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Analysis of Multiple Choice Questions: Item Difficulty, Discrimination Index and Distractor Efficiency

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ABSTRACT

Background: The quality of the multiple-choice questions (MCQs) used in educational measurement depends on their difficulty index (DIF I), discrimination index (DI) and distractor efficiency (DE).

Aim: The study is aimed at analyzing the single response MCQs of an Anatomy course in an undergraduate nursing program and finding the relationship between the DIF I and DI.

Material and method: The 48 MCQs and 144 distractors used in a summative exam after completion of 15 credit hours of an Anatomy course, attended by 56 students in a College of Nursing in Saudi Arabia, were analyzed.

Results: Twenty-four out of 48 MCQs had average DIF I (30-70%), 29 items (60.40%) had excellent DI (>0.35) and 10 (20.83%) were good items (DI=0.25-0.34). When the two indices were combined, there were 23 'ideal' questions. The mean DIF I and DI were 67.50 and 0.44 respectively. There were 107 (74.30%) functional distractors in all. The proportion of items having 0,1,2 and 3 non-functional distractors (NFDs) were 50%, 27.08%, 18.75% & 4.17% respectively, with a mean DE of 74.30%. There was a significant negative correlation between the DIF I and DI ($r=-0.721$; $p<0.01$), showing that with increasing difficulty index, the ability to discriminate between the high and low achievers decreased.

Conclusion: Generating high-quality items is an important aspect of the educational assessment. Analyzing items and banking them for future use will enhance the quality of assessment. The results of the study will provide an opportunity to change the way MCQs are developed and used in educational assessment.

Keywords: *Item analysis, Difficulty Index, Discrimination Index, Distractor Efficiency, Nonfunctional Distractors*

INTRODUCTION

Appropriate use of assessment strategies is a challenge to educators. Assessment, integral to learning involves an appraisal of student learning and feedback for improving teaching-learning experiences. It is commonly known that assessment drives learning[(1)]. Carefully constructed tests by educators will enhance educational functions. Increasingly multiple choice questions (MCQs) are used for assessing students' performance. Therefore, there is a growing concern about the quality of the tests that are used for assessment.

A wide range of content and objectives on a large number of students are assessed through MCQs [(2)]. Not all educators agree with the use of this format. Few concede that it is time-consuming and challenging to develop MCQs for measuring higher cognitive skills [(3)]. Others are of the opinion that MCQs focus on recall rather than comprehension, application and analysis of course-related information[(4)]. Unfortunately,

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