Vol.5 No. 2 2022

ISSN Online: 2709-7625

ISSN Print: 2709-7617

ITEM ANALYSIS FOR TEST TO EXAMINE THE EFFECT OF E-MODULE ON THE ACADEMIC PERFORMANCE OF 7TH CLASS SCIENCE STUDENTS IN ISLAMABAD

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ABSTRACT

The main aim of this research was to investigate quantitative characteristics (difficulty level, discrimination index and distractor efficiency) of research tool regarding the first four units of 7th class general science to be used for pretest on the research on "effect of e-module on the academic performance of 7th class general science students in Islamabad". The researchers got the data from 210 randomly selected students both from urban and rural area schools of Islamabad Capital Territory. Researchers used 33% students from high achievers and 33% from the lower achievers by taking 70 students from HE and 70 students from LEs. In difficulty level (Diff I) and discrimination index (DI) of total 140 students were taken both from group of high marks from top corner and group of lower marks for the bottom corner. Distractor analysis (DE) was done on the data of 210 students. Descriptive statistics was used to analyses the data. On the basis of findings from the analyses of difficulty level and discrimination index that two test items (16 & 17) were eliminated from the tool due to very low values of Diff. I (<29) and DI values (<20). Four items were difficult (revised and improved) and 17 items were moderately difficult retained and sustained. There was only one item which was easy. Discrimination index (DI) of 22 items was discriminatory and retained after minor improvements. Distractor analysis (DE) determines the functionality of distractors. If some distractors are not selected by the students/respondents they are considered for revisions. In this research only one distractor was found to have DE value less than 5%, and three distractors with DE value less than 7%. It was recommended to eliminate and change distractor with value of DE less than 5% and revise and improve distractors with DE value less than 7%. It was also found that except two test items all items were valid and reliable. It was further recommended that item analyses is very useful technique to find the reliability and validity of a tool .

Keywords: Item Analyses, Multiple Choice Questions (MCQs), Difficulty index, discrimination index and distractor effectiveness.

INTRODUCTION

Item analysis technique is used to determine the quality of test items which may be in the form of multiple choice questions (MCQs). In item analyses, psychometric domains assessed in item analyses are difficult level or index (Diff I), dicrimination index (DI) and distractor effectiveness (DE) (Atalmiş & Kingston, 2017). Basically three things can be inferred from the results of item analyses viz, quality of teaching, examinees understanding regarding test items, parameters of options given at the end of each statement. Item analysis is based on the selection of choices asked from the students. After conducting item analysis, it was to be decided , what to do as a result of item analyses. For example through results of item analyses researchers may revise, change, improve or discard the test items or distractors. Keeping in view normality curve or standard criterian of difficulty level used by schools or boards, researches ensured the criteria. The most hard and difficult items or the most easiest items need to be improved, revised or eliminated . The decision of revision, improvement or elimination of the items can be based on the difficulty index, dysfunctional/nonfunctional distractors and discrimination index

In Pakistan, MCQs are essentially used in all type of examinations from schools to college level. In MCQs test items there is one statement (answer of which is required) and four to five options , from which only one option may be the answer of that statement. All other options are distractors and belong to same category. The correct answer or option is termed a key whereas distractors are also known as alternatives. In Pakistan mostly four options are used as key and distractors. This analysis is done to purify items ,which will be used for pretest during the study of effect of e-module on the academic achievement of 7th class science students.

Teaching of general science is difficult to conduct in a true sense due to many reasons and students are compelled to learn the science because science is compulsory at middle school level in Pakistan and students has to pass the examination. Curriculum of general science at middle school level is integration of Biology, Chemistry, Physics and

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ISSN Online: 2709-7625
ISSN Print: 2709-7617

Astronomy. Test was developed from first four units comprising Biology portion only and each item contained four options in which one option was correct and other three were distractors. Total there were 72 distractors. Using tests as research tool needs to be valid and reliable. Researchers were also curious to determine the useability, validity and reliability of the tool. In many researchers to find the discrimination index 27% upper and 27% lower achiever data is taken for finding discriminatin index, but here researchers were taking 33% higher achievers and 33% lower achievers. From the sample of 210 students 70 students who were high achiever and 70 students who were low achievers were selected for item analyses.

The researchers were interested in item analysis because most of the researchers perform directly validity and reliability procedures. Furthermore most of the science teachers and test item developers pay less attention to find out the distractor efficiency through distractor analysis, difficulty level and discrimination index for their MCQs. Most of the test item developers depend on their experience and expertise. In the field of medical education, higher education a considerable work has been done towards item analysis. Comparatively this type of analyses is few in Pakistani researchers as in other countries of the region. Researcher considers that it will be a novel step towards item analyses at elementary (middle) level general science and writing about it for publications. This article will provide help for future researchers and those who are involved in teaching and learning process.

OBJECTIVE OF THE STUDY

Objectives of this research study were to:

1. find out the difficulty level of MCQs of the test.
2. find out the discrimination index of the MCQs of General Science (Biology Section).
3. find out the nonfunctional distractors from the test items of general science (biology section).
4. purify test items through item analyses.

THEORETICAL LITERATURE REVIEW

Item Analysis

Researchers tried to improve data collection instruments through a number of statistical techniques and tools. Test is a tool which is used to assess the achievement and performance of students for a particular content and subject. A test is collection of different test items. Item is a form of question where answer of a statement is sought through helping students by giving them clue in the form of options (Sharma, 2021). Out of these options one option is correct and other three options are distractors. Item analysis help the item developers to make the test items more useful and valueable. Item analysis is a system and set of systemtic procedures used to evaluate the test items for their effective use in data collection. Items analysis can be analysed in qualitative form where form and structure of the item statement, answer and distractors are examined through experts and experiencd persons in relevant fields. Quantitative analysis was done by using statistical procedures to calculate their statistical properties.

As Popham (2002) and Trice (2000) stated that assessment and evaluation of students in certain area is an integral part of the learning and teaching. This assessment can be done through MCQs where items have power to measure the abilities of students for which MCQs have been developed. Item analysis is one of the best method to make the items valid and reliable. Item analyis can be done in three ways viz; difficulty index, discrimination index and distractor analysis. Items can be rejected, accepted or improved through difficulty index and discrimination index whereas distractors are selected or rejected on the basis of distractor analysis (Sharma, 2021). Distractor analysis is a process where we examine the students' responses in an individual test item. If an option is not selected by any student, it is assumed that option has no relevancy and hence is non functional. As a result to include maximum distractors (options) which are functional.

According to Gronlund(1993), item analyses make us able to observe the item characteristics and improve the quality of items. Sim and Rasiah (2006) and Zubairi and Kassim (2006) reported that through results of item analysis, teachers can make necessary changes in test items for making items effective for measurement of achievements of students during examinations. Gupta, Singh and Singh (2009) viewed that item analysis is a process to assess the quality of test items as a whole. Considine, Botti and Thomas (2005) believed that test item analyses provide necessary information about validity and reliability of a test item.

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Test Items (MCQs)

Multiple choice question is a type of assessment which consist of a stem (statement) and many options. Generally four options are used for one stem. These options contain correct answer called key, and other options are called distractors which are not correct answers but closely related to key or correct answer. These MCQs are used extensively as a formative assessment and summative assessment tool. Cizek and O'Day (1994) reported that test Item (MCQ) consists of a stem with a question statement followed by number of possible answers called options. Out od these options one option is the correct answer called key while other options are called distractors.

Now a days MCQs items are used to measure hogher orser thinking skills such as critical thinking skills, analytical skills and interpretation skills in the framework of Blooms taxanomy

(Kumar, Jaipurkar, Shekhar, Sikri & Srinivas , 2021).

Difficulty Level/ Index (DIF I)

Difficulty level/index of test items is a part of item analysis, defined as the major proportion of students who select the correct options in a test item. If less umber of respondents select the correct options of key options then this test item is considered to be difficult. Difficulty index ranges from 00% to 100%. Difficulty level/index can be found by using this formula when 3rd part of high achiever and 3rd part of low achiever are slected out of the whole sample.

DIFF I= RH+RL/ NH+NL

Here, RH is the number of correct answers in the higher group; RL is the number of correct answers in the lower group; NH is the number of respondents in the higher achievers; NL is the total number of respondents in Lower achievers

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Discrimination Index (DI)

Discrimination index (DI) is a domain of item analysis where it is calculated that how much an item discriminates between high achievers and low achievers. Range of discrimination index is from -1 to +1. Gujjar, Kumar and Rana (2014) define the discrimination index as "the ability of an item to differentiate between students of higher abilities and lower abilities".

Discrimination index can be calculated with the help of this formula:

DI= 2 (RH-RL) /RH+RL

Distractor

As discussed in MCQs each question statement has answers in the foem of options. All options except correct option are called distractors. Distractors are wrong answers. Distractor analysis is done to see whether a student being tested can see a difference in a test. A test developer has to follow some rules while developing test items. And distractors are so closely related that it becomes difficult for a respondet to choose correct answer. Some researchers say that a good didtractor has the ability to attract more respondents from the group of students with low abilities. According to Malau-Aduli and Zimitat (2012), a distractor which is not attempted by any respondent is dysfunctional as it does not help to measure the educational objectives, is valueless for test item and has negative impact on learner. Mehta and Mokhasi (2014) stressed that distractors are essential component of a tst item as it has a reasonable impact on the total test scores. Students performance is related to the design of the distractors .

Distractors on the basis of their functions are categorized into two types. They are dysfunctional distractor (NFD) and functional distractor (FD). This division can be inferred on thebasis of respondents reponses. If an option is selected by less than 5 % respondents (students), it is considered as dysfunctional/ non functional/ ineffective distractor.Conversaly if distractor is selected by more than 5% students (respondents), it is termed as functional /effective distractor.

. According to Tarrant, Ware and Mohammed (2009), Vyas, and Supe (2008), & Patil and Patil (2015), the distractors/ options which are selected by more than 5% students are called functional distractors(FDs) and distractors/optionswhich are selected by less than 5% students then it is called dysfunctional/non functional distractors(DFDs/NFDs). The percent of a distractor can be calculated by using the following formula:

Percent of a distractor = Number of students who selected distractor/total number of students x100%

Effectiveness of Distractors / Distractor Efficiency (DE)

Distractors' Efficiency (DE) for any test item has range from 0% -100% and is likely to determine on the basis of dysfunctional distractors in an item. Distractor Efficiency(DE) of an item with one key and three distractors can be expressed as 100% , 66.66%. 33.33% and 0% depending upon the number of dysfunctional distrators (DFD).

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Number of Dysfunctional Distractors (DFDs)	Distractors Efficiency (DE)
3 Dysfunctional Distractors	0.00 percent
2 Dysfunctional Distractors	33.33 percent
1 Dysfunctional Distractors	66.66 percent
0 Dysfunctional Distractors	100 percent

Empirical Literature Review

Research study conducted by Sharma (2021) on item analysis on B.Ed students in Nepal in 2020 on 27 students with 20 Multiple choice questions, difficulty level (Diff I), discrimination index (DI) and distractor analysis (DE). Diff.I, D I and DE for test items is given in the following table.

Table.1: Item Analysis for 20 Test items

S.N	Detail of Diff Level(Diff I)	Detail (DI)	Detil of Distractor Analysis(DE)
1	3 Items (0.20-0.39)	2 items (0.20- 0.29)	5 items with one dysfunctional Distractors. (3,8,13,18,20)
2	14 items (0.40-0.59)	0 Item(0.30- 0.39)	
3	2 items (0.60-0.79)	18 items ≥ 0.40	15 items with 0 dysfunctional distractors.(1,2,4,5,6,7,9,10, 11,12,14,15,16,17,19)
4	1 item(0.80-0.89)		

A research study conducted by (Agarwal, Burud and Nagandla, 2019) on 120 multiple 'choice questions. Sample for data collection was 113 medical students at International Medical University, Malaysia. Item analysis descriptions are given in table.2 in the following:

Table.2 Item Analysis of 120 test Items.

S.N	Detail of Diff Level (Diff I)	Detail of Discrimination Index (DI)	Distractor Efficiency (DE)
1	5Items (very difficult)	45 items showed good discrimination index	47 test items with no DFD
2	20 Items (Good)	37 items showed fair discrimination index	51 Items with one DFD
3	42 Items(Excellent)	23 items showed poor discrimination index	18 with 2 DFD
4	18 Items (easy)	15 items showed negative discrimination index	4 items with 3 DFD
5	35Items (very easy)		

In research conducted by (Mahjabeen, Alam, Hassan, Zafar, Butt, Konain and Rizvi ,2018) on 65 test items (MCQs). Sample for this research was 110 students studying in 4th year MBBS programme at " Islamabad Medical and Dental College Islamabad" during the year 2017.

Table.3 Item Analysis for 65 Test Items.

S.N	Detail of Diff Level (Diff I)	Details of Discrimination Index (DI)	Distractor Efficiency (DE)
1	1 test items was very difficult	34 items showed Excellent Discrimination index.	16 Items wer with zero DFDs
2	53 Items difficult but acceptable	15 Items showed good D I	30 items had one DFDs

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ISSN Print: 2709-7617

3	11 items were too easy	5 showed acceptable DI	16 with two DFDs
4		11 showed poor DI	3 items were with three DFDs.

Patil, Palve1, Vell and Boratne (2016) conducted a study on 30 MCQs administered to 22 students of medical at Mahatma Gandhi Medical College Research Institute. Total 30 keys and 90 dostractors were analysed. Average of difficulty level, discrimination index and distractor efficiency were 38.3%, 0.27 and 82.8% respectively. Eleven test items out of 30 showed higher difficulty index while five(5) showed difficulty easeness greater than 60. (Symbollically Diff I of 11 test items >30% & Diff.I of 5items > 60%). Discrimnation index of 15 test items was very good. It was amazing that 16 distractors with percentage of 17.8% were found dysfunctional being selected by less than 5% respondents.

Research on item analysis by Namdeo and Sahoo (2016) conducted on 25 MCQs. Data was collected from 76 students of medical at Kalinga Institute of Medical Science (KIMS) Bhubaneswar showed that Diff I of 8 test items with diff I > 70% were too easy , 14 items with diff I range (30-70%) were acceptable whereas 3 test items with diff I < 30% were too difficult. Discrimination index (D I) value of 12 test items >0.35 was excellent, range of DI of 3 test items (020-0.34) and 8 test items was found < 0.2. There were total 75 distractors , there were 22 test items with dysfunctional distractors, whereas 8 test items contained one dysfunctional distractors, 10 test items have two dysfunctional distractors and 4 test items contained 2 dysfunctional distractors (Namdeo & Rout, 2016)

METHODOLOGY

Research Design

Cross sectional survey research design was used for this study. Researcher gathered primary data from the test which was used in research to find out the effect of e-module on the academic performance and attitude of 7th class science students . Researcher analysed the data to do item analyses and to find the difficulty level (Diff I), discrimination index (DI) and distractor effeciency (DE).

Sample and Sampling Technique

Sample of 210 students studying in 7th class in Islamabad Model Institutions under jurisdiction of FDE, Islamabad out of all students studying in 7th class during academic year 2022-2023. The sample was selected through multistage random sampling technique.

Variables in the Study

Researcher developed 25 test items with four options (one correct options called key and three vey close to correct option but wrong options called distractors in each test item) are major variables. Difficulty level (Diff I), Discrimination Index (DI) and distractor Effeciency(DE) are other variables of this study.

Nature and Source of Data

The primary souce of daa was test which was developed from four units of general science for class 7th published by National Book Foundation, Islamabad for studenets studying in schools of Islamabad Capital territory. Data was ratio data. Test as a tool of collecting data was developed in the form of MCQs.

Analysis and Interpretation of Data

All data were analysed. Test was administered to 210 students , marked according to key. Tool contained 24 test items. Frequencies and percentages were used to calculate the item analysis. In first step marks of the students were arranged in ascending order and 210 students were splited into tree parts. Each part contain 70 students. seventy students from students who got more marks and 70 students who got least marks were selected. Record

Table 4: Number of examinees who answered rightly in both groups

Item No.	Right options (RH)	Right options (RL)	Total	Item No.	Right Options (RH)	Right Options (RL)	Total
1	63	42	105	**13**	51	22	73
2	66	29	95	**14**	49	16	65
3	64	24	88	**15**	51	35	86
4	61	15	76	**16**	25	14	39

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5	56	18	74	**17**	24	13	37
6	58	25	83	**18**	43	17	60
7	52	27	79	**19**	52	15	67
8	49	27	76	**20**	37	15	52
9	49	34	83	**21**	51	21	72
10	49	23	72	**22**	54	27	81
11	50	24	74	**23**	51	37	88
12	50	22	72	**24**	50	35	85

Difficulty Level (Diff I)and Discrimination Index (D I)

The difficulty index and the discrimination index of each question item can be computed by using the following formulae:

Difficulty Level (DIF I) = RH+RL / NH+ NL & Discrimination Index (DI) = 2(RH-RL)/N

Table.5: Difficulty Level and Discrimination Index

MCQ Item Number	Difficulty Index (DIF I)	Discrimination Index (DI)	MCQ Item Number	Difficulty Index (DIF I)	Discrimination Index (DI)
1	0.75%	0.30	13	0.52%	0.41
2	0.68%	0.53	14	0.46%	0.47
3	0.63%	0.57	15	0.61%	0.23
4	0.54%	0.66	16	0.28%	0.16
5	0.53%	0.54	17	0.26%	0.16
6	0.59%	0.47	18	0.43%	0.37
7	0.56%	0.36	19	0.48%	0.53
8	0.54%	0.31	20	0.37%	0.31
9	0.59%	0.21	21	0.51%	0.43
10	0.51%	0.37	22	0.58%	0.39
11	0.53%	0.37	23	0.63%	0.20
12	0.51%	0.40	24	0.61%	0.21

Analysis of the Difficulty Index (Diff. I)

The researcher has employed the following table to analyze the difficulty index of each question item.

Table 6: Evaluation of difficulty index

S. No	Diff.I	Number of Items	Item Evaluation	Recommendations
1	<29	02	Most difficult	Eliminated
2	0.30-0.49	04	Difficult	Kept with minor changes
3	0.50-0.69	17	Moderately difficult	Sustained

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ISSN Print: 2709-7617
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4	0.70- 0.89	01	Easy	Kept after revision
5	>0.90	00	---	---

Table shows that two questions were most difficult as they fell under the difficulty range less than 29. The difficulty level of item 16 was 0.28% and item number 17 was 0.26%. It was recommended to eliminate these two test items. Item numbers 14, 18, 19 & 20 lie in the range of (0.30 – 0.49). In the same way item numbers 2,3,4,5,6,7,8,9,10.11.12.13.15.21.22,23 &24 lie in tha range of difficulty level of (0.40 – 0.79) were sustained. One test item number 1 was found to be very easy and lies in the difficulty range >90. It was recommended to revise the test item number.1

Analysis of Discrimination Index (D I)

The researcher used the following table to analyze and interpret the discrimination index of each question item.

Table 7: Evaluation of discrimination index

S.N.	DI	N	Percentage	Evaluation	Recommendation
1.	< 0. 20	02	8.33%	Not discriminating item, marginal item	Discarded
2.	0.20- 0.29	4	16.67%	Moderately discriminating, fair item	Retained
3.	.30- 0.39	8	33.33%	Discriminating item, good item	Retained
4.	≥ 0.40	10	41.67%	Very discriminating, very good item	Retained

Table.6 shows that test item 16 & 17 that lie in the discrimination slab (<0.20) were marginal items and not discriminating, and were eliminted/ discarted .Test item numbers 9,15,23 & 24 lie in the discrimination index slab (0.20-0.29) were moderately discriminating and fair items. It was recommended to review these items. Test items 1,7,8,10,11,18,20 & 22 had discriminant power , good items . it was recommended to keep these items as they were. Test item numbers 2, 3, 4,5, 6, 12, 13, 14, 19 & 21were very discriminating and considered very good items. These items were kept as they were due to their more discriminatory nature.

DISTRACTOR ANALYSIS

Process of distractor analysis includes calculation of number of students who selected each distractor and correct answer. Distractor efficiency is determined on the basis of the number of NFDs. NFDs means that if there is no distractor selected by the studentss in an item. Any item may have dysfunctional distractor which may be one, two or three. If any option is not selected by students is may be said about that distractor, that this distractor in dysfunctional/ nonfunctional distractor. It means DE is expressed as 0%, 33.3%, 66.6% and 100% depending on the number of NFDs. The percent of each distractor was calculated by using the following formula:

Percent of a distractor: Number of students who selected a distractor/ total number of studentsx100

Table.8: Distractor Analysis

S. N	Option A	Option B	Option C	Option D	S. N	Option A	Option B	Option C	Option D
1	14	13	21	162	**13**	27	117	52	14
	6.67%	6.19%	10.0%	77.14%		12.85%	55.71%	24.76%	6.67%
2	20	17	163	10	**14**	40	24	117	29
	(9.5%	8.09%	77.62%	4.76%		19.04%	11.42%	55.71%	13.81%
3	23	142	31	14	**15**	33	140	19	18
	10.95%	67.61%	14.76%	6.67%		15.71%	66.67%	9.04%	8.57%
4	36	37	115	22	**16**	60	50	50	53
	17.14%	(17.61%	(54.76	10.47%		28.57%	23.80%	23.80%	25.23%

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5	29	137	29	15	**17**	54	69	44	43
	(13.80%	65.23%	13.81%	7.14%		25.71%	32.85%	20.95%	20.48%
6	29	32	130	19	**18**	58	27	90	35
	13.80%	15.24%	61.90%	9.04%		27.61%	12.86%	4042.86%	16.67%
7	133	20	26	31	**19**	36	50	32	92
	63.33%	9.52%	12.38%	14.76%		17.14%	23.80%	15.24%	43.81%
8	40	125	27	18	**20**	52	93	41	24
	19.04%	(59.52%	12.85%	8.57%		24.76%	44.28%	19.52%	11.43%
9	29	20	137	24	**21**	116	42	29	23
	13.80%	9.52%	65.23%	11.42%		55.24%	20%	13.81%	10.95%
10	30	123	24	33	**22**	50	99	28	33
	14.28%	58.57%	11.42%	15.71%		23.81%	47.14%	14%	15.71%
11	28	124	30	28	**23**	30	23	34	123
	13.33%	59.04%	14.28%	13.33%		14.28%	10.95%	16.19%	58.57%
12	119	33	38	20	**24**	28	16	133	33
	56.67%	15.71%	18.09%	9.52%		13.33%	17.61%	63.33%	15.71%

Analysis of Distractors

As discussed above there were twenty four test items. Total number of distractors was 72 in this tool. During expert opinion tool was revised and improved. There was only one distractor with DE (4.76%) in test items 2 and distractor D. In test items no.1 & 3 there are three distractors which has DE value less than 7%. This means that these distractors are very near to nonfunctional distractors. Total four distractors can be considered as dysfunctional out of 72. There are 68 distractors which were functional as their distractor efficiency value was more than 7%. Three test item distractors were suggested to revise and one distractor was suggested to change. Resultantly distractor D in item number 2 was changed. Distractors (A & B) in item No.1 and distractor D in item no.3 were revised.

CONCLUSION & RECOMMENDATIONS

Item analysis is very useful statistical procedure for finding the difficulty level of test items, discrimination index of test items and distractor efficiency of test items, which ultimately contributes towards reliability and validity of the test items. In this study there were two test items which were completely eliminated as their difficulty level was two high and their discriminatory power was also very low. Further there were four test items whose difficulty level and discrimination index showed that they need to be revised, hence four test items were revised.

All other test items have favorable difficulty level and discrimination index and were sustained.

Distractor analysis showed that there were four distractors with DE less than 7%, out of which one distractor with 4.76 % DE value was with DE value less than 5%. It was recommended to change distractor in test item no.2 and revise distractor (A, B in item.1 & distractor D in item No.3). All other distractors except these four were functional as they have DE value more than 7 %.

There were 24 Multiple choice questions , out of which two test items fell in the range of most difficult level (< 29) all other test items fell in difficulty range between (0.30 -0.89). Two test items (16 & 17) which have difficulty level < 29 were eliminated from the list, four test items which fell in the category of (0.30-0.49) were considered difficult. These four test items (14, 18, 19 & 20) were revised and these items are likely to be accepted and sustained after revision. The test items which fell in the range of difficulty level (0.50-0.69) were moderately difficult. The number of moderate difficult items was 17 (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 21, 22, 23 & 24) were most likely to be sustained without any revision. There was only one test item with difficulty index (0.70 -0.89) which was item no.1. The result of 24 test items was found. The results showed that there were two items (16 &17) which fell in the slab of diff. I (< 20). They have very minute discriminating power and hence were eliminated from the main tool. Test items (9, 15, 23 & 24 fell in the slab (0.20-0.29) were considered to be moderately discriminating and fair items. These test items were recommended to improve. Hence these test items were retained with minor improvements. Test items (1, 7,8,10,11,18,20 & 22) had reasonable discriminatory power , hence proved good items. It was recommended to keep items (1, 7,8,10,11,18,20 & 22) as they were. Test items (2, 3, 4,5, 6, 12, 13, 14, 19 & 21) were very discriminating and considered very good items. These items were kept as they were due to their power of best discrimination.

ISSN Online: 2709-7625

ISSN Print: 2709-7617

Distractor analysis showed that there were four distractors with DE less than 7%, out of which one distractor (option D) with 4.76 % DE value was with DE value less than 5%. It was recommended to change distractor D in test item no.2 and revise distractor (A, B in item.1 & distractor D in item No.3). All other distractors except these four were functional as they have DE value more than 7 %.

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