# CHAPTER - 3

## REVIEW OF PAST STUDIES

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CHAPTER: 3

Review of Related Literature

3.0.0 Introduction:

Any researcher has to be aware about the kind of researches/studies undertaken in his/her related field. And therefore it is the first condition for any researchers to study earlier related literature. In the first chapter of the present study the researcher has tried to provide the information regarding, the research problem, statement of the research problem, objectives, hypotheses, importance of the study, limitations of the study, definitions of the conceptual terms, variables of the study and planning of the upcoming chapters were given.

In the present chapter reviews of the earlier related literatures to the present study are given. Besides it is also described that how the present study is different from the earlier related researches.

3.1.0 Importance of the Review of Related Literature:

Many researchers are being undertaken to improve the level present education scenario and to find a solution to the problems of the present education field. But it is important to find right kind of guidance and direction to accomplish any research successfully. Such guidance and direction can be received with the help of review of related literature and in this way can provide an proper direction to his own research.

According to J. G. Aggrawal (1966)

*The study of literature which is done in past, gives supports and feedback to the researcher.*

Review of the related literature which gives the researcher information regarding various researches undertaken in any field, which actually opens the doors of knowledge to achieve some goal,

Water R. Brong (1996) says describing the importance of such review of the related literature:

“*The literature in any field forms the foundation up on which all future work will be built.*”

C. V. Good (1963) , explains the relevant importance of research review as follows.
The keys to the vast storehouse of published literature may open doors to sources of significant problems and explanatory hypothesis and provide helpful orientation for definition of the problem background for selection of procedure and comparative data for interpretation of results. In order to be truly creative and original. One must read extensively and critically as a stimulus to thinking.

To review the related literature the researcher uses the earlier researches, dissertations, research papers, journals etc. by reviewing such literature one can also know the kind of difficulties that were faced by the earlier researchers. The review the related literature provides a logical insight to the researcher which is very necessary for any research.

The following reasons can be given for describing its importance and utility:

- The researcher gets a deep knowledge of the related field by the review the related literature.
- The researcher gets guidance for the research methods and deciding the proper research tools. Apart from this one also gets support for the analysis of data as well.
- By the review of the earlier related literatures a design for the future researches can be developed.
- Information regarding which methods and techniques will be useful for the research will also be received.
- From the results which are already available a comparative and useful facts can be found.
- The researcher becomes clear about the concepts of his/her research. The clarity of the concepts become good and useful and the researcher's knowledge increases.

Thus, the researcher selected 16 related researches of Ph.D. level and studied them whose summary is given in 3.2.0.

3.2.0 Review of Past Studies:

To construct the new Reasoning Ability Test, it is necessary to study the past studies carried out by research scholars in past especially studies related present problem becomes very essential. For present study, the investigator also reviewed the I. Q. tests because it contains items related to Mathematical Reasoning. So, investigator
decided to review the following past studies in a viewpoint with a geographical chorology along with time period.

The earlier researches can be useful in giving guidance to the researchers. The researcher studied the earlier related literatures as per his knowledge. The summary of the earlier related literatures is as given below:

3.2.1 Review – 1

Researcher: Muhammad Seed Khan

University: University of Agriculture

Degree: Ph. D.

Year: 2004

Title: construction and standardization of Intelligence Test for Secondary Level

Objectives: To develop and standardize an Intelligence Test to measure the general intelligence of the students having the age range 14 to 16 years.

Test Construction:

In order to develop items first of all, the available material related to verbal as well as non-verbal intelligence testing were reviewed and secondly, a group of psychologists who had some experience in the construction were consulted and their guidance was sought. The test material was selected in such a manner as to measure the various aspects of general intelligence ‘g’ like Abstract reasoning, Spatial relation, Conceptual ability, Accuracy of discrimination and Education of relation etc.

The items were developed according to specification of the general content. The ideas for the test items were also borrowed from different famous and standardized intelligence test. Initially a pool of 100 items falling into four categories was developed. Each category included 25 items. The basic reason for including four categories of items was to make the test as valid as possible and to provide opportunity to measure different aspects of one’s intellectual functioning. After per testing investigator calculate internal consistency, difficulty levels and discrimination index in respect to each item. Keeping in view the three indices 40 items were eliminated. The remaining 60 items were rearranged according to their level of difficulties. The final test consisted of 60 items having four subtests, 16 items each in
three subtests and 12 items in the fourth subtest were retained. The four subtests were:

1. Analogies
2. Series (Numbers and Alphabetical)
3. Classification
4. Word Building

All the subtests of the test were highly loaded on general ability factor “g” and fluid ability “gf”.

Sample:
The first pool of 100 items was tried out on a sample of 300 students of standard 9th and 10th in the age range of 14+ to 16+ years. The final test consisting of 60 items was administered on a sample of 10,000 students, 2500 boys and 2500 girl from urban areas. Similarly 2500 boys and 2500 girls from rural area of standard 9th and 10th ages between 14+ to 16+ years. The sample was taken from Nine districts of the province Panjab (Three from each regions) and Islamabad.

Data Analysis:
The purpose of the administration was item analysis, Internal consistency, difficulty levels and discrimination index in respect to each item were computed.

The reliability of the each subtest of the test was explored separately by using split-half and Kuder Richardson methods.

The validity of the test was determined by finding and examining intercorrelations of different subtests of the test.

The factorial validity of the test was estimated with the help of statistical method called factor Analysis. The content validity of the test was also determined by taking expert’s judgments. The data was analyzed to find out mean scores, standard deviations and inter correlations of the four subtest and their correlation’s with the total test.

Gender, Urban and rural differences were also investigated.

reliability, and KR_{20} ratio for all subtests are shown in following table.
The result suggested highly reliability of the test both in terms of internal consistency and stability of the results.

From the Factor analysis the intercorrelation of different subtests having values ranging from 0.69 to 0.97. It's shows that the validity was good for this test.

The mean percentage of correct answers indicated that subtest 1 was the most difficult one where as, subtest : 4 was the easiest one.

The result of inter-correlation sows that all the subtest and the entire test as a whole measure a general factor.

Performance of boys were found significant than its counter part i.e. Boys performed better than girls.

Performance of rural areas student were found significant than its counter part i.e. Urban students performed better than rural students.

3.2.2 Review – 2

Researcher: Annapurna Prusty

University: Utkal University, Bhubaneswar, Orissa,

Degree: Ph.D.

Year: 2006

Title: Effectiveness of Inductive Thinking Model of Teaching on Learners’ Achievement in Social Studies
Objectives:

1. To assess the effectiveness of Inductive Thinking Model of Teaching (ITMT) on learners' achievement in three subject areas of Social Studies. The subobjectives under this major objective were:
   a. To assess the effectiveness of Inductive Thinking Model of Teaching (ITMT) on learners' achievement in Geography.
   b. To assess the effectiveness of Inductive Thinking Model of Teaching (ITMT) on learners' achievement in History.
   c. To assess the effectiveness of Inductive Thinking Model of Teaching (ITMT) on learners' achievement in Civics.

2. To compare the impact of Inductive Thinking Model of Teaching (ITMT) and Traditional Method of Teaching on Learners' achievement in Social Studies. This objective was constituted of the following three sub-objectives:
   a. To compare the impact of Inductive Thinking Model of Teaching (ITMT) and Traditional Method of Teaching on learners' achievement in Geography.
   b. To compare the impact of Inductive Thinking Model of Teaching (ITMT) and Traditional Method of Teaching on learners' achievement in History.
   c. To compare the impact of Inductive Thinking Model of Teaching (ITMT) and Traditional Method of Teaching on learners' achievement in Civics.

3. To compare the impact of Inductive Thinking Model of Teaching (ITMT) and Traditional Method of Teaching on learners' inductive reasoning ability.

4. To compare the impact of Inductive Thinking Model of Teaching (ITMT) and Traditional Method of Teaching on learners' creative thinking ability.

5. To compare the impact of Inductive Thinking Model of Teaching (ITMT) and Traditional Method of Teaching on learners' concept attainment ability.
Tools:

The characteristics of all the tools constructed by the investigator, namely, 3 comprehensive tests, 18 learning assessment tests, on Geography, History and Civics, the Inductive Reasoning Test (IRT) and Concept Attainment Test (CAT) in parallel forms have been well established. The Verbal Test of Creative Thinking (Mehdi, 1985) has been well selected for measuring Creative Ability.

Sample:

190 8th Std. students of the 4 selected schools out of 9 Oriya medium high schools of Sambalpur Municipal area, affiliated to BSE, Orissa constituted the sample for the pilot study. All the 35 students of Std. VIII of Budharaja High School constituted the Experimental Group for the final study, whereas, all the 34 students of Std. VIII of Zilla School constituted the control Group for the final study.

Research Method:

Quasi Experimental – pre-test post-test experimental control group design has been well employed for the study.

Data Analysis:

Compatible statistical techniques have been employed for data analysis, namely, Mean, SD, Skewness, Kurtosis, Percentiles and ANCOVA.

Major Findings:

1. ITMT was found to be effective on learners' achievement in three subject areas of Social Studies, namely, Geography, History and Civics.

2. Impact of ITMT was found to be better than that of traditional method of teaching on learners' achievement in Geography.

3. Impact of ITMT was found to be better than that of traditional method of teaching on learners' achievement in History.

4. Impact of ITMT was found to be better than that of traditional method of teaching on learners' achievement in Civics.

5. Impact of ITMT was found to be better than that of traditional method of teaching on learners' Inductive Reasoning Ability.
6. Impact of ITMT was found to be better than that of traditional method of teaching in enhancing learners' Concept Attainment Ability.

7. No significant difference was found in the impact of ITMT and Traditional Method of Teaching in enhancing the Learners' Creative Ability.

3.2.3 Review – 3

Researcher: Ms. Madhumita Roy

University: Nagaland University, Kohima

Degree: Ph.D

Year: 2004

Title: To Study the Effect of Creativity Appreciation Training Programme (CATP) on the Teachers Attitudes towards Creative Teaching and Learning

Objectives:

1. To study the attitudes of High and Higher Secondary school teachers towards creative teaching and learning.

2. To make a comparative study of the attitudes of male and female High and Higher Secondary school teachers from Government and Private Schools towards creative teaching and learning.

3. To construct a Creativity Appreciation Training Programme for High and Higher Secondary school teachers.

4. To study the effect of CATP on the attitudes of High and Higher Secondary school teachers with respect to sex, type of schools (Govt./Private), experience, setting (rural/urban), training and as a whole.

5. To find out the opinion of High and Higher Secondary school teachers on CATP.

Tools: Torrance Opinionnaire on Creative Teaching and Learning to measure the attitude of teachers towards creative teaching and learning, and CATP constructed by the investigator, were the tools employed for the study.

Population and Sample: The sample of 400 High and Higher Secondary School Teachers has been properly drawn from Dimapur and Kohima districts employing
suitable sampling techniques, namely, stratified random sampling and cluster sampling.

**Research Method:** Single group pre-test – post-test experimental design has been employed to study the effectiveness of the treatment. Torrance Opinionnaire was used as pre-test and posttest. Four hour training on CATP was conducted systematically by distributing printed instructional material on CATP to each teacher under session.

**Method of Data Analysis:** Percentage, mean, SD, Coefficient of correlation and t-test were the statistical techniques appropriately employed to analyze the data.

**Major Findings:** The study reveals that there has been positive and appreciable impact of Creativity Appreciation Training Programme (CATP) in enhancing the attitude of

3. Female High and Higher Secondary School Teachers towards creative teaching and learning.
5. Private High and Higher Secondary School Teachers towards creative teaching and learning.

11. High and Higher Secondary School Teachers with experience < 10 years towards creative teaching and learning.

12. There has been a significantly positive impact of CATP on the change in attitude of High and Higher Secondary school teachers towards creative teaching and learning.

13. The male teachers were found to show greater improvement in their attitudes towards creative teaching and learning through CATP than the female teachers.

14. The Govt. School teachers were found to show greater improvement in their attitudes towards creative teaching and learning through CATP than the private school teachers.

15. The untrained teachers were found to gain more through CATP than the trained teachers.

16. Teachers teaching in urban schools demonstrated a more positive change in their attitude towards creative teaching and learning than the teachers teaching in semi-urban or rural areas.

17. The more experienced teachers were found to gain more through CATP than the less experienced teachers.

18. The teachers opined that creative teaching should be incorporated in all teacher training curricula and orientation programme.

3.2.4 Review – 4

Researcher: SAM RAN TONGPAENG

University: DAVV, Indore

Degree: Ph.D.

Year: 2002

Title: Strategy of Developing Creativity of University Students of Thailand construction and standardization of Intelligence Test for Secondary Level
Objectives:

1. To develop verbal and non-verbal instructional material for developing verbal creativity.

2. To study the effectiveness of the developed instructional material in terms of creativity, its components, curiosity and reactions of the University students towards the developed instructional material.

3. To compare adjusted mean scores of fluency, flexibility, originality, creativity and curiosity, separately of the experimental and control groups by considering their Pre-test, intelligence, risk taking, self confidence, tolerance of ambiguity and independence as covariates.

4. To study the effect of treatment, sex, and their interaction on fluency, flexibility, originality, creativity and curiosity separately by considering pre-test, intelligence, risk taking, self confidence, tolerance of ambiguity and independence as covariates.

5. To study the effect of treatment, scholastic achievement, intelligence and their various interactions on fluency, flexibility, originality, creativity and curiosity, separately by considering pre-test, risk taking, self confidence, tolerance of ambiguity and independence as covariates.

Tools: Standardized tools were used for the assessment of intelligence, risk taking, tolerance of ambiguity, self confidence, independence and creativity. Appropriate tools were developed for the assessment of curiosity and reactions towards the instructional material.

Population and Sample: 240 second year under graduate students were selected randomly from the Faculty of Nursing, Naresuan University, Pitsanulok Province, Thailand.

Research Method: Quasi Experimental – pre-test post-test experimental control group design has been well employed for the study.

Method of Data Analysis: Correlated t and ANCOVA were used for data analysis.

Major Findings:

1. The developed instructional material (DIM) was found to enhance, fluency, flexibility, originality and creativity amongst students.
2. The DIM was found to be effective in enhancing curiosity amongst students.
3. Students were found to have favorable reaction towards DIM.
4. The treatment of DIM was found to enhance fluency significantly more in comparison to conventional method.
5. Males and females were found to possess fluency to the same degree.
6. Originality was found to be independent of interaction between treatment and sex.
7. Creativity was found to be independent of interaction between treatment and sex.

3.2.5 Review – 5

*Researcher*: Vaghela Sumitraben U.
*University*: Gujarat Vidyapith
*Degree*: Ph.D.
*Year*: 2006
*Title*: To Study the Logical Aptitude of the Teacher Trainees of the PTC Colleges.

**Objectives**: 
1. To know the logical aptitude of the teacher trainees of PTC Colleges.
2. To study the logical aptitude of the teacher trainees of PTC Colleges in the context of the gender, area, and teaching type.
3. To study the logical aptitude of the teacher trainees of PTC Colleges in the context of their stream of education.

**Population and Sample**: 
The teacher trainees of the PTC colleges studying in the Ahmedabad District were included as the population of the present research.

While from the Teacher trainees of the PTC colleges studying in the Ahmedabad District, the teacher trainees studying in the first year of the 10 PTC colleges of urban and rural area were selected in the clusters by using stratified random sampling method as the sample of the present study.
Research Method:
In the present research the investigator has used Survey method of research as the research method.

Method of Data Analysis:
In the present research from the frequency distribution of the achieved scores of each group, the average, standard deviation, Kakudata and Virupata were calculated. And the average difference in the achieved scores and ‘t’ Scores were also found.

Major Findings:
1. The Logical Reasoning aptitude of the Teacher trainees of the PTC colleges was found to be of lower level.
2. The average achieved scores of the boys and girls of the PTC colleges in the Logical Aptitude Test is was subsequently 34.13 and 35.67. While the standard deviation was subsequently of 9.9 and 11.2. The Logical Reasoning aptitude of boys and girls Teacher trainees of the PTC colleges was found to be similar.

3.2.6 Review – 6

Researcher: Satish P. Pathak
University: CASE, MSU
Degree: Ph. D.
Year: 2002
Title: Preparation of A Creativity Program for Pre-Service Teacher Trainees at Primary Level and A Study of Its Effectiveness

Objectives:
1. To construct and standardize a creativity test for pre-service teacher trainees at primary level
2. To identify the creativity level of pre-service teacher trainees at primary level
3. To prepare a creativity program for pre-service teacher trainees at primary level
4. To study the effectiveness of creativity program with respect to
   a. Creativity Components

72
b. Caste Category; and
c. Academic Stream

**Tools:** A test of creativity to identify the creativity level of pre-service teacher trainees and a creativity program for them was developed by the investigator. The test of creativity was in both the forms verbal and non-verbal. The verbal form included three types, namely, imaginative events, novel uses of the things and similarity. The non-verbal form of the test included three types of activities, namely, picture construction, picture completion and circles and rectangles. The factorial validity of the test was established. The coefficient of correlations of the four components with total score on creativity ranged from 0.4683 to 0.6590. (Significant at 0.01 levels) Concurrent validity of the creativity test as against Mehdi’s (1973) test of creative thinking was found to be 0.5955 (significant at 0.01 level) The reliability of the test as calculated by the split-half method was found to be 0.5915 (significant at 0.01 levels)

**Development of Creativity Program:** The creativity program developed by the investigator comprised of 52 activities. It was validated with the help of experts.

**Population and Sample:** An initial sample of 10 pre-service teacher trainees who were studying in the first year during 97-98 in DIET – Kathlal (Dist. Kheda) was drawn for pilot administration of the tool to identify the creativity level. For final administration of the tool, the whole class of the first year primary school teacher education (1998-99) of DIET, Vadodara (40 trainees) were selected as the sample. For studying the effectiveness of the creativity program the total number of trainees studying in the first year primary school teacher education during 1999-2000 of DIETS – Rajpipla (Dist. Narmada) and Santrampur (Dist. Panchmahal) were selected as the sample for the phase 2 of the study. 46 trainees of Rajpipla were treated as experimental group, whereas 43 trainees of Santrampur were treated as control group.

**Research Method:** Pre-test, post-test, experimental and control group design has been employed for the study.

**Method of Data Analysis:** ANCOVA and two way ANOVA were the statistical techniques employed for data analysis.

**Major Findings:**

1. The mean effect of the treatment in terms of a creativity program on the primary school student teachers was found significant for the creativity and its
components namely fluency, flexibility, originality and elaboration, respectively.

2. There was no significant difference in the mean creativity scores of the teacher trainees of different caste categories in case of the experimental group.

3. There was no significant difference in the mean creativity scores of the teacher trainees of different academic stream in case of the experimental group.

4. No interaction effect of caste category and academic stream was found on the mean creativity score of the primary school student teachers of the experimental group.

3.2.7 Review – 7

Researcher: Patel Chimanbhai K.

Year: 1991

University: Gujarat Vidyapith

Degree: M. Phil.

Title: “Construction and Standardization of the Logical Aptitude Test for the Students of Standard 5 to 7 studying in Primary Schools of Gujarat State.”

Objectives:

1. To construct a Logical Aptitude Test for the Students of Standard 5 to 7.
2. To decide the reliability of the test.
3. To decide the validity of the test.

Construction of the Test:

The test was divided into four parts, 1) Puzzle Solving 2) Similar Relationship 3) Mathematical Relationship 4) In the Aeronautical Relation subsequently 11, 22, 11 and 10 details were arranged. The test was a multiple choice questions type in which answers were to be given after reasoning.

Population and Sample of the Research:

By taking the students studying in Standard 5 to 7 in the western part of Ahmedabad city as the population of the study and from them the private schools were selected randomly as the sample of the study. In these schools form the students studying in
the Stands 5 to 7 639 boys and 497 girls thus total 1136 students were selected as the sample by using cluster sampling method.

**Research Method:**

In the present research the investigator has used Survey method of research as the research method.

**Method of Data Analysis:**

In the present research the Standard Deviation Average were calculated as per the gender, age and standard. And to assess the average difference in the achieved scores ‘t’ Scores were also found. To assess the reliability the correlation calculation was done.

**Major Findings:**

1. There was no significant difference in the average of the boys and girls of Standard 5 to 7.
2. There was no significant difference in the Age Norms in the students of Standard 5, 6 and 7.
3. The reliability score on the sample of 139 students was found to be of 0.98 with the help of Half – Split Method.
4. The reliability score found with the help of Kuder Richardson Formula 21 on 639 boys, 497 girls and total 1136 students was subsequently of 0.83, 0.84 and 0.83.

3.2.8 Review – 8

**Researcher:** Kishorkumar K. Leuva

**University:** South Gujarat University, Surat

**Degree:** Ph. D.

**Year:** 2002

**Title:** An Effectiveness of Competency Based Inductive Thinking Model in Science to Develop Reasoning Ability of Primary School Students

**Objectives:**

1. To study the effectiveness of competency based Inductive Thinking Model in Science to develop the Reasoning Ability of Primary School Students.
2. To compare the Reasoning Ability of the children of High, Average and Low SES.

**Population and Sample:** The equivalence of the experimental group and control group was established on the basis of achievement in Science for Standard VI, IQ, SES and Reasoning Ability.

**Tools:** IQ test, SES test and Reasoning Ability tests have been employed for the study. All the criterion tests were constructed by the investigator.

**Research Method:** The mean achievement of the experimental group has been found significantly higher than the mean achievement of the control group. It establishes the effectiveness of Inductive Thinking Model in developing reasoning ability.

**Method of Data Analysis:** t-test was used for data analysis.

**Major Findings:**

1. The mean achievement of the experimental group has been found significantly higher than the mean achievement of the control group. It establishes the effectiveness of Inductive Thinking Model in developing reasoning ability.

2. The Inductive Thinking Model has been found to develop the Reasoning Ability of the pupils of all the SES- high, average and low.

3. The retention through the Inductive Thinking Model has been found greater than through the traditional method.

4. The pupils have been found to like learning through the Inductive Thinking Model.

3.2.9 Review – 9

**Researcher:** Patel Dashrathbhai S. 16

**Year:** 2001

**University:** Saurasthra University

**Degree:** Ph.D.

**Title:** “Construction and Standardization of the Verbal Reasoning Ability Test for the Students of Higher Secondary Schools of Gujarat State.”
Objectives:
1. To construct a Verbal Reasoning Ability Test in Gujarati language for the Students of Higher Secondary Schools of Gujarat State and to standardize it.

Population and Sample:
The students studying in Higher Secondary Schools of Gujarat State were the population of the study.

From the whole Gujarat State 35 schools were selected from which one class of Standard 11 and 12 was selected. In these schools form the students studying in the Stands 11 and 12 1691 boys and 1833 girls thus total 3524 students were selected as the sample.

Research Method:
In the present research the investigator has used Survey method of research as the research method.

Data Analysis:
In the present research the Standard Deviation Average were calculated as per the gender, age and standard. And to assess the average difference in the achieved scores ‘t’ Scores were also found. To assess the reliability the correlation calculation was done. Test – Re test method was used for deciding the reliability of the test.

Findings:
1. In terms of the Verbal Reasoning Ability the group of Standard 11 was found to be superior to the group of Standard 12.
2. In terms of the Verbal Reasoning Ability the group of Science students was found to be superior to the group of Arts or Commerce students.
3. There is no effect of gender or area found on the verbal reasoning ability of the students of the sample.
4. There was no significant difference in the average achieved scores of the urban and rural area students in the Verbal Reasoning Ability Test.
3.2.10 Review – 10

Researcher : Solanki, M. R.
University: Sardar Patel University
Degree : Ph. D.
Year : 1999

Title: An investigation into the relationship of Reasoning Abilities with achievement of concepts in Mathematics of the student of secondary schools.

Objectives:

1. To construct and standardise the Reasoning Ability Test.
2. To study the relation of Reasoning ability of the students with the achievement of concepts in Mathematics.
3. To study the relation of Reasoning ability of the students with the achievement of concepts in Mathematics in relation to their residing area.
4. To study the relation of Reasoning ability of the students with the achievement of concepts in Mathematics in relation to their sex.
5. To study the relation of Reasoning ability of the students with the achievement of concepts in Mathematics in relation to their I. Q.
6. To study the relation of Reasoning ability of the students with the achievement of concepts in Mathematics in relation to their caste.

To fulfill the above objectives fifteen hypotheses were generated and were tested.

Tools:

The investigator used the following tools for the present study.

- **Reasoning Ability Test**: The investigator could not find the reasoning ability test of Mathematics in Gujarat. Hence the investigator developed the Reasoning ability test to measure the reasoning ability among the high school students.

- **Group Test of Intelligence**: The investigator used the group test of intelligent developed and standardized by K. G. Desai and C. L. Bhatt, Guj.
Uni, Ahmedabad to measure the I. Q. of the high school students, which was available in Gujarati Language.

**Sample:**

The investigator used the following tools for the present study. Out of 2000 students 1000 students were from urban area and 1000 students were from rural area. Out of 2000 students, 1000 students were boys and 1000 students were girls. Thus the investigator gave equal weightage to the students of both areas and both the sex. The sample was selected randomly from the high schools of all the districts of Gujarat State.

**Data Analysis:**

- The investigator prepared a factorial design to study the effect of independent variables like area, Sex, intelligence and caste on the reasoning ability of the students of concepts in mathematics.

- ANOVA was used for the analysis of the data. Investigator also used ‘F’ test for hypothesis of the study.

**Major Findings:**

The sex difference, Area difference and level of I. Q. were found to be significant on the relationship of Reasoning ability of the students with achievement of concepts in Mathematics but the cast difference found to be not significant.

3.2.11 Review – 11

**Researcher:** Gajjar, J. H.

**University:** Gujarat University

**Degree:** Ph. D.

**Year:** 2008

**Title:** Construction and standardisation of Mathematical Reasoning Ability test for the student of Higher Secondary School of Gujarat.

**Objectives:**

1. To Construct and standardise a Mathematical Reasoning Ability Test for the students of Higher Secondary Schools of Gujarat State.
2. To study whether there exists any Area – difference with reference to the Mathematical Reasoning Ability (MRA).

3. To study where there exist any sex-difference with reference to the mathematical Reasoning Ability (MRA).

4. To study where there exist any standard with reference to the mathematical Reasoning Ability (MRA).

5. To study where there exist any stream with reference to the mathematical Reasoning Ability (MRA).

**Test Construction:**

Following two criteria were kept to plan the test

1. The test should contain the items which can evaluated the MRA.

2. The test should not be very short because validity of the test is to be found out by spil-half method

Two hundred items were constructed for pilot study. After the item analysis 100 items were selected for the policy test and the final form of the test consisted of 50 items having five as follows.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Sub Test</th>
<th>Nos. of item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General question</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Number Figures</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>Analogy</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Number Series</td>
<td>06</td>
</tr>
<tr>
<td>5</td>
<td>Miscellaneous</td>
<td>06</td>
</tr>
</tbody>
</table>

**Sample**

A sample of 2106 students (997 boys and 1109 Girls) were selected from six main zones of Gujarat State by stratified randomized cluster sampling Technique for the final run of the test.

**Data Analysis:**

1. The purpose of the administration was item analysis difficulty levels and discrimination index in respect to each item were computed.
2. The reliability of the test was estimated by using Split-half, Test-Retest, Cronbach-$\alpha$, Kuder-Richardson's methods and Rulon's formula.

3. Factorial validity of the test was found out with the help of factor analysis and criterion related validity was also worked out.

4. Significant difference on MRA of different variables like area, sex, faculties, classes were also worked out by using t-test.

**Major Finding**

The major finding of this study are as follows:

1. There was a significant difference between the total score of students of Educationally Backward and Educationally Forward Areas on MRA.

2. There was not significant difference between the total scores of Boys and Girls. So, there was not exists any Sex-difference with reference to the MRA.

3. There was a significant difference between the total score of students of standard 11th and 12th.

4. It was clear from one-way ANOVA that Stream has significant effect on MRA.

5. A Ready Reckoner of PR's from scores on the test was prepared for each cells.

6. The Reliability of the test was determine by

   - Test-Retest 0.710
   - Split-half 0.9999
   - Cronbach's $\alpha$ 0.95
   - Kuder-Richardson formula 0.92
   - Rulon’s formula 0.93
   - KR$_{20}$ formula 0.93
   - Factor Analysis 0.71

   The range of reliability Co-effecient was 0.71 to 0.9999

Different types of validity of the test were checked. They were:

- Criterion – Related Validity
- Construct Validity
- Content Validity
Factorial Validity by using the principal component analysis, the factorial structure showed “General Factor”

3.2.12 Review – 12

Researcher: Desai Kaushal A.

University: Gujarat University

Year: 2006

Degree: Ph.D.

Title: “Construction and Standardization of the Logical Aptitude Test for B.Ed. Teacher Trainees.”

Objectives of the Research:

1. To construct a Logical Aptitude Test for B.Ed. Teacher Trainees.
2. To decide the validity of the Logical Aptitude Test.
3. To decide the reliability of the Logical Aptitude Test.
4. To establish the Norms for the Logical Aptitude Test.
5. To assess the difference between the boys and the girls in the Logical Aptitude Test.
6. To assess the difference between the rural area and the urban area teacher trainees of B.Ed. Course in the Logical Aptitude Test.

Population and sample:

For the present research as the population of the present research the teacher trainees of the Gujarati Medium B.Ed. colleges in the academic year 2005–2006 in the Gujarat State were selected.

Research Method:

For the present research the investigator used Survey Method for the Data collection.

Construction of the Test:

The test was divided into 13 parts for the construction of the test. In which there are total 117 items are there. The items from item number 1 to 13 are for the practice purpose. And in the total 104 items from item number 14 to 114 13 parts were there, in which 8 parts were related to verbal reasoning and 5 parts were related to non-verbal reasoning. After the logical consideration a multiple choice type test was
prepared. The reliability score of the test was kept between 0.84 to 0.97 and for the validation of the test the methods of Content Validity, Factor Validity, Face Validity Predictive validity were used.

Method of Data Analysis:

In the present research on the basis of the frequency distribution of the calculations of average, standard deviation were done. To decide the reliability of the average difference the calculations of t value were done. After that of find out the reliability the test - retest method was used and the formula of R20 was used.

Major Findings:

1. The validity with the scores of primary test was found to be of 0.28. The validity with the test Desai Verbal and Non- Verbal Group Test was found to be of 0.76 and with the rating of the lecturers it was found to be of 0.37.
2. In the factorial analysis of the test the value of the first factor was found to be of 93.66.1. This factor is Logical Aptitude Test. So we can say this test is a valid test.
3. The students of urban area were found to be superior than the students of rural area in the context of the logical reasoning.

3.2.13 Review – 13

Researcher: Patel Haribhai M.

Year: 2004

University: Gujarat University

Degree: Ph.D.

Title: “Construction and Standardization of a Logical Aptitude test bases on the item response principle for the teacher trainees of PTC colleges.”

Objectives of the Research:

1. To construct a Logical Aptitude Test for the teacher trainees of PTC colleges.
2. To calculate the characteristic scores based on item response principle and Person Characteristic scores.
3. To Study the characteristic based on item response principle.
4. To decide the validity and reliability of the Logical Aptitude test based on the
   item response principle.

**Population and Sample:**

The teacher trainees of first and second year of the PTC colleges studying in the
   academic year 2002-03 in the Ahmedabad and Gandhinagar Districts were included
   as the population of the present research.

600 teacher trainees of the first and second year studying in the selected PTC
colleges were the sample of the present study.

**Research Method:**

In the present research the investigator has used Survey method of research as the
research method.

**Method of Data Analysis:**

In the Logical Aptitude test 5 sub tests were included. In each sub test there are 20
   items included. By rating the each sub test by RESCAL, the scoring of the entire test
was done. For this the RESCAL programme was run separately for each sub test. By
   running the RESCAL programme the number of correct responses and the responses
were to be filed. As a result of which ate the end of the computer processing as the
output the finding value its Standard Error, df and the individual characteristic, its
   Standard Error were found.

**3.2.14 Review – 14**

**Researcher:** Bakrania, D. M.

**University:** Gujarat University

**Degree:** Ph. D.

**Year:** 2002

**Title:** Construction and standardisation of Mathematical Reasoning Ability test for the
   pupils of the colleges of Gujarat State.

**Objectives:**

1. To construct and standardise of Mathematical Reasoning Ability Test for the
   college students of Gujarat State.

2. Whether there exists any sex-difference with reference to this test?
3. Whether there exists any sex-difference with reference to this test?

4. Whether there exists any faculty-difference in which pupils are studying with reference to this test?

5. Whether there exists any classes (students studying in different years difference in which pupils are studying with reference to this test?)

**Test Construction:**

Following two criteria’s were kept to plan the test:

1. The test should contain the items which can evaluate the MRA.

2. The test should not be very short because validity of the test is to be found out by split-half method.

3. Two hundred items were constructed for pilot study. After the item analysis 100 items were selected for the pilot test and the final form of the test consisted of 50 items having seventh subtest as follows:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Sub Test</th>
<th>No. items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number Series</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Questions of number</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>General Questions</td>
<td>07</td>
</tr>
<tr>
<td>4</td>
<td>Signs</td>
<td>02</td>
</tr>
<tr>
<td>5</td>
<td>In a form of matrices</td>
<td>01</td>
</tr>
<tr>
<td>6</td>
<td>Analogy</td>
<td>01</td>
</tr>
<tr>
<td>7</td>
<td>Number in figures</td>
<td>06</td>
</tr>
</tbody>
</table>

**Sample:**

A sample of 2586 students were selected from five main zones of Gujarat State by stratified Randomized cluster sampling Technique for the final run of the test.

**Data Analysis:**

1. The purpose of the administration was item analysis difficulty levels and discrimination index in respect to each item were computed.

2. The reliability of the test was estimated by using Split-half, Test-Retest, Cronbach-a, Kuder-Richardson’s methods and Rulon’s formula.
3. Factorial validity of the test was found out with the help of factor analysis and criterion related validity was also worked out.

4. Significant difference on MRA of different variables like area, sex, faculties, classes were also worked out by using t-test.

Major Findings:

1. There exists a significant difference between Area (Educated/Educationally backward area) with reference to MRA

2. There exists a significant difference between the Sex. (Male/Female) with reference to MRA

3. There exists a significant difference between Faculties (Science/Commerce/Arts) with reference to MRA

4. There exists a significant difference between Classes (F.Y./S.Y./T.Y.) with reference to MRA.

5. The value of reliability Coefficients ranges from 0.071 to 0.088. This shows the present test was reliable one.

6. From the factor analysis the inter correlation of different subtest having values ranges from 0.109 to 0.570. It’s shows that the validity was good for this test.

3.2.15 Review – 15

Researcher : Patel Harshaben R.

Year : 2001

University : Gujarat University

Degree : Ph.D.

Title : “Construction and Standardization of the Verbal Reasoning Ability Test for the Students of Secondary Schools of Gujarat State.”

Objectives :

1. To construct a Verbal Reasoning Ability Test in Gujarati language for the Students of Secondary Schools of Gujarat State and to standardize it.

2. To assess whether there is any difference in the verbal reasoning ability of the students in the context of Standard, gender, and area or not.
Population and Sample:

The students studying in Secondary Schools of Gujarat State were the population of the study.

In the sample of the study total 5655 students were selected. From which the number of students in Standard 8, 9 and 10 were subsequently 1928, 1899 and 1829. The number of boys and girls in the sample is subsequently 3147 and 2508.

Research Method:

In the present research the investigator has used Survey method of research as the research method.

Data Analysis:

In the present research the Standard Deviation Average were calculated as per the gender, age and standard. And to decide the Norms, ‘t’ Scores were also calculated. To assess the reliability the correlation calculation was done. Correlation was found for deciding the reliability of the test.

Major Findings:

1. There was significant effect found of gender on the scores of Verbal Reasoning Ability Test.
2. There was significant effect found of area on the scores of Verbal Reasoning Ability Test.
3. There was significant effect found of standard on the scores of Verbal Reasoning Ability Test.

3.2.16 Review – 16

Researcher: Mulwani, R. C.
University: Gujarat University
Degree: Ph. D.
Year: 1999
Title: Construction and Standardisation of a Verbal Group Test of Intelligence for the Blinds of Gujarat State.
Objectives:

1. To construct an intelligence test for the blind pupils of std: 8 to 12+.
2. To prepare instructions to conduct the test.
3. To standardise the test on the blind pupils of standard 8 to 12+.
4. To see if there is any significant sex-difference in the average score of boys and girls.
5. To prepare a ready reckoner of IQs from scores and manual for the test.

Test Construction:

In order to develop items first of all, the available material related to verbal intelligence testing were reviewed and 230 items were selected for the test construction and secondly, K. G. Desai and Kanubhai Thakor, who had some experience in test construction were consulted and their guidance was sought.

After pre-pilot study investigator calculate difficulty value and discrimination index in respect to each item. Keeping in view the 10 subtests was decided for final test and each subtests have eight best items. The ten subtest are as follows:

1. Odd Man out
2. Opposite word
3. Arrange words to form sentences
4. Classification
5. Proverbs
6. Anology
7. Series
8. Following Directions
9. Problems
10. Arithmetic

The final test consisted of 80 items having 10 subtest, 8 items each in subtests.

Sample:

The total number of blind pupils knowing the Braille quite well and studying in std 8 and above were in Gujarat State 500. The researcher thought to consider this population as the sample for the test. There were some persons who were not fluent over Braille. The researcher therefore selected 433 blind pupils out of 500 from different 15 institutions of Gujarat State by cluster method.

Data Analysis:

1. The age average were calculate for the aggregate groups.
2. Significant difference of Gender and average were also worked out by t-test.

3. The reliability of the test was estimated by using Split-half, Test-Retest Cronbach-α, Kuder-Richardson’s and Rulon’s method.

4. Factorial Validity of the test was found out with the help of Factor Analysis.

**Major Findings:**

1. Age average were calculated for each of the age groups 12, 13, 14, 15, 16 and 17 and above. As no significance difference was found between the average scores of boys and girls. The average were calculated for the aggregate groups.

2. No gender difference was observed in the score obtained. So that gender norms were not estimated.

3. The difference between the average of 14 and 16 and 15 and 17 and above are not found to be significant but all other differences between the means of consecutive ages viz, 12 and 13, 12 and 14, 12 and 15, 12 and 16, 12 and 17 and above 13 and 14, 13 and 15, 13 and 16, 13 and 17 and above, 14 and 15, 14 and 17 and above were found to be significant at 0.05 level.

4. The reliability Coefficient ranges from 0.71 to 0.95. This shows the test was highly reliable.

5. Factorial validity obtained from SPSS/PC+ programme is found to be significant at 0.01 level. It shows the validity of the test is good.

**3.3.0 Observation:**

The above mentioned reserches were studied by the investigator and got the solution of the following questions which were be helpful to her.

- How to prepare a items for the tool ?
- How to get the opinion of experts ?
- What will be the statistic of samples ?
- How the statistical calculation can be performed ?
- How can data be collected and analysed ?
- How we can interpreted the statestical results ?
- How to find conclusions ?
3.3.1 Analysis of finding


By studying the related literatures we could find that the related literatures of D. Patel (2001), Gajjar (2008) were conducted on Higher secondary level students while Roy (2004) conducted his research on secondary and Higher secondary level students, and the related studies of Khan (2004), Prusty (2006), Tongpaeng (2002), Solanki (1999) Harsha Patel (2001) were on secondary school level. While the researches of Vaghela (2006), Pathak (2002), H. Patel (2004) were conducted on P.T.C, related literatures of Patel (2001), Leuva (2002) were conducted on primary school level students, the study of Bakrania (2002) was on college students, while Desai (2006)'s study was on B.Ed. teacher trainees and the related study of Mulwani (1999) was on Blind students.

By studying the related literatures we could find that in the related literatures of Solanki (1999), H. Patel (2004) Intelligence Quotient was kept as one of the variables in the research in which both the investigators found significant difference on the basis of IQ and which was in favour of students with Higher Intelligence Level. While in the related literatures of Khan (2004), Roy (2004), Leuva (2002), Solanki (1999), Desai (2006), Bakrania (2002) Area was kept as one of the variables in the research in which in the study of Solanki (1999) there was no significant difference found on the basis of area while in the studies of Khan (2004), Roy (2004), Leuva (2002), Desai (2006), Bakrania (2002) there was significant difference found on the basis of area. In the studies of Khan (2004), Leuva (2002) and Bakarania (2002), the difference was found in favour of urban area students. While in the studies of Roy (2004) and Desai (2006) the difference was found in favour of rural area students. And in the related literatures of Khan (2004), Roy (2004), Tongpaeng (2002), Vaghela (2006) Patel (2001), D Patel (2001), Solanki (1999), Gajjar (2008), Desai (2006), Bakrania (2002) Gender was
kept as one of the variables in the research in which in the studies of Tongpaeng (2002), Vaghela (2006) Patel (2001), D Patel (2001) and Desai (2006) there was no significant difference found on the basis of gender while in the studies of Khan (2004), Roy (2004), Solanki (1999), Gajjar (2008), Bakrania (2002) significant difference was found which is in the favour of boys. There are various variables taken by the investigators of these related literature but all these are not discussed here as they are not concerning the present research variables.

By studying the related literatures we could find that in the related literatures of Prasty (2006) in the subject of social science and Leuva (2002) in the subject of science the Teaching Models were prepared while in the related literatures of Roy (2004), Pathak (2002) the learning programme was developed. In the related literature of Tongpaeng (2002) the study material was developed. And in the study of Solanki (1999) just comparison between logical aptitude and achievement was done and Vaghela (2006) in his research did a Survey to test the logical aptitude of the students.

3.4.0 Similarity of the Present Study with the Related Literature:

In the reviews of the related literatures and the present study, the main similarity was that the logical reasoning test was prepared in all the related literatures and the present study. The related literatures of Prusty (2006), Roy (2004), Tongpaeng (2002), Vaghela (2006), Pathak (2002), Patel (2001), Leuva (2002) were conducted using Experimental Method of Research for their researches, in the present research also the experimental method of research was used. In all the related literatures the variables were also similar to the present study. The present study has the variables of Intelligence Quotient, Area, Gender which are similar to the related literatures.

3.4.1 Uniqueness of the Present Study:

In the studies of Roy (2004), Pathak (2002) the creativity training programme was developed while in the present study self learning material was developed.

The variables like parents’ income, parents’ education and type of institute are not taken in any of the related literature.

The related literatures are not conducted keeping in mind one specific standard while the present study was conducted keeping in mind the students of standard 8.
The present study was conducted in the Gandhinagar District while the earlier related literatures were conducted in the areas like dimapur, kohima, santrampur, ahmadabad etc;

The effectiveness of retention is not assessed in any of the earlier related literature, while in the present study, the effectiveness of retention is assessed.

In the self learning kind of material developed in the earlier related literature of Tongpaeng (2002) the study material was prepared in the form of questions and answer format, while in the present research step by step procedure till the solution of the problem is given.

3.5.0 conclusion

The investigator was enlighten for the future planning of her own study after surveying various past studies, she was benefited with the knowledge about the study.
Reference

Books


Website


Ph.D. Thesis


2. Annapurna Prusty (2006), Effectiveness of Inductive Thinking Model of Teaching on Learners Achievement in Social Studies, (Unpublished doctoral dissertation, Utkal University, Bhubaneswar, Orissa.)

3. Madhumita Roy (2004); To Study the Effect of Creativity Appreciation Training Programme (CATP) on the Teachers Attitudes towards Creative Teaching and Learning, (Unpublished doctoral dissertation, Nagaland University, Kohima)

4. SAM R. Tongpaeng (2002); Strategy of Developing Creativity of University Students of Thailand construction and standardization of Intelligence Test for Secondary Level, (Unpublished doctoral dissertation, DAVV, Indore)

5. Sumitra U. Vaghela (2006); To Study the Logical Aptitude of the Teacher Trainees of the PTC Colleges, (Unpublished doctoral dissertation,Gujarat vidyapith, Gujarat)


8.kishor k. Leuva (2002); An Effectiveness of Competency Based Inductive Thinking Model in Science to Develop Reasoning Ability of Primary School Students (Unpublished doctoral dissertation, South Gujarat University, Surat)


16. R.C. Mulwani (1999); Construction and Standardisation of a Verbal Group Test of Intelligence for the Blinds of Gujarat State (Unpublished doctoral dissertation, Gujarat University)