RESEARCH ARTICLE

ITEM ANALYSIS OF MULTIPLE CHOICE QUESTIONS

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ARTICLE INFO	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 index found to be 50 %, discrimination of the question to be 0.4 and the distract or 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

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. It provides information concerning three points:

a) 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?

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

c) 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.

Aim

To study MCQs of subject Hospital Administration for MOJCC and carry out item analysis.

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Objectives

The objectives of the study are as under:

a. To define item analysis
b. To explain the procedure of item analysis
c. To review MCQ's and suggest improvements for defective items
d. List the uses of item analysis
e. To understand the MCQs scoring system

METHODOLOGY

The methodology applied during the study were

a. **Sample Size:** Five groups of 60 students each of MOJCC (Medical Officer Junior Command Course) 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.

b. **Place of Study:** Study carried out among MOJCC of AFMC, Pune.

c. **Duration of study:** Five groups of 60 students each covered over a period of one year.

OBSERVATION & ANALYSIS

The study was carried in 300 students of MOJCC where an MCQ examination was conducted.

a. Marking of all the answer sheets were done
b. Students were ranked based on their test scores
c. Top third i.e., 100 students as high achievers and bottom third i.e., 100 students as low achievers while the middle third were not used for analysis.
d. All five 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

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

Where
H= Number of students in the high achiever group answering the item correctly
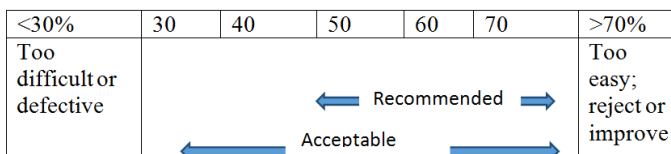L= Number of students in the low achiever group answering the item correctly
N=Number of students in both groups including non responders.

Thus for a given example,

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

$$= 50\%$$

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

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

The discrimination of a question

The discrimination index 'd' is calculated by the formula

$$D = H - L \backslash N \times 2$$

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

$$D = 70-30/200 \times 2$$
$$= 0.4$$

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 students 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 students.

Conclusion

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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