Volume : 4 | Issue : 3 | March 2015 • ISSN No 2277 - 8179

Research Paper

AN ITEM ANALYSIS FOR THE ADJUSTMENT OF MULTIPLE CHOICE QUESTIONNAIRE

Healthcare

KEYWORDS : item analysis, difficulty index, distractor effectiveness

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ABSTRACT

Background: Item analysis is the validation of a MCQs after it has appeared in a question paper. This post validation is done by analyzing the student's answer to each item. When formalized, the procedure is called item analysis.
Aim & objectives: To study MCQs of subject Hospital Administration among Post graduate doctors and carry out item analysis and to review MCQ's and suggest improvements for defective items and also to list the uses of item analysis.
Study design and methods: Cross-sectional questionnaire based study carried out among 300 post graduate doctors in a period of one year.
Results: Analysis of data was done on 3 factors i.e. difficulty indexfound to be 50 %, discrimination of the question to be 0.4 and the distractor effectiveness to be 10%.
Conclusion: Result of the study concluded that item analysis can be used for the evaluation of the MCQs indicating the strength of questionnaire through difficulty level

INTRODUCTION

Many of us use the internet or the "web" (world wide web) as a source of information. In medical education, the web is increasingly used both as a learning tool to support formal programmes and as a means of delivering online learning programmes. What can educators do to ensure that the potential of the web is used effectively to support both their own learning and that of their students? (1).Learning in the clinical environment has many strengths. It is focused on real problems in the context of professional practice. Learners are motivated by its relevance and through active participation. Professional thinking, behaviour, and attitudes are "modelled" by teachers. It is the only setting in which the skills of history taking, physical examination, clinical reasoning, decision making, empathy, and professionalism can be taught and learnt as an integrated whole. Despite these potential strengths, clinical teaching has been much criticized for its variability, lack of intellectual challenge, and haphazard nature (2).

Item analysis is the validation of MCQs after it has appeared in a question paper. This post validation is done by analyzing the student's answer to each item. When formalized, the procedure is called item analysis. It provides information concerning three points:

Difficulty Index. This is the difficulty of the item, i.e., is the item of an appropriate level of difficulty for the batch of students tested?

Discrimination index. This is the discrimination power of the item, i.e., is the item capable of discriminating between knowledgeable and ill-informed students?

Distractor effectiveness. This is the effectiveness of each alternative. Is each alternative closely balanced, plausible and logical? it is useful to get a feedback on the effectiveness/functionality of each alternative, since poor alternatives would lead to a greater possibility of guessing the correct answer (3).

Group discussion plays a valuable role in the allround education of students, whether in problem based learning and team projects or in the more traditional academic scenario of the tutorial or seminar (4).

Skill based assessments are designed to measure the knowledge, skills, and judgment required for competency in a given domain. Assessment of clinical skills has formed a key part of medical education for hundreds of years(5).

Evaluation is an essential part of the educational process. The focus of evaluation is on local quality improvement and isanalogous to clinical audit. Medical schools require evaluation as part of their quality assurance procedures, but the value of evaluation is much greater than the provision of simple audit information. It provides evidence of how well students' learning objectives are being achieved and whether teaching standards are being maintained (6).

AIM

2. To study MCQs of subject Hospital Administration among Post graduate doctors and carry out item analysis.

OBJECTIVES

- To define item analysis
- To explain the procedure of item analysis
- To review MCQ's and suggest improvements for defective items
- List the uses of item analysis
- To understand the MCQs scoring system

METHODOLOGY

Sample Size: Five groups of 60 Post graduate doctors each were taken. Hence a sample size of 300 being statistically significant was taken.

They were subjected to 20 MCQs similar in nature duly validated by the faculty. These MCQs were taken from various topics of hospital Administration from standard text bodies.

Place of Study: Study carried out among Post graduate doctors of AFMC, Pune.

Duration of study: Subjected to one time questionnaire on a given date and time for 1 year.

OBSERVATION

3. The study was carried among 300 doctors where an MCQ examination was conducted

- Marking of all the answer sheets were done

Volume : 4 | Issue : 3 | March 2015 • ISSN No 2277 - 8179

- Post graduate doctors were ranked based on their test scores
- Top third i.e., 100 doctors as high achievers and bottom third i.e., 100 doctors as low achievers while the middle third were not used for analysis.

- All questions were analyzed for the purpose of depiction where (C) was correct response.

Options	Number selecting the option amongst high achievers (H)	Number selecting the option amongst low achievers (L)
a)	10	22
b)	10	20
c)	70	30
d)	Nil	04
No response	10	24
Total (N)	100	100

Difficulty index or facility value

$$P = \frac{H+L}{N} \quad X\ 100$$

Where

H= Number of Post graduate doctors in the high achiever group answering the item correctly

L= Number of Post graduate doctors in the low achiever group answering the item correctly

N=Number of Post graduate doctors in both groups including non responders.

Thus for a given example,

$$P = \frac{70 + 30}{200} \times 100 = 50\ \%$$

The interpretation, clear that difficulty index or facility value is shown under:

<30%	30	40	50	60	70	>70%
Too difficult or defective						Too easy; reject or improve

The discrimination of a question

The discrimination index 'd' is calculated by the formula

D= H – L \N X 2

Where, the symbols H, L & N represent the same parameters as mentioned in the earlier example. Thus, for the given example

D = 70-30/200X2
= 0.4

The interpretation of the discrimination index shown as under:

< 0.15	0.15-0.25	0.25-0.35	>0.35
Discard or defective	Revise	Good	Excellent

The minimum acceptable discrimination level depends upon the number of Post doctors taking the test, but can be taken as 0.25 for practical purposes. Items with a negative discrimination index indicate a wrong item/ key, which in most cases represent a typographical error that has crept into question paper.

The distractor effectiveness or functionality

For a distractor to be functional, it must attract at least 5% of the total response in the two groups. In the above example option (d) is nonfunctional having been chosen by only 10 % of doctors.

Conclusion

5. Thus, item analysis can tell us if an item was too easy or to difficult, how well it discriminated between high and low scorers on the test, and whether all the alternatives functioned as anticipated.

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