Chapter 3
Review of past studies

3.1.0 Introduction
3.2.0 Importance of review of past studies
3.3.0 Review of past studies

3.3.1 Singh R. N. (1971)
3.3.2 Pratap S. (1972)
3.3.3 Kabu C. L. (1980)
3.3.4 Kesker P. U. (1980)
3.3.5 Bhatt G. C. (1981)
3.3.6 Banker H. R. (1981)
3.3.7 Mishra A. (1981)
3.3.8 Patel R. P. (1981)
3.3.9 Shah P. C. (1981)
3.3.10 Desai G. S. (1995)
3.3.11 Kachchhala S. (1996)
3.3.13 Mulwani R. C. (1999)
3.3.14 Pandya A. A. (1999)
3.3.15 Joti T. A. (2000)
3.3.16 Bakrania D. M. (2002)

3.4.0 Observations.
3.5.0 Conclusion
3.1.0 Introduction:

This chapter deals with review of related past researches carried out in the field of psychological testing. Such review can provide guideline for planning and execution of the present research work. Importance of review work is discusses as follow.

3.2.0 Importance of review of past studies:

The literature in any field forms the foundation upon which all future work can be built.

According to J. G. Aggrawal, the study of literature, which is done in past, gives support and feedback to the researcher.

Review of the related literature allows the researcher to acquaint himself with current knowledge in the field or area in which he is going to conduct his research. The objectives of reviewing related literature are as follow.

1) To enable the researcher to define the limits of his field:

Review helps the researcher to delimit and define his problems. The information regarding related literature helps the researcher to up-date his work. It also helps the researcher to decide the objectives clearly and accurately.

2) To avoid unfruitful and useless problem area:

The researcher can select those areas in which positives findings are very likely to result and his endeavors would be likely to add to the universe of knowledge in a meaningful way.

3) To avoid unintentional duplication of well established findings:
It is of no use to replicate a study when the stability and validity of its result have been clearly established. Review helps to save time and energy by avoiding duplication of work and provides right direction to materialized the study.

4) Understanding of the research methodology:

Review of related literature provides right methodology to be adopted to conduct research work. It helps the researcher to trace out tools and techniques to collect data. The review of related literature provides insightful statistical analysis, which leads the researcher for accurate and valid result.

5) To know previous recommendations:

The final and important specific reason for reviewing the related literature is to know about the recommendations of previous researchers for further research, which they have listed in their studies. Such recommendations will provide “Do’s and don’t” to the researcher.

3.3.0 Review of past studies:

Now to construct the new Spatial Ability Test it is necessary to study the studies carried out in past by researches scholars. Especially study of these types of tests becomes very essentials. So investigator decided to review the following researcher’s work.
3.3.1 Singh R. N. (1971)
3.3.2 Pratap S. (1972)
3.3.3 Kabu C. L. (1980)
3.3.4 Kesker P. U. (1980)
3.3.5 Bhatt G. C. (1981)
3.3.6 Banker H. R. (1981)
3.3.7 Mishra A. (1981)
3.3.8 Patel R. P. (1981)
3.3.9 Shah P. C. (1981)
3.3.10 Desai G. S. (1995)
3.3.11 Kachchhala S. (1996)
3.3.13 Mulwani R. C. (1999)
3.3.14 Pandya A. A. (1999)
3.3.15 Joti T. A. (2000)
3.3.16 Bakrania D. M. (2002)

3.3.1

Investigator :- Singh R. N.
Title :- Construction and standardization of a Battery Test of verbal, Abstract and Numerical Reasoning.
Degree :- Ph. D. (Psychology)
Year & University :- 1971, Marathwada University
Objectives :-

The study aimed on constructing and standardizing a test battery to measure the general mental ability and certain special
abilities of the pupils of higher secondary schools and pre-
university classes. (Covering the age range of 13th to 20th) for the
purpose of educational guidance and counseling.

Sample :-

The battery was standardized on a sample of 4,500 pupils.

Tools :-

The battery which was named as A Battery of verbal
Numerical and Abstract Reasoning (VNART) or 'A test of General
Mental Ability', consist of verbal reasoning test (VRT), Numerical
Reasoning Test (NRT) and Abstract Reasoning Test (ART). Items
were developed on each subsets and were administered as a pilot
study to a sample of thirty pupils each of the class IX, X, XI and
pre-university class. For the purpose of item analysis, the battery
was administered to 370 from each of the above-mentioned
classes.

Data collection :-

A self-made test was administered on the selected
sample.

Data analysis :-

The coefficient of Split- half reliability for the VRT, NRT,
ART and VNRT corrected by the spearmen- Brown formula were
found to be 0.82, 0.92, 0.91 and 0.94 respectively. The co-
efficient of reliability by Test- Retest method was found 0.73, 0.80,
0.70 and 0.80 respectively. The co-efficient of reliability by KR
formula was 0.82 for VRT, 0.94 for NRT, 0.96 for ART. The co-
efficient of validity against the schools examination marks for VRT,
NRT, ART and VNRT were found 0.50, 0.37, 0.46 and 0.56
respectively. The VRT and VNART had a co-efficient of validity 0.70 and 0.61 respectively, against a Verbal Intelligence Test. The co-efficient of validity against Raven’s standard progressive Matrices was 0.60 for ART and 0.63 for VNART. The co-efficient of validity against Scholastic Aptitude Test was 0.74 for NRT and 0.70 for VNART. Standard scores and deviation IQs were also developed.

3.3.2

**Investigator :-** Pratap S.

**Title :-** *Construction and standardization of an Entrance Test for pupils in Engineering and Technology*.

**Degree :-** Ph. D. (Psychology)

**Year & University :-** 1972, Maharaja Sayajirao University.

**Objectives :-**

The study was aimed to construct and standardizing an entrance test for the enrolment in Engineering courses.

**Sample :-**

All the freshmen Engineering pupils of Roorkee University.

**Tools :-**

The investigator constructed eight subsets, namely,

(i) Classification,   (ii) Analogies,  (iii) Numerical,
(iv) Verbal reasoning,  (v) Pictorial reasoning,
(vi) Space relations,  (vii) Engineering,  (viii) Science

Each subset had fifty items at the initial stage.
The subsets were administered to 100 pupils of all the different branch of engineering for pre-try out. Twenty items for each subset were selected and were arranged randomly in parallel forms A and B. The revised test was administered to the pupils of Roorkee University.

The selection of items for the final form was based partly on statistical characteristics of each item. The final form was test comprised ten items in each sub-test with the time limit of forty minutes.

**Data collection :-**

A final form of test was administered to the selected sample. As per specifications responses were converted in to scores as per scheme.

**Data analysis :-**

A content and predictive validity were estimated by using first year and second year achievement based on their annual examinations. The estimated values for form A & B were 0.91, 0.78 and 0.64, 0.60 respectively. The correlation between scores earned on form A & B was 0.75.

Factorial validity was estimated by using Thurston's centriod method and factor loading for any subtest was not more than 36.16%. So that the nature of the test was of specific test.

The mean of the test scores was found and was 44.72, the median 46.32 and standard deviation 46.32. The measure of divergence of the frequency distribution showed skew ness at 0.43 and Kurtosis at 0.25. Norms were established in the form of standard scores, T-Scores and percentile norms.
Investigator :- Kabu C. L.

Title :- A Psychological Analysis of the Mathematically Gifted at the Secondary and Higher Levels of Education.

Degree :- Ph. D. (Education)

Year & University :- 1980, Jammu University

Objectives :-

The objectives of the study were.

i. To find out whether the mathematically gifted were superior in numerical ability, abstract reasoning, intelligence and creativity to the average or non-gifted group.

ii. To determine the influence of Rote memory on mathematically gifted.

iii. To find out whether the mathematically gifted exhibited better adjustment than the non-gifted.

iv. To compare the mathematically gifted with the non-gifted on different personality traits.

Sample :-

A sample of 550 pupils consisting mathematically gifted and non-gifted were selected.

Tools :-

The investigator used the following tools for data collection.

i. Cattell's culture free test of intelligence, Numerical Ability Test, Abstract Reasoning Test.
Data collection:

5 tests shown in tools, were administered on the selected sample.

The major findings:

i. The intelligence was a significantly influencing factor on mathematical gifted at the undergraduate level.

ii. The numerical ability and abstract reasoning were found significantly high in the mathematically gifted than its counterpart at the undergraduate and postgraduate level.

iii. Personality factors were not found to have any consistent pattern in the mathematically gifted children belonging to different classes.

iv. The mathematically gifted children of different classes were found to be well adjusted as compared to their counterparts.

v. The mathematically gifted in B.A. part-1 were found to be significantly higher on all the six factors of creativity.

3.3.4

Investigator: Kesker P. U.

Title: Construction and standardization of Problem Solving Ability Test for the pupils studying in Grades III to VII.

Degree: Ph. D.

Year & University: 1980, Gujarat University
**Objectives :-**

The main objective of the study was to construct and standardized a Problem Solving Ability Test.

**Sample :-**

A sample of 4,739 pupils was selected from standard III to VIII.

**Tools :-**

The investigator constructed test consist of 93 items.

**Data collection :-**

The investigator used self-made test for data collection.

**Data analysis :-**

Reliability of the test was established by Test-retest method, Split-half method, Hoyt's formula and Kuder Richardson formula and the values of those methods were 0.30, 0.97, 0.96 and 0.70 respectively. The three types of validity i.e. Congruent, Concurrent and Predictive validity were established. The correlations between school achievement and the scores of Problem test were between 0.25 to 0.95. Moreover, correlation with IQ test was 0.82.

3.3.5

**Investigator :-** Bhatt G. C.

**Title :-** Construction and standardization of Verbal Reasoning Test for the pupils studying in Grades VIII and IX of secondary schools of Saurashtra Area.

**Degree :-** Ph. D.

**Year & University :-** 1981, Saurashtra University
Objectives :-
The main objectives of the study were.
i. To construct and standardize a Verbal Reasoning Test in Gujarati.
ii. To check the significance of different between subgroups based on sex, region and grades.
iii. To establish norms for boys and girls separately.

Sample :-
The sample of 5,449 pupils was selected from ninety-six different schools situated at sixty-two different places of Saurashtra region by the stratified random sampling technique.

Tools :-
A self-made tool was used for it. Items were constructed on the lines of DAT. Two hundred items were constructed for pre-tryout. After the item analysis, 134 items were selected for the pilot test they were arranged in to two forms. The final form of the test consisted of sixty items.

Data collection :-
A prepared final test was administered on the selected sample for establishing norms.

Data analysis :-
Descriptive statistics like measures Central Tendencies, Standard deviation and Skewness were worked out. Reliability was established by Test-Retest, Split-half and Kuder Richardson formulas 20 and 21. The reliability co-efficient were 0.82, 0.93, 0.91 and 0.82 respectively. Percentile scores, Standard Scores, T-Scores and Stanine Scores were developed as norms.
The major findings:

i. The means of boys and girls of grade IX were higher than those of grade VIII.

ii. The means of boys were higher than those of girls in grades VIII and IX and in the entire sample.

iii. Urban and rural area differences were observed only in case of the grade IX only.

3.3.6

Investigator: Banker H. R.

Title: Construction and standardization of Abstract Reasoning Test for the pupils in Grades VIII and IX of the Secondary Schools of Saurashtra.

Degree: Ph. D.

Year & University: 1981, Saurashtra University

Objectives:

The main objective of the study was to construct and standardized an abstract reasoning test.

Sample:

The final test was administered on 5,277 pupils of ninety-one different school of fifty-nine different places of Saurashtra. Their stratification was done according to sex, grade, area and district sampling.

Tool for data collection:

Eight types of series were prepared and nearly 200 items were administered on 111 pupils for the pre-tryout. Selected items were administered on 370 pupils of Saurashtra. Item analysis and distracter analysis were carried out for preparation of final test.
form. Thus, Reusable printed test booklets of final form were prepared and this tool was used for data collection.

Data collection :-
A final test was administered on 5,277 pupils of ninety-one different schools of fifty-nine different places of Saurashtra.

Data analysis :-
The data was analyzed by statistics like mean, median, S.D., t-test and skew ness. Reliability of the test was established by Test-retest method, Split-half method, Rulon formula and Kuder Richardson formula. The three types of validity i.e. congruent validity, Concurrent validity and predictive validity were established. Three hypotheses were proposed relating to sex, standard and area differences.

The major findings :-
i. Area different was not found to be significantly related to abstract reasoning.

ii. Sex and standard differences were found significant. Hence, separate norms were established for boys and girls of standard VIII and IX in form of Percentile ranks, Standard scores, T-Scores, Stainines and latter grades.

3.3.7

Investigator :- Mishra A.
Title :- Construction and standardization of a Test of Creativity.
Degree :- Ph. D., (Psychology)
Year & University :- 1981, Jodhpur University
Objectives :-

The main objectives of the study were.

i. To develop a test of creativity both in verbal and non-verbal forms and standardize it on the pupils of standard VIII and IX.

ii. To validate the test with intelligence in order to see whether any relationship existed between them.

Sample :-

A randomize sample of 496 pupil of standards VIII and IX of both the sex, studying in government school of Jodhpur was taken.

The age of pupils ranged from 12.5 to 15.6 years. The average age of the pupils was 14.4 years.

Tools :-

The test was constructed on the lines of Guilford’s scheme of classification of cognitive abilities, fluency, flexibility, originality and elaboration. The verbal test of creativity was planned to include four subtests viz., unusual uses, consequences test, product improvement, and the similarity test. Non-verbal activities like picture construction, picture object synthesis and picture completion were included and were used to measure for factors like fluency, flexibility, originality and elaboration. For the try out, 100 subjects of both sexes studying in standards VIII and IX were selected in order to accomplish the objective for finding out discrimination power and internal consistency of each of the items of both the verbal and non-verbal tests.
Data collection :-

The final test was administered to the selected sample.

Data analysis :-

The extent of accuracy and appropriateness of items to the behavior domain were determined on the basis of the judgment of the experts and having conceptual clarifications of the trait components to be measured. The discrimination power and internal consistency of each item in the test were found out. Test-retest reliability, coefficients of factor scores and total creativity scores for both the verbal and non-verbal test were found to be considerable high ranging from 0.64 to 0.92, which were significant at 0.01 level. The validity coefficients between both the verbal and non-verbal tests and the rest of creative thinking development by Baqer Mehdi were found to range from 0.32 to 0.77. The factorial validity coefficients for the verbal and non-verbal test were found to be ranging from 0.30 to 0.89.

Norms in form of percentile rank and T-Scores were computed.

3.3.8

Investigator :- Patel R. P.

Title :- Construction and standardization of General ability test for standards XI and XII.

Degree :- Ph. D.

Year & University :- 1981, Sardar Patel University
Objectives :-

The main objective of the investigation was to develop a non-verbal test of general mental ability for Gujarati speaking pupils of higher secondary schools of Gujarat state.

Sample :-

The final sample was consist of 5,725 pupils studying in the higher secondary schools of Gujarat state.

Tool :-

The test was in two parts. One part was a pupil's familiarity with the world around him through his experiences in home, school and community. There were test items related to various field of Indian culture, science, social science, community affairs and arts. Part 2 presented geometric drawings designed to test the Abstract Reasoning. This part of the test provides an equal challenge to all pupils regardless of their cultural background.

Data collection :-

Prepared test was administrated on the selected sample.

Data analysis :-

The coefficient of reliability ranged between 0.71 and 0.81 by different methods. The coefficients of validity against teacher’s rating as 0.59, against examination performance use in terms of marks as 0.52, against tests of intelligence as 0.68 and 0.79. Factor loading revealed that the test was heavily loaded with ‘9’ factor. Age norms and grade norms were established and deviation IQs and percentiles for the test were computed.
Investigator :- Shah P. C.

Title :- Construction and standardization of a Verbal Reasoning Test for pupils of standard VI and VII in Saurashtra.

Degree :- Ph. D.

Year & University :- 1981, Saurashtra University

Objectives :-

The main objective of the study was to plan, construction and standardize a verbal reasoning test.

Sample :-

Total 9,382 pupils of 200 different schools of different places in Saurashtra were selected by cluster and stratified sampling techniques.

Tools :-

Eighteen types of series were prepared and nearly 220 items were constructed and were administered to 111 pupils for pre-tryout. After item analysis, selected items were administered to 370 pupils of ten different schools of Amreli, Bhavnagar and Surandranagar districts for tryout. Items analysis and distracter analysis were carried out for final selection of item for final test form.
Data collection :-

Printed test booklets the final form were printed along with separate answer sheets. A manual of instruction was also prepared. This test was administered on the sample as a final run.

Data analysis :-

The data were analyzed by applying, some important statistics like Mean, Median, S.D., ‘t’-test. Reliability of test was established by Test-retest method (0.88), Split-half method (0.89), Rulon’s formula (0.86), Kuder Richardson formula (0.92), and Flanagan formula (0.84). Three types of validity were established. They were congruent validity (0.72 and 0.52), concurrent validity (0.88 and 0.80) and predictive validity (range from 0.72 to 0.36).

The major findings :-

i. Sex, standard and area difference were found significant.

ii. Standard VII pupils excelled than standard VI pupils, boys excelled girls and urban pupils excelled rural pupils in verbal reasoning.

iii. Separate sex, standard and area norms were established in the form of PR, Standard Scores, T-Scores, Stanines and letter grades.

3.3.10

Investigator :- Desai G. S.

Title :- The Construction and Standardization of a Language Creativity Test in Gujarati for Students of Standards VIII to XII, (in Gujarati).

Degree :- Ph. D. (Education)

Year & University :- 1995, Gujarat University
Objectives :-

The objectives of the study were:

(1) To determine the behaviors for components of creativity.
(2) To construct a test for measuring language creativity in Gujarati.
(3) To standardize the test on the students of Standards VIII to XII.
(4) To establish grade norms and also gender norms if mean difference of scores of boys and girls is significant.

Sample :-

The final administration of the test for the establishment of norms was done on a sample consisting of 1500 students of Standards VIII to XII (50 boys and 50 girls from each standard) studying in schools of Ahmedabad city.

Tools :-

For the construction of the test, a number of items were prepared and they were corrected and rearranged after consulting the experts of the field. Four components of creativity, namely, fluency, flexibility, originality and elaboration were kept in mind while preparing the test items.

Instructions and scoring technique were finalized and item wise time also was fixed. The test can be given individually or in group. The answers were to be written in the test booklet. The students had to complete each subtest in a given time and begin new subtest only when earlier was completed. After completing all the subtests, they were given ten minutes more so that they could write if they had some idea in any item.
Data collection :-

Three try-outs were done on the respective samples of 30, 500 and 215 boys and girls of Standards VIII to XII from three different schools of Ahmedabad. After the second try-out, 15 answer sheets were given to four experts for evaluation with a view to test the reliability of the scoring technique. On the basis of the difficulty value and discriminative value of the items, the final form of the test was prepared.

Data analysis :-

The test contained six sub tests: Free composition; Dialogue writing; Poetic style; Story writing; Word fluency and Sentence fluency. The reliability of each subtest was determined by test-retest method (N=50, interval=2 months), which ranged from 0.67 to 0.86. The inter-scorer reliability established by getting the same answer sheets (N= 50) evaluated by two scorers was 0.85. Therefore, it was decided that the tool was reliable for measuring creativity in Gujarati of students of Std. VIII to XII. The construct validity, internal consistency, content validity and face validity of the test were checked and found to be satisfactory.

3.3.11

Investigator :- Kachchhala S.
Degree :- Ph. D. (Education)
Year & University :- 1996, Gujarat University
Objectives :-

The objectives of the study were:

(1) To construct and standardize a Vocational Preference Inventory for secondary and higher secondary school pupils of Gujarat state.

(2) To study the influence of standard, sex and their interactions on each area, separately, of Vocational preference of pupils.

Sample :-

The test was administered to 50 students of rural area for pre-pilot testing. The statements were corrected according to the results. For the pilot testing, the corrected form of the inventory was administered to 180 students [90 boys and 90 girls].

The final test was administered to a sample of 2000 pupils (1000 girls and 1000 boys) of Standards IX, X, XI (Science stream) and XI (General stream) selected from five districts of Gujarat by using Stratified Purposive Sampling technique.

Tools :-

For the construction of the inventory, seven areas related to commerce, engineering, business, artistry, science, agriculture and literature were selected. The investigator referred to Brainard’s Vocational Preference Inventory. 30 statements were prepared for each area, some of which were taken from Brainard’s Inventory. The statements were arranged in a spiral order. A five point rating scale was developed.

Data analysis :-

The mean score for each statement was computed and 20 statements with the highest and the lowest mean scores were
selected from each area. Thus the final form consisted of 140 statements. The test-retest reliability was determined (N = 95, r = 0.71). The validity of the inventory was computed against the scores of Interest Inventory by J. Dave (r = .61).

Gender wise, grade wise and stream wise (in case of higher secondary students) percentile norms were established for each area of vocational preference. The area wise scores were analysed through F-test, Duncan’s Multiple Range Test and Multiple Correlation techniques.

The Major Findings:

The major findings were:

1. The correlation between any two areas was positive but not very high (r ranged from 0.30 to 0.69).
2. Standard had significant influence on the area related to business, science and agriculture.
3. Sex had significant influence on the area related to artistry.

3.3.12

Investigator: - Parekh K. P.

Title: - Construction and Standardization of Language Creativity Measurement Test of Hindi Language for the Trainees of P.T.C. Colleges of Gujarat State.

Degree: - Ph. D. (Education)

Year & University: - 1998, Gujarat Vidyapith.
Objectives :-

The objectives of the study were:

(1) To determine the behavioral components of creativity for creativity measurement test for the Trainees of P.T.C. Colleges.

(2) To construct and standardize a test for the measurement of language creativity (written expression) in Hindi language and to prepare instructions for the administration of the test.

(3) To study some variables - such as gender, area and management- affecting language creativity.

Sample :-

The pre-piloting and piloting were done on the samples of 40 and 200 trainees, respectively, of the second year PTC.

The final test was administered on 723 second year PTC trainees selected through Stratified Random Cluster Method.

Tools :-

The primary form of the test was prepared to test four components of language creativity, namely, fluency, flexibility, originality and elaboration. It contained 40 items under 5 subtests.

The final form of the test contained 12 items under 5 subtests, i.e. word fluency, free composition, dialogue writing, story writing and poem writing. The time duration was 70 minutes. The scoring was done according to the prepared scoring key.

Data analysis :-

The Mean, Median, SD, Q of the scores of six subgroups in relation to gender, area and management were found to be in accordance with those of the entire sample. Skewness and Kurtosis
of the scores of six subgroups and of the entire group were non-significant. The reliability coefficient of the test ranged from 0.61 to 0.97. The validity of the test was established through Cronbach Alpha method, Factor Analysis and correlation with intelligence scores on Desai - Bhatt Group Intelligence Test and with the achievement scores of the trainees in Hindi. All the results proved the validity of the Language Creativity Measurement Test of Hindi Language. The Percentile norms, T - norms and Stenine norms were established separately for men and women; for rural and urban trainees; and for trainees of government and private PTC colleges because the mean differences between the scores of the subgroups according to gender, area and management were significant. The mean differences of the scores of the groups according to interaction of gender x area and gender x management were not significant, whereas the significant mean difference was found among the scores of the groups according to interaction between area and management.

3.3.13

Investigator :- Mulwani, R. C.

Title :- Construction and Standardization of a Verbal Group test of Intelligence for the Blind of Gujarat State (for the Age Group 12 and Above).

Degree :- Ph. D. (Education)

Year & University :- 1999, Gujarat University.
Objectives :-

The main objective of the study was to construct and standardize a verbal group intelligence test for the blind pupils of Standards VIII to XII and to see if there is any significant sex-difference in the average score of boys and girls.

Sample :-

The pilot testing was done on 60 students of Standard VIII and above. And for the final run, the standardization sample of 433 blind students from fifteen institutions of Gujarat State was selected by cluster method.

Tools :-

Test comprised 10 verbal subtests in Braille arranged in test battery form. The ten subtests were:

1. Odd-man out,
2. Opposite words,
3. Arrange the sentences,
4. Classification,
5. Proverbs,
6. Analogy,
7. Series,
8. Following direction,
9. Problems and
10. Arithmetic.

A number of items were coined for the subtest. The pre-piloting was done on ten blind pupils without any time limit. Using Harper’s method facility value and discrimination index were calculated for each item and the best items were selected for making ten blocks of 8 items each. A liberal time limit was fixed.

Data analysis :-

Age averages were calculated for each of the age groups. The difference of average scores of boys and girls being non-significant, the age averages were calculated for the aggregate group. A curve of mental growth was drawn from the
age averages and was smoothed. Age norms were determined using this growth curve. A scheme to convert raw scores of the test into IQs and PRs was prepared by converting the SD of scores into SD of IQs keeping in view the average norms of each age group. A ready reckoner of IQs and PRs from scores on the test was prepared.

The major Findings:

The findings were:

The reliability coefficients computed through various methods ranged from 0.91 to 0.95. The standard error of measurement ranged from 3.23 to 4.34. The face, predictive, factorial, construct, and content validity of the test were found to be satisfactory. The correlation coefficient of the test scores with the examination scores and with the teachers’ opinion scores about the intelligence of their pupils were 0.81 and 0.93 respectively. The correlation coefficient of the present test scores and the scores on Desai verbal-nonverbal group intelligence test was 0.80. Two factors viz. factor G and the Numerical factor were identified through the Factor Analysis.

3.3.14

Investigator :- Pandya, A. A.
Title :- Development and Standardization of a Group Intelligence Test for the Gujarati Speaking Pupils of the standards V to VII.
Degree :- Ph. D. (Education)
Year & University :- 1999, Bhavnagar University
Objectives :-

The objective of the study was to construct and standardize a Verbal Group Test of Intelligence for Gujarati speaking pupils of standards V, VI and VII.

Sample :-

Item analyses were conducted on the three random samples of 333, 337 and 347 urban and rural boys and girls in standards V, VI and VII during the three try-outs.

The final form was administered on 2500 pupils, among them 1209 boys and 1291 girls and 1252 urban and 1248 rural students. The final sample was selected from Gujarat state using the Stratified Random Cluster Sampling Technique. There were 808, 815 and 877 students of standards V, VI and VII respectively in the sample drawn from 23 schools of 9 representative districts of Gujarat state.

Tools :-

Three try-outs were carried out for refining and selecting different items for the final run. Parallel forms and omnibus and battery forms of the test were found identical in the try-outs. From the total of 210 items, 56 items were finally selected.

Sets of standard, age, gender, and area-wise norms as central tendency, deviation IQs, percentile ranks, and normalized standard - T scores were established.

Data collection :-

The final test (with separate answer sheet) consisting of seven types of verbal items was administered to 2500 pupils.
The major findings:

The findings were:

1. The reliability of the test was examined by
   (a) Test-Retest Method
       \((N = 224, \text{one month interval, } r = 0.78)\);
   (b) Split-half Method
       \((N = 200, r = 0.97)\); and
   (c) Inter-Item Consistency Method
       \((N=200 \text{ to } 2500, r = 0.90 \text{ to } 0.91)\).

2. The test was validated against
   (a) standardized school achievement test
       \((N = 62, r = 0.35 \text{ to } 0.62)\);
   (b) teacher’s rating of intelligence
       \((N = 171, r = 0.64)\);
   (c) Desai-Bhatt Group intelligence test (GIT)
       \((N = 46, r = 0.53)\);
   (d) Champabahen Bhatt GIT
       \((N = 48, r = 0.55 \text{ to } 0.79)\);
   (e) Shah non-verbal GIT
       \((N = 47, r = 0.75)\);
   (f) Desai verbal and non-verbal DIT
       \((N = 64, r = 0.60 \text{ to } 0.75)\); and
   (g) Jyoti Dave verbal and non-verbal GIT
       \((N = 166, r = 0.64 \text{ to } 0.74)\).
(3) The Graph theory-based Cliffs' Consistency Indice C (indicating construct validity in terms of unidimensionality) was 0.30.

(4) The Cronbach Alpha was 0.91 showing the content validity of the test.

(5) Factor Analysis was done using a computer program. Nineteen factors were extracted with Eigen values greater than 1.00 and they explained 64.30 percent variance in the scores on the test. After Rotation, factor matrix confirmed the operational definition of intelligence in the study.

(6) The investigator prepared a detailed manual of the test. In the subsequence studies, relationship between students' intelligence and their age, gender, standard and area of residence was established.

3.3.15

Investigator :- Joti T. A.
Title :- Construction and Standardization of a Group Intelligence Scale for Tribal Pupils of grades V to VII in Relation to Environment and Culture.
Degree :- Ph. D. (Education)
Year & University :- 2000, Gujarat University
Objectives :-
The prime objective of the investigation was to provide an up-to-date Standardized group Intelligence Test for tribal children studying in grades V to VII in Gujarat state.
Sample :-

The pre-pilot run, the first try-out and the second try-out were done on the samples of 12, 24 and 240 tribal pupils, respectively, of the grades V, VI, and VII.

The sample of 2000 (Boys: 1100 and girls: 900) was selected by stratified cluster random sampling method from 25 schools of all the eight tribal districts of the Eastern region of Gujarat. The standardization sample comprised 1701 subjects of ages 10 to 14 and 14+ (90 in number).

Tools :-

The test is a verbal-nonverbal, battery type group test which comprises 5 verbal and 5 nonverbal subtests. The verbal subtests were:

- (1) Synonyms,
- (2) Antonyms,
- (3) Similarity,
- (4) Analogy and
- (5a) Series and (5b) Problems.

The nonverbal subtests were:

- (1) Similarity,
- (2) Classification,
- (3) Analogy,
- (4) Series and
- (5) Absurdity.

Each subtest consisted of 10 items and the total being 100 items. The primary form of the test contained 20 item's in each subtest. For selecting items, pooled selection method put forth by Harper A. E.(Jr.) was adopted. Ten items for each subtest were selected for their high discrimination indices and were rearranged in each subtest in a new order in view of their facility values. A practice test item was placed in the beginning of each
subtest. Time limit for each subtest was determined in such a way that most of the pupils of grade V were able to finish all the ten items in each subtest. Thus it was more or less a power test and not a speed test.

**Data collection:**

The final form of the test was printed along with separate answer sheets. This test was administered on the sample as a final run.

**Data analysis:**

The t-test indicated no significant difference between age wise means of boys and girls. Therefore, age wise combined scores of both genders were utilized to furnish PRs and DIOs as norms.

**The major findings:**

The reliability of the verbal subtests, nonverbal subtests and the whole test was estimated by test-retest method, split-half method and method of rational equivalence, which ranged from 0.88 to 0.99. It connoted different attributes like temporal stability, internal consistency and inter-item consistency. The standard error of measurement ranged from 2.6 to 4.0. The co-efficient of correlation between the battery scores and the scores on Shah’s mini intelligence test were 0.57 for boys and 0.70 for girls. The content, predictive, concurrent and construct validities of the battery were satisfactory. With the help of Hotelling’s Principal Components Analysis, three factors were extracted, viz., g factor, verbal factor V and Perception of Relationship having Eigen values of 7.60, 1.33 and 1.08 respectively; variances being 58.5, 10.2 and 8.3 respectively.
Investigator : Bakrania D. M.

Title : Construction and standardization of Mathematical Reasoning Ability Test for the pupils of the Colleges of Gujarat state.

Degree : Ph. D.

Year & University : 2002, Gujarat University

Objectives :

The main objectives of the study were.

i. To construct and standardize a mathematical ability test for the pupils of college.

ii. To study the effects of such variables like area, sex, faculty and class on mathematical ability.

Sample :

Total 2,586 pupils of 15 different colleges of Gujarat state were selected by cluster and stratified sampling techniques.

Tools :

The investigator prepared the test by him self. The test was divided in seven types. For the first tryout the investigator prepared 100 items. On the basis of difficulty value and discriminative value only 50 items were selected in final run.

Data collection :

The final form of the test was printed along with separate answer sheets. This test was administered on the sample as a final run.
Data analysis :-

The data were analyzed by applying, some important statistics like Mean, Median, S.D., ‘t’-test. Reliability of test was established by Test-retest method (0.71), Split-half method (0.78), Cronbach’s formula (0.88), Kuder Richardson formula (0.85) and Rulon’s formula (0.72). And the validity of the test was estimated by Criterion related validity and the value was 0.71, the reliability of the test from factor analysis was 0.65.

The major findings :-

i  Sex, Class, Faculty and Area difference were found significant.

ii The performance of pupils of S.Y., T.Y. and F.Y. was in descending order in mathematical reasoning ability.

iii The performance of Commerce pupil was lowest while Science pupil was at the top.

iv. The mathematical reasoning ability was in favor of male pupils.

3.3.17

Investigator :- Patel V. K.

Title :- Construction and standardization of Mathematical Ability test for Primary School children of Standard: 5th to 7th.

Degree :- Ph. D.

Year & University :- 2004,

Hemchandracharya North Gujarat University
Objectives :-

The main objectives of the study were.

i. To construct and standardize a mathematical ability test for primary school children.

ii. To study the effects of area, sex, standard, school type on mathematical ability.

iii. To establish norms for primary school children.

Sample :-

The test was standardized on a sample of 3,600 pupils of primary school. Stratified random sampling technique was used.

Tools :-

The investigator used the self made test for data collection. In initial stage, the test had 7 subtests consisting 170 items. But after pre-piloting, investigator selected 140 items for second tryout. After item analysis 100 items were selected for final run.

Data collection :-

The final form of the test was printed along with answer sheets. This test was administered on the sample as a final run.

Data analysis :-

The coefficients of Reliability were as follow.

i. By Test-retest method : 0.81

ii. By Split-half method : 0.8055

iii. By Spearman-Brown formula : 0.8923

iv. By Rulon’s formula : 0.96

v. By Flagon’s formula : 0.96

vi. By KR$_{20}$ formula : 0.9693
The values of validity lies in between 0.37 to 0.73. Norms were established in the form of PR, T-Scores and Stanine form.

The major findings:

i. There were significance difference shown in the variables of Sex, School types.

ii. Boys had more mathematical ability than girls.

iii. The children studying in private school were significantly ahead of government school children.

iii. There was no significant difference of area in mathematical ability.

3.4.0 Observation:

From study of above different studies the investigator came to know the certain matters which are as follows.

i. Sex, Standard(Grade), Area are the variables, which almost all the investigator used.

ii. From above mentioned references one can observe that all the investigator got the significant difference in variable sex and standard(Grade).

iii. Just 2 out of 17 investigator couldn't get significant difference in area variable.

iv. Two investigators deals with the variable Stream, and both got the significant difference at 0.01 level.

v. 12 out of 17 investigator used the Test- Retest and Split half method for reliability.
vi. The range of reliability values lies in between 0.30 to 0.97.

vii. 7 investigator used the KR formulas for finding reliability. The values of that is very high it is around 0.90.

Investigator studied the foresaid tests, some other tests and it's study. With the help of these studies the investigator came to know the important components of the test, different methods of finding reliability and validity, size of sample to be selected etc.

After the study of related literature, he used to gained knowledge of this study in the following points.

- In deciding the types of items.
- For fixing the size of sample.
- Process of construction of test.
- Administration of test.
- Method of finding conclusions.

3.5.0 Conclusion:

After surveying various researcher studies and comprehensive discussion of related researches, the investigator was enlightened for the future planning of his own study. He was benefited to fix up subtests, selection of content of universe, variety of items and process of standardization.
Endnotes


