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Brief Report

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Asian and Hispanic Nursing Student Response to Linguistically Modified Multiple-Choice Exam Questions

Brenda Moore, Ph.D., RN-BC, CNE[#]

College of Nursing, Texas Woman's University, Texas, USA

#Corresponding author: Brenda Moore, Ph.D., RN-BC, CNE, Associate Professor, College of Nursing, Texas Woman's University, 304 Administration Dr., Denton, Texas 76204, USA

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Abstract

Aim: Compare exam scores of ESL to non-ESL nursing students on a standard format multiple-choice exam compared to a linguistically modified exam.

Background: Culturally diverse ESL nursing students in the US fail to complete nursing programs at a far greater rate than native English speakers. Most failures are due to academic deficiency as determined by multiple-choice examinations. Multiple-choice exams are commonly composed of questions containing linguistic errors and cultural bias.

Design: Experimental, post-test-only, control group design. Statistical analysis using a 2x2 factorial ANCOVA statistic identified differences between groups.

Method: 644 senior level nursing students were involved in the research with a subset of 51 Asian and 58 Hispanic students. An experimental (linguistically modified) and a control (non-modified) multiple-choice exam were constructed.

Conclusion: Linguistic modification allows students more time to complete the exam, and adds clarity to exam questions. The process of linguistic modification should be used by all nursing educators to provide fair and equitable exams.

Keywords: Diversity; English-as-a-second-language; Linguistic modification; Nursing students

Introduction

English-as-a-Second-Language (ESL), culturally diverse nurses, are needed in the United States (U.S.) healthcare system because of the increasing diversity of the general population. Unfortunately, a significant percentage of ESL nursing students fail U.S. nursing programs [1,2]. The reasons for this are complex; finances, family responsibly, cultural adaptation and employment all play a role [3]. However the most common reason is academic failure.

Background

The impetus behind the research was to improve ESL nursing student retention. Improving the quality of multiple-choice exams is a crucial first step. Multiple-choice exams are the most common evaluation tool in nursing programs within the U.S.; the same style of the nationwide exam required to become a professional nurse. Unfortunately ESL students find multiple-choice exams to be one of the most challenging aspects of nursing school [4,5]. One reason for this is the presence of linguistic errors in exam questions. Linguistic errors include: irrelevant content, poor sentence structure, and culturally biased words. Errors of this type increase the reading burden for test takers. Linguistic modification, as part of best practices in item writing, removes these errors [5-7]. The specific aim of this study was to compare exam scores of ESL to non-ESL nursing students on a standard format multiple-choice exam (as provided by a publisher) compared to a linguistically modified exam.

Method

The research design was experimental, posttest-only control group. Three hypothesis were aligned with the research 1) both the ESL and non-ESL students will demonstrate higher scores on the linguistically modified exam in comparison to the standard exam, 2) the non-ESL students will score higher than the ESL students on both the linguistically modified exam and the standard exam and 3) 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. Using SPSS® statistical software, a 2x2 factorial ANCOVA statistic identified differences between groups.

Drs. Abedi and Sato [7] developed a guide to create linguistically modified multiple-choice questions. This guide was used to create the 50 question linguistically modified (experimental) exam. The second (control) exam included 50 questions as produced by the publisher. The 50 questions on each of the exams were identical. The only difference being the linguistic modification of the questions for the experimental exam. The answer options remained the same. An example of linguistic modification can be seen in (Table 1). In this example all irrelevant information is removed leaving the material that aligns with the intention of the question. “Does the student understand the importance of relieving pressure for a patient with a pressure ulcer”? The word count for the question stem was decreased from 41 to 25 words. This represents a reduction in reading load and allows the student time to concentrate on the answer instead of working through the question.

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
Change the patient’s bedding at least every day.
Record the size and appearance of the ulcer weekly.
Provide the patient with a high-calorie, high-protein diet.
Change the patient’s position at least every 2 hours.*
A chronically ill patient is on bed rest and has a stage II pressure ulcer over the coccyx. What is the most important nursing action?
Change the patient’s bedding at least every day.
Record the size and appearance of the ulcer weekly.
Provide the patient with a high-calorie, high-protein diet.
Change the patient’s position at least every 2 hours.*
Note. Answer is indicated by the asterisk.

Table 1: Example of a control (original from publisher) question followed by a linguistically modified question.

The Asian and Hispanic ESL nursing student study is a subset of a much larger project. Asian and Hispanic ESL students are defined as individuals that self-identified as ethnically Asian or Hispanic and speak English as a second language. The larger research project involved 644 nursing students from multiple nursing programs throughout the U.S. The 644 participants were divided into four subgroups consisting of ESL and non-ESL students of multiple ethnicities. By random assignment, two of the subgroups completed a 50 question multiple-choice experimental exam (linguistically modified). The other two subgroups completed a 50 question multiple-choice control exam (standard question format).

Results

The results of the study indicate that both ESL and non-ESL participants demonstrated higher exam scores on the experimental exam in comparison to the control exam. In addition the experimental exam was perceived as easier to understand and slightly less difficult than the control exam. Overall, the students completed the experimental exam in 10% less time than the control exam. A detailed analysis of the Asian and Hispanic ESL nursing student research resulted in unexpected findings. The 27 Asian ESL students finished the experimental exam in 16% less time than the 24 Asian ESL students completing the control exam. However, despite the time difference, the scores of both groups were statistically similar. The 31 Hispanic ESL students finished the experimental exam in 11% less time than the 27 Hispanic ESL students completing the control exam. Significantly, the experimental group of 31 Hispanic ESL students scored 2% higher than the control group; this may be the difference between passing and failing. Similar to the larger study, both groups perceived the linguistically modified exam as easier to understand.

Conclusion

The decrease in time is a critical finding. Nursing students are frequently in testing situations that have time limits. Linguistic modification decreases reading load, sentence complexity and question length. This allows students more time to consider the answer to a question instead of struggling to understand the question itself. Linguistic modification has a clear role in nursing education. Educators should consider the use of linguistic modification while creating test questions and when modifying questions retrieved from published test item banks. In this way, nursing educators will develop fair and equitable evaluation tools for all students regardless of ethnicity or native language.

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