CHAPTER 4

DEVELOPMENT OF THE TEST

SOURCES OF ITEM COLLECTION

- Experts' Opinion
- Literature (national and foreign) already available
- Discussion with school teachers

ITEM POOL

PRE-PRELIMINARY TRY-OUT

PRELIMINARY AND SUBSEQUENT TRY-OUTS

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Every person faces new situations everyday, in his home, school, or society. Individuals have to adapt mentally to new problems arising out of new situations either by finding their solution(s) or by making necessary changes to readjust to them. The kind of behavior and the capacity to solve such problems differs from individual to individual. Indeed, individual differences are universal throughout the animal scale. The main purpose of the present work is to construct a group test and thereby to make an effort to measure the amount of problem-solving ability in general and specific in various situations, arising either at home, or school, or sports, or society in day to day life.

The present author has examined several tests — verbal and non-verbal — available in Gujarati for several age groups. The existing tests were lacking either in their contents, or norms, or age range employed. Some were old enough requiring revision. So the present author has attempted to develop a test of problem-solving ability, at times called intelligence test, by drawing its items on the situations arising in day-to-day life experiences with special reference to pupils studying in grades III, IV, V, VI and VII.
If the scores of any such test are to have a meaningful and correct interpretation, then the behaviour sampled, which is measured by the test must be truly representative. As a first step in this direction, the range of applicability was defined as Gujarati children studying in standards III, IV, V, VI and VII. To give an adequate coverage to the most likely situations involving mental activities required in the problem-solving ability in the universe of items, information from the following sources was obtained:

a) Experts' opinion
b) Literature (national and foreign) already available
c) Discussion with school teachers

(a) Experts' opinion

With a view to obtain information regarding the likely situations which will force a choice on a Gujarati child studying in standard III, IV, V, VI or VII, some experts were consulted. The author approached about 6 experts who are eminent educationists and are principals of renowned primary schools, and had a free discussion with them about the activities to be covered. This provided the present author good amount of situations on which appropriate items may be planned.
(b) Literature (national and foreign) already available

Some standardized tests that are already in use were carefully studied. The report of the Asian Expert Seminar on The Development of Science / Mathematics - Concepts In Children (Unesco Regional Office for Education in Asia, 1972), California Short-Form Tests Of Mental Maturity, Stanford-Binet Intelligence Scale, Third Revision (Terman, L. M. & Merrill, Maud A., 1955), Davis and Bell's Test of General Intelligence Or Problem-Solving Ability (1953), etc. were studied in details. Further, Gujarati Adaptation of Wechsler Intelligence Scale for Children (1966), Bhatt's Group Tests of Intelligence For Gujarati Pupils Of Standards V, VI and VII (1962), Adaptation of the Stanford - Binet Intelligence Scale, Third Revision for Gujarati Children of Age Group 13 to 16 (1965) were the tests from which the necessary information was collected. It proved a useful source for obtaining items.

(c) Discussion with School teachers

The author had free discussions with about 10 teachers, who were experienced and were actually handling the standards III, IV, V, VI and VII. These discussions were helpful in determining the capacity
of the students from urban, semi-urban, and rural areas to grasp and understand the various situations. The discussion gave new situations and provided added insight regarding the items already drawn from other sources.

**ITEM POOL**

After obtaining the guidance from the experts' opinion and the discussion with school teachers, the relevant mental tests, both published in and outside India, were studied. This enabled the author to prepare about 1000 items in Gujarati covering various situations. These items were carefully analyzed to avoid repetitions, ambiguities and clumsiness. Finally 198 items were retained in the list.

These items were again examined by school teachers, whose comments about the content, structure and language of the items were considered. Some changes, wherever necessary, were made. (See Appendix A)

The items were classified into seven categories evolved by the author on the basis of existing tests. Opinions of the experts regarding the adequacy of the categorization were also obtained.
Preliminary Try-Out

The pre-preliminary form comprising of 198 items, divided into seven categories was prepared. It was administered individually to 20 subjects with a view to have a complete record of observations of each individual. The observation was confined to his reactions to the test, manner of handling, recording, etc.

A careful analysis of the testees' reactions and responses, the scores obtained, and the author's personal experience helped in preparing the first preliminary form consisting of seven categories and 93 items.

Preliminary and Subsequent Try-Outs

The preliminary form had 93 items of which the number of items for spatial relations, similarities, reasoning (non-verbal), reasoning (verbal), the best way and numerical ability were 20, 10, 17, 19, 9 and 19 respectively.

This form was administered to 60 students of both the sexes. It was administered to about 20 students at a time.
The scores of this administration were used to analyse the items regarding their difficulty, discrimination, internal consistency as shown by point biserial correlation, and sex-bias (See Appendix B).

On the basis of this item analysis, the second preliminary form containing 112 items was prepared. It was again administered to 60 students of both the sexes, and the item analysis was done to ascertain the difficulty, discrimination, internal consistency, and sex-bias. The cluster analysis was carried out to trace the existence of factors, if any.

After rejecting the unsatisfactory items and the addition of a few items, the final form consisting of 100 items was prepared.

**Scoring.**

Weighted and unweighted scoring systems are in use. The present author adopted a simple unweighted system of scoring. The scoring key is given in Appendix (D).

The scoring of this test consists of just counting the number of correct responses. The possible
range of score is from a minimum of 0 to a maximum of 100. Higher scores indicate more problem-solving ability.

PLAN OF THE TEST

The final form contains 100 items. The items are sub-divided into 7 sub-tests of (i) Spatial Relations, (ii) Similarities, (iii) Reasoning (non-verbal), (iv) The Best Way, (v) Indispensable Part, (vi) Reasoning (verbal), and (vii) Numerical Ability. The sub-tests are arranged in the order mentioned above. Items in each sub-test are arranged in ascending order of difficulty. The difficulty value of each item was obtained by the item analysis. The test is printed in the form of a sixteen page folder of crown size. The first page contained space for general information about the subject, general instructions and a table for entering the score for each sub-test and the total. On second to sixteenth pages, all sub-tests are printed. The test is given in Appendix C.

INSTRUCTIONS FOR ADMINISTRATION

All instructions for answering the test are given on the first page. The test can be given either to an individual or to a group. It was decided to have no time limit, at this stage, for answering each
sub-test. Sufficient time was given so that every subject could attempt all items in every sub-test. The time required to answer every sub-test in this way was noted. The total time required for giving instructions and explaining the illustrations is about 30 minutes and the actual time for answering the test is about 35 minutes. The results of the test should be treated as strictly confidential and only a right person for a right cause may have access to these results.

The detailed instructions for administration are given in Appendix E.