for a patient on the first postoperative day after an abdominal aortic aneurysm repair, the information that is most significant when the nurse is assessing for the return of peristalsis is
    A. absence of abdominal distention.
    B. passing of flatus with ambulation.
    C. dark brown nasogastric (NG) tube drainage.
    D. moderate abdominal tenderness.

42. The nurse identifies the nursing diagnosis of ineffective peripheral perfusion related to decreased arterial blood flow for a patient with chronic PAD. In evaluating the patient outcomes following patient teaching, the nurse determines a need for further instruction when the patient says,
    A. "I will have to buy some loose clothing that does not bind across my legs or waist."
    B. "I will change my position every hour and avoid long periods of sitting with my legs down."
    C. "I will use a heating pad on my feet at night to increase the circulation and warmth in my feet."
    D. "I will walk to the point of pain, rest, and walk again until I develop pain for a half hour daily."

43. The nurse has identified the collaborative problem of potential complication: pulmonary embolism for a patient with left-calf DVT. Which nursing action is appropriate to include in the plan of care?
    A. Maintain bed rest as ordered.
    B. Administer oxygen to keep $O_2$ saturation >90%.
    C. Apply compression gradient stockings.
    D. Remind the patient to dorsiflex the feet and rotate the ankles.

44. In planning care for a patient with a venous stasis ulcer on the right lower leg, the nurse uunderstands that the most important intervention in promoting healing of the ulcer is
    A. adequate dietary intake of proteins and vitamins.
    B. prevention of infection with prophylactic antibiotics.
    C. application of external compression to the lower leg.
    D. keeping the ulcer moist with hydrocolloid dressings.

45. Which of these nursing actions in the care plan for a patient who had a repair of an abdominal aortic aneurysm 5 days previously is most appropriate for the nurse to delegate to an experienced nursing assistant?
    A. Teach the patient the signs of possible wound infection.
    B. Monitor the quality and presence of the pedal pulses.
    C. Check the lower extremity strength and movement.
    D. Assist the patient in using a pillow to splint while coughing.

46. While working in the outpatient clinic, the nurse notes that the chart states that a patient has intermittent claudication. Which of these statements by the patient would be consistent with this information?
    A. "My fingers hurt when I go outside in cold weather."
    B. "Sometimes I get tired when I climb a lot of stairs."
    C. "When I stand too long, my feet start to swell up."
    D. "My legs cramp whenever I walk more than a block."

47. When evaluating the outcomes of preoperative teaching with a patient scheduled for a coronary artery bypass graft (CABG) using the internal mammary artery, the nurse determines that additional teaching is needed when the patient says,
    A. "I will need to take an aspirin a day after the surgery to keep the graft open."
    B. "I will have incisions in my leg where they will remove the vein."
    C. "They will stop my heart and circulate my blood with a machine during the surgery."
    D. "They will use an artery near my heart to bypass the area that is obstructed."

48. A patient with a history of chronic heart failure is admitted to the emergency department with severe dyspnea and a dry, hacking cough. The patient has pitting edema in both ankles, blood pressure (BP) of 170/100, an apical pulse rate of 92, and respirations 28. The most important assessment for the nurse to accomplish next is to
    A. auscultate the lung sounds.
    B. assess the orientation.
    C. check the capillary refill.
    D. palpate the abdomen.

49. A patient with newly diagnosed type 2 diabetes mellitus asks the nurse what "type 2" means in relation to diabetes. The nurse explains to the patient that type 2 diabetes differs from type 1 diabetes primarily in that with type 2 diabetes
    A. the patient is totally dependent on an outside source of insulin.
    B. there is decreased insulin secretion and cellular resistance to insulin that is produced.
    C. the immune system destroys the pancreatic insulin-producing cells.
    D. the insulin precursor that is secreted by the pancreas is not activated by the liver.

50. A diagnosis of hyperglycemic hyperosmolar nonketotic coma (HHNC) is made for a patient with type 2 diabetes who is brought to the emergency department in an unresponsive state. The nurse will anticipate the need to
    A. administer glargine (Lantus) insulin.
    B. initiate oxygen by nasal cannula.
    C. insert a large-bore IV catheter.
    D. give 50% dextrose as a bolus.

PLEASE CONTINUE TO THE LAST PAGE

# Appendix X

## Multiple-Choice Exam – Experimental

Mark only one answer on the scantron form for each question unless otherwise directed. Make any erasures neat and complete.

1. A patient is admitted with severe dehydration. The patient has elevated blood urea nitrogen (BUN) and elevated creatinine levels. The 24-hour-urine output is 380 ml. Which finding does the nurse expect in the urinalysis?
   A. proteinuria
   B. bacteriuria
   C. high specific gravity
   D. tubular casts

2. A patient with severe heart failure has elevated BUN and creatinine levels. What is the goal of collaborative care that the nurse plans for this patient?
   A. preventing hypertension.
   B. replacing fluid volume.
   C. diluting nephrotoxic substances.
   D. maintaining cardiac output.

3. A 72-year-old patient is hospitalized with pneumonia. Two days after admission the patient is disoriented and confused. Which assessment data indicate that the patient is experiencing delirium rather than dementia?
   A. The patient was oriented and alert when admitted.
   B. The patient has a history of increasing confusion over several years.
   C. The patient is disoriented to place and time but oriented to person.
   D. The patient's speech is fragmented and incoherent.

4. A 62-year-old patient is brought to the clinic by a family member. The patient is not sleeping well and has difficulty solving common problems. Which question does the nurse ask the patient to determine the patient's current mental status?
   A. "What day of the week is it today?"
   B. "Where were you born?"
   C. "Do have any feelings of sadness?"
   D. "How positive is your self-image?"

5. A patient is evaluated for Alzheimer's disease (AD). What information does the nurse teach the family about the disease?
   A. the most important risk factor for AD is a family history of the disorder.
   B. a diagnosis of AD can be made only when other causes of dementia have been ruled out.
   C. new drugs have been shown to reverse AD dramatically in some patients.
   D. the presence of brain atrophy detected by MRI confirms the diagnosis of AD in patients with dementia.

6. Which patient is most likely to develop osteoarthritis?
   A. 24-year-old man who participates in a summer softball team.
   B. 36-year-old woman who is newly diagnosed with diabetes mellitus.
   C. 56-year-old man who is a member of a construction crew.
   D. 49-year-old woman who works on an automotive assembly line.

7. A 28-year-old woman has stage II moderate rheumatoid arthritis (RA). The patient is prescribed methotrexate (Rheumatrex). The nurse obtains a health history from the patient. What information does the nurse communicate to the health-care provider?
   A. a history of infectious mononucleosis as a teenager.
   B. a family history of age-related macular degeneration of the retina.
   C. been trying to have a baby before her disease becomes more severe.
   D. been using large doses of vitamins and health foods to treat the RA.

8. A patient with a severe migraine headache is seen in the clinic. The patient states, "I have had four similar headaches in the last 3 months. I am afraid to make social plans because I never know when I will have these headaches." What is the most appropriate nursing action?
   A. refer the patient for counseling to assist with stress reduction.
   B. ask the patient to keep a diary with details about headaches.
   C. encourage the patient to learn muscle-relaxation techniques to minimize headache frequency.
   D. teach the patient about the effectiveness of the triptan drugs in treating migraine headaches.

9. A patient with a systemic bacterial infection has the chills, is shaking, and states, "I feel cold." At this stage of the febrile response, what does the nurse expect to find?
   A. skin flushing.
   B. rising body temperature.
   C. decreasing blood pressure.
   D. muscle cramps.

10. A diabetic patient is scheduled for a laparotomy. Which nursing intervention is most important to promote wound healing?
   A. maintaining the patient's blood glucose in a normal range.
   B. ensuring that the patient obtains an adequate amount of dietary carbohydrates.
   C. administration of antipyretics to keep the temperature less than 103° F.
   D. applying a dry, sterile dressing to the surgical incision daily.

11. A chronically ill patient is cared for at home by family members. The patient is on bed rest and has a stage II pressure ulcer over the coccyx. What is the most important instruction for the nurse to give to the family to prevent further tissue damage?
   A. change the patient's bedding at least every day.
   B. record the size and appearance of the ulcer weekly.
   C. provide the patient with a high-calorie, high-protein diet.
   D. change the patient's position at least every 2 hours.

12. A 65-year-old patient is at risk for coronary artery disease (CAD). The nurse develops a teaching care plan for the patient. Which risk factor does the nurse focus on in the care plan?
   A. family history of heart disease.
   B. low activity level the patient reports.
   C. increased risk associated with the patient's ethnicity.
   D. high incidence of cardiovascular disease in older people.

13. What is the purpose of a coronary angiography and percutaneous coronary intervention (PCI)?
   A. determine whether there are any structural defects in the chambers of the heart.
   B. locate any coronary artery obstructions and administer thrombolytic agents.
   C. measure the amount of blood being pumped from the heart with each contraction.
   D. visualize any coronary artery blockages and dilate any obstructed arteries.

14. A patient with acute coronary syndrome (ACS) has a percutaneous coronary intervention (PCI). Which finding by the nurse indicates the need for immediate intervention?
    A. Chest pain level 8 on a 10-point scale
    B. Heart rate 100 beats/min
    C. Blood pressure (BP) 104/56 mm Hg
    D. Pedal pulses 2+

15. A patient with stable angina is taking sublingual nitroglycerin (Nitrostat). The nurse develops a teaching care plan for the patient. What is the expected patient outcome for the care plan?
    A. stating that nitroglycerin is to be taken only if chest pain develops.
    B. listing the side effects of nitroglycerin as gastric upset and dry mouth.
    C. identifying the need to call the emergency medical services (EMS) if chest pain persists 5 minutes after taking nitroglycerin.
    D. recognizes that taking the nitroglycerin is important to decrease the ongoing atherosclerosis of the coronary arteries.

16. A patient has impaired fasting glucose (IFG). A program of weight loss and exercise is recommended for the patient. What is the reason for these lifestyle changes?
    A. the high insulin levels associated with this syndrome damage the lining of blood vessels, leading to vascular disease.
    B. although the fasting plasma glucose levels do not currently indicate diabetes, the glycosylated hemoglobin will be elevated.
    C. the liver is producing excessive glucose, which will eventually exhaust the ability of the pancreas to produce insulin, and exercise will normalize glucose production.
    D. the onset of diabetes and the associated cardiovascular risks can be delayed or prevented by weight loss and exercise.

17. The patient is recently diagnosed with type 2 diabetes. A 1200-calorie diet and exercise are prescribed for the patient. What is the purpose of exercise for this patient?
    A. increase energy and sense of well-being, which will help with body image.
    B. facilitate weight loss, which will decrease peripheral insulin resistance.
    C. improve cardiovascular endurance, which is important for diabetics.
    D. set a successful pattern, which will help in making other needed changes.

18. A patient with type 2 diabetes is prescribed glyburide (Micronase, DiaBeta, Glynase). What does the nurse teach the patient about this medication?
    A. glyburide stimulates insulin production and release from the pancreas.
    B. the patient should not take glyburide for 48 hours after receiving IV contrast media.
    C. glyburide should be taken even when the blood glucose level is low in the morning.
    D. glyburide decreases glucagon secretion.

19. A patient with chronic heart failure has severe dependent edema. The patient's legs are weeping serous fluid. What is the correct nursing diagnosis for this patient?
    A. activity intolerance related to venous congestion.
    B. disturbed body image related to massive leg swelling.
    C. impaired skin integrity related to peripheral edema.
    D. impaired gas exchange related to chronic heart failure.

20. An 80-year-old patient with heart failure sometimes confuses the "water pill" with the "heart pill." The patient lives alone and cares for herself. What does the nurse include in discharge planning for this patient?
    A. transfer to a dementia care service.
    B. referral to a home health care agency.
    C. placement in a long-term-care facility.
    D. arrangements for around-the-clock care.

21. A 52-year-old patient is recently diagnosed with pernicious anemia. The nurse teaches the patient about pernicious anemia. Which statement by the patient demonstrates an understanding of the disease?
    A. "I will need to have cobalamin ($B_{12}$) injections regularly for the rest of my life."
    B. "I will stop having a glass of wine with dinner."
    C. "The numbness in my feet will go away once my hemoglobin level returns to normal."
    D. "My diet should include more red meat or liver."

22. A patient is admitted to the hospital with sickle cell crisis. What is an important action for the nurse to take while caring for this patient?
    A. limit the patient's intake of oral and IV fluids.
    B. evaluate the effectiveness of opioid analgesics.
    C. encourage the patient to ambulate as much as tolerated.
    D. teach the patient about high-protein, high-calorie foods.

23. A patient is hospitalized with severe anemia. The health-care provider orders transfusion with packed RBCs. What is the most important nursing action to prevent a blood transfusion reaction?
    A. verify the patient identification according to hospital policy.
    B. administer the blood as soon as it arrives on the nursing unit.
    C. initiate the blood transfusion at a rate of no more than 2 ml/min.
    D. stay with the patient during the first 15 minutes of the transfusion.

24. A patient is admitted with acute pericarditis. The nursing diagnosis is Acute pain related to inflammatory process. What is an appropriate nursing intervention?
    A. force fluids to 3000 ml/day to decrease fever and inflammation.
    B. teach the patient to take deep, slow respirations to control the pain.
    C. position the patient in Fowler's position, leaning forward on the overbed table.
    D. remind the patient to ask for the opioid pain medication every four hours.

25. A patient is recovering from rheumatic fever. The nurse teaches the patient about long-term management of rheumatic fever. Which statement by the patient indicates the need for additional teaching?
    A. "I will need to have monthly antibiotic injections for 5 years or longer."
    B. "I will call the doctor if I develop excessive fatigue or difficulty breathing."
    C. "I will need to let my dentist know that I have had this rheumatic fever."
    D. "I will be immune to further episodes of rheumatic fever after this infection."

26. The community health nurse is involved in programs to prevent rheumatic fever. What is the most important community intervention to decrease the incidence of rheumatic fever?
    A. teaching people to seek medical diagnosis and treatment for streptococcal pharyngitis.
    B. providing prophylactic antibiotics to people with a family history of rheumatic fever.
    C. immunizing susceptible groups of people with streptococcal vaccine.
    D. promoting hygienic measures to prevent the transmission of streptococcal infections.

27. A patient with cardiomyopathy is admitted to the hospital. Heparin is prescribed for the patient. The nurse teaches the patient about anticoagulation therapy. Which statement does the nurse include in the teaching?
    A. "Heparin will help prevent blood clots from forming in your heart chambers."
    B. "Heparin is used to improve the circulation to the muscles in your arms and legs."
    C. "Heparin has been prescribed to stop blood clots from traveling to your lungs."
    D. "Heparin makes it easier for your heart to pump and will decrease your symptoms."

28. A patient has a diagnosis of prehypertension. The nurse determines that the patient has the following risk factors for developing hypertension. Which risk factor is most important for the nurse to discuss with the patient?
    A. gets no regular aerobic exercise
    B. is 5 pounds over the ideal weight
    C. has a low dietary fiber intake
    D. drinks wine with dinner once per week

29. A patient is prescribed labetalol (Normodyne) to treat hypertension. The nurse teaches the patient to change position slowly. What is the rationale for this teaching?
    A. blocks the renin-angiotensin-aldosterone system (RAAS).
    B. paralyzes the smooth muscle of blood vessels.
    C. decreases sympathetic nervous system activity.
    D. prevents the movement of calcium into the cardiac cells.

30. What is a clinical manifestation of a large bowel obstruction?
    A. metabolic alkalosis.
    B. referred pain to the back.
    C. bile colored vomiting.
    D. abdominal distension.

31. An 86-year-old patient lives alone and has a limited income. The patient takes medication to control blood pressure. The patient knows the names of the medications and when to take them. However, the patient does not take the medications regularly, so the blood pressure is not well controlled. What is an appropriate nursing intervention?
    A. discuss the patient's possible confusion with a family member.
    B. ask the patient about whether the cost of the medications is too high.
    C. offer the patient teaching about long-term effects of hypertension.
    D. assist the patient with an easier dosing schedule to improve compliance.

32. A patient is assessed for hypertention. Laboratory tests are ordered. The nurse monitors the values for organ damage. Which value is the nurse most concerned about?
    A. blood urea nitrogen (BUN) of 15 mg/dl (5.4 mmol/L).
    B. serum hemoglobin of 14.7 g/dl (135 g/L).
    C. serum creatinine of 2.6 mg/dl (230 mmol/L).
    D. serum potassium of 3.8 mEq/L (3.2 mmol/L).

33. A patient is diagnosed with adult celiac disease. The nurse teaches the patient about treatment of the disease. Which statement by the patient demonstrates understanding?
    A. "I must take folic acid for the rest of my life."
    B. "I will avoid dietary wheat, rye, barley, and oats."
    C. "I will be sure to take all of the ordered antibiotics."
    D. "I should eat only very low-fat or fat-free foods."

34. A patient is admitted with a possible stroke. Aspirin is ordered for the patient. Which information indicates a possible contraindication for aspirin?
    A. The patient has atrial fibrillation.
    B. The patient has dysphasia.
    C. The patient states, "I suddenly developed a terrible headache."
    D. The patient has a history of brief episodes of right hemiplegia.

35. What is the best description of a carotid endarterectomy procedure?
    A. "The diseased portion of the artery in the brain is removed and replaced with a synthetic graft."
    B. "A catheter with a deflated balloon is positioned at the narrow area, and the balloon is inflated to flatten the plaque".
    C. "A wire is threaded through an artery in the leg to the clots in the carotid artery and the clots are removed."
    D. "The carotid endarterectomy involves surgical removal of plaque from an artery in the neck."

36. A patient has been admitted with nausea and vomiting. Which situation requires the most rapid intervention by the nurse?
    A. The patient has been vomiting several times a day for the last 4 days.
    B. The patient is lethargic and difficult to arouse.
    C. The patient's chart indicates a recent resection of the small intestine.
    D. The patient has taken only sips of water.

37. A patient is admitted with nausea and vomiting. Which nursing action could the nurse delegate to a nursing assistant?
    A. Assess for signs of dehydration.
    B. Ask the patient what precipitated the nausea.
    C. Auscultate the bowel sounds.
    D. Assist the patient with oral care after vomiting.

38. A patient has suffered massive abdominal trauma. The patient is given famotidine (Pepcid). What is the purpose of this medication?
    A. decrease the risk for nausea and vomiting.
    B. prevent aspiration of gastric contents.
    C. inhibit the development of stress ulcers.
    D. lower the chance for *H. pylori* infection.

39. A patient has an upper respiratory infection (URI). The nurse teaches the patient about care of upper respiratory infections and prevention of secondary infections. Which statement by the patient indicates the need for additional teaching?
    A. "I will drink lots of juices and other fluids to stay hydrated."
    B. "I will watch for changes in nasal secretions or the sputum that I cough up."
    C. "I can take acetaminophen (Tylenol) to treat discomfort."
    D. "I can use my nasal decongestant spray until the congestion is all gone."

40. A patient had a total laryngectomy and radical neck dissection. The nursing diagnosis is Body image disturbance related to loss of control of personal care. What is an outcome related to this nursing diagnosis?
    A. wears clothing that minimizes the disfigurement caused by surgery.
    B. lets the spouse provide hygiene and stoma care.
    C. asks that only family members be allowed to visit.
    D. learns to remove and clean the laryngectomy tube independently.

41. A patient had a repair of an abdominal aortic aneurysm. The nurse assesses the patient on the first post-operative day. Which finding is the best indicator of the return of peristalsis?
    A. absence of abdominal distention.
    B. passing of flatus with ambulation.
    C. dark brown nasogastric (NG) tube drainage.
    D. moderate abdominal tenderness.

42. A patient has chronic peripheral arterial disease (PAD). The nurse teaches the patient about PAD. Which statement by the patient indicates the need for additional teaching?
    A. "I will have to buy some loose clothing that does not bind across my legs or waist."
    B. "I will change my position every hour and avoid long periods of sitting with my legs down."
    C. "I will use a heating pad on my feet at night to increase the circulation and warmth in my feet."
    D. "I will walk to the point of pain, rest, and walk again until I develop pain for a half hour daily."

43. A patient is admitted with a venous thrombosis (DVT) of the left lower leg. The nurse identifies the potential complication of pulmonary embolism. What is an appropriate nursing action to prevent pulmonary embolism?
    A. Maintain bed rest as ordered.
    B. Administer oxygen to keep $O_2$ saturation >90%.
    C. Apply compression gradient stockings.
    D. Remind the patient to dorsiflex the feet and rotate the ankles.

44. A patient has a venous stasis ulcer on the right lower leg. What is the most important nursing intervention to promote healing of the ulcer?
    A. adequate dietary intake of proteins and vitamins.
    B. prevention of infection with prophylactic antibiotics.
    C. application of external compression to the lower leg.
    D. keeping the ulcer moist with hydrocolloid dressings.

45. A patient had a repair of an abdominal aortic aneurysm 5 days ago. Which action could the nurse delegate to a nursing assistant?
    A. Teach the patient the signs of possible wound infection.
    B. Monitor the quality and presence of the pedal pulses.
    C. Check the lower extremity strength and movement.
    D. Assist the patient in using a pillow to splint while coughing.

46. A patient is diagnosed with intermittent claudication. Which statement by the patient is consistent with this diagnosis?
    A. "My fingers hurt when I go outside in cold weather."
    B. "Sometimes I get tired when I climb a lot of stairs."
    C. "When I stand too long, my feet start to swell up."
    D. "My legs cramp whenever I walk more than a block."

47. A patient is scheduled for a coronary artery bypass graft (CABG) using the internal mammary artery. The nurse has completed pre-operative teaching. Which statement by the patient indicates the need for additional teaching?
    A. "I will need to take an aspirin a day after the surgery to keep the graft open."
    B. "I will have incisions in my leg where they will remove the vein."
    C. "They will stop my heart and circulate my blood with a machine during the surgery."
    D. "They will use an artery near my heart to bypass the area that is obstructed."

48. A patient with chronic heart failure is admitted to the emergency department with these symptoms: severe dyspnea; dry, hacking cough; pitting edema in both ankles; blood pressure (BP) of 170/100; apical pulse rate 92; and respirations 28. What is the next nursing action?
    A. auscultate the lung sounds.
    B. assess the orientation.
    C. check the capillary refill.
    D. palpate the abdomen.

49. Which statement describes type 2 diabetes?
    A. the patient is totally dependent on an outside source of insulin.
    B. there is decreased insulin secretion and cellular resistance to insulin that is produced.
    C. the immune system destroys the pancreatic insulin-producing cells.
    D. the insulin precursor that is secreted by the pancreas is not activated by the liver.

50. An unresponsive patient in the emergency department is diagnosed with hyperglycemic hyperosmolar nonketotic coma (HHNC). What is the next nursing action?
    A. administer glargine (Lantus) insulin.
    B. initiate oxygen by nasal cannula.
    C. insert a large-bore IV catheter.
    D. give 50% dextrose as a bolus.

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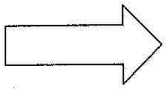

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Curriculum Vitae

Graduate College
University of Nevada, Las Vegas

Brenda Moore

Degrees:

Associate Degree Nursing, 1988
Houston Community College, Houston Texas

Bachelor of Science Degree in Nursing, 2006
University of Alabama, Tuscaloosa, Alabama

Master of Science Degree Nursing, 2009
Michigan State University, East Lansing, Michigan

Special Honors and Awards:

Opal Goolsby Outstanding Teaching Award nominee, 2013
National Student Nurse Association Teacher of the Year, 2013

Publications:

Moore, B.S. (2014). *Survival of the Fittest: Linguistic Modification in Nursing Education*. Poster presented at The Western Institute of Nursing Research Conference. Seattle, Washington.

Moore, B.S. (2009). Why health care workers decline influenza vaccination. *American Association of Occupational Health Nurses Journal, 57(11), 475*-478.

Moore, B. S. (2009). *Influenza vaccine and the health care worker: Why do they decline?* Poster presented at the meeting of The Center for American Nurses' Lead Summit 2009. Orlando, Florida.

Dawkins, V. Cowan, M., Moore, B. Musgrove, B (2009). *High fidelity simulation: A new strategy for orientation and competency validation*. ANCC National Magnet Conference. Louisville, Kentucky.

Dissertation Title: Survival of the Fittest: The Role of Linguistic Modification in Nursing Education

Dissertation Examination Committee:

Chairperson, Michele C. Clark, PhD, RN
Committee Member, Carolyn Yuhca, PhD, RN
Committee Member, Jennifer Kawi, PhD, RN
Graduate Faculty Representative, Leann Putney, PhD