



Construction and Standardization of Reasoning Ability Test for Grade 8 Students

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1. Introduction

Now a day's India is progressing leaps and bound by organizing activities in different fields and by new education systems steps in and therefore the span of education is become vast. The students are increasing in numbers in education. The students who have studied the subjects at higher secondary level are going to prefer subjects in higher education branches.

In present research, the researcher constructed and standardized the reasoning ability test for the students of standard 8 of Ahmedabad city.

2. Definitions of Reasoning Ability

2.1 Construction

According to Merriam-Webster's online dictionary,

"The arrangement and connection of words or group of words in a sentence: syntactical arrangement."

According to Terry & Thomas (1977),

"Programmed instruction term for the construction of an answer either in writing or by performance actively, not by passive choice."

2.2 Standardization

According to Menzel (1952), "A standardisation of a test involves the steps of construction, administration, evaluation and implementation."

According to Carter.V. Good (1973), "Test standardized: A test for which content has been selected and checked empirically, for which norms have been established, for which uniform methods of administrating and scoring have been development and which may be scored with a relatively high degree of objectivity."

2.3 Reasoning

According to Merriam Webster dictionary, "Reasoning is the use of reason; especially: the drawing of inferences or conclusions through the use of reason"

According to Dictionary.com, "Reasoning is the process of forming conclusions, judgments, or inferences from facts or premises."

2.4 Ability

Good (1973) defined ability as "The degree of capability necessary to find the correct solution to problem situations." "An estimate of such ability derived by administrating standardized tests."

According to Merriam-Webster dictionary, "Abilities are physical, mental or legal power to do something."

3. Objectives

The objectives in present study are as below.

- 1.To construct Reasoning Ability Test for the students of Grade VIII.
- 2.To standardize the constructed Reasoning Ability Test.
- 3.To find out different types of reliability of Reasoning Ability Test.
- 4.To find out different types of validity of Reasoning Ability Test.

4. Research Tool

In present study, the researcher constructed and standardize Reasoning Ability Test for Grade VIII students. The researcher conducted whole process of construction and standardization of Reasoning Ability Test as per following steps.

4.1 Construction of Items

At primary base, the main task was to decide different factors of reasoning ability and then construct items for each factor. At primary level, the researcher constructed 90 MCQ types items in it. The test was divided in three parts: 1) Verbal Reasoning Ability, 2) Mathematical Reasoning Ability and 3) Nonverbal Reasoning Ability. Each item has four responses out of which only one response is true, another three were false.

4.2 Experts' Opinions

This test was sent to the different research experts from B.Ed. and M.Ed. colleges. The experts were asked to provide their valuable suggestion regarding any improvement is necessary for research tool. As per given by their suggestions the researcher amended his tool. Some suggestions were about grammatical mistakes and about format of sentences. The grammatical mistakes and format of sentences have been changed according to suggestions.

4.3 Preprimary piloting of test

For pre-primary piloting the test was given to 20 students selected from Ahmedabad city. The main goal or pre-primary piloting was to determine the exact time the students would take to complete the test. The researcher noted every problem at where students were facing to complete this test. Some information was also noted by the researcher where the students faced problem to understand. By keeping all these points in mind, the researcher amended the test for primary piloting. In primary test there were 90 items which were divided in three parts as shown in table 1.

Table 1: Total items in primary Reasoning Ability Test

No.	Part	Items
1	Verbal reasoning ability	30
2	Mathematical Reasoning Ability	30
3	Nonverbal Reasoning Ability	30
Total		90

4.4 Primary piloting of test

After reconstruction of Reasoning Ability Test the researcher moved on primary piloting of test. For primary piloting the researcher selected 370 students of grade VIII from upper primary schools of Ahmedabad.

4.5 Item analysis

The scores of Reasoning Ability Test of 370 students obtained by primary piloting were classified, tabulated and used for item analysis. For item analysis, the researcher found difficulty value and discriminating value for each item. The items having discriminating value less 0.2 were rejected, the other items were not rejected and comprised in final test. Thus, 37 items out of 90 have discriminating less than 0.2 were rejected and other 53 items were not rejected which are comprised in final test. Thus, final reasoning ability test has 53 items.

4.6 Construction of final test

In final test there were 59 items in it. These items were divided in three different parts as shown in table 2.

Table 2: Items of final Reasoning Ability Test

No.	Part	Items
1	Verbal reasoning ability	19
2	Mathematical Reasoning Ability	18
3	Nonverbal Reasoning Ability	16
Total		53

5. Reliability and Validity of the Tool

To standardize the tool different types of reliability, validity and norms must be found. In present research the researcher has also found reality, validity and norms of the tool.

5.1 Reliability of the Test

Following methods were used to find out reliability of Reasoning Ability Test.

Table 3: Different types of reliability

No.	Reliability	Value
1	Test-retest (Spearman Brown)	0.89
2	Split-half (Spearman Brown)	0.89
3	Split-half (Rulon)	0.93
4	Split-half (Flanagan)	0.81
5	Guttman split-half	0.96
6	Cronbach's Alpha	0.97
7	Kuder Richardson KR ₂₀	0.91
8	Kuder Richardson KR ₂₁	0.90

5.2 Validity of the Test

Two types of validity of Reasoning Ability Test were found:

5.2.1 Face Validity

In present research, the researcher constructed Reasoning Ability Test for grade VIII students. The present scale was observed and reviewed by different experts and it was reconstructed as recommended by them. So, this test has a good face validity.

5.2.2 Content Validity

As the Reasoning Ability Test was reviewed by different experts, the experts were suggested different changes in different items constructed by the researcher. The researcher has changed or added the items suggested by the experts. So, the present Reasoning Ability Test has a good content validity.

6. Major Findings

In present study, the researcher constructed and standardized Reasoning Ability Test for Grade VIII students of Ahmedabad city. The researcher found out different types of reliability and validity of it. According to this, following findings were revealed.

1. The value of reliability of test-retest method was found very good. This revealed that the Reasoning Ability Test has a good reliability.
2. The value of reliability found by split-half method was very good which revealed that the test has a very good reliability.
3. The value of reliability found by Guttman's formula was very good.
4. The value of Cronbach's Alpha was very high.
5. The values of KR₂₀ and KR₂₁ using Kuder Richardson formula was found very good.
6. The Reasoning Ability Test has a very good face validity.
7. The Reasoning Ability Test also has a very good content validity.

7. Conclusion

Thus, on the basis of above major findings of this research, the main objective to construct and standardize a Reasoning Ability Test for Grade VIII students was fulfilled completely. The researcher

took samples from Ahmedabad city. All scientific steps of construction and standardization of psychological test was applied for better result.

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