Chapter: 2

Review of Reference Literature

2.1 Introduction
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2.1. Introduction:

In the field of education, interest, attitude, aptitude have very important place in which aptitude measurement has special importance. Teacher can get special information about the student by aptitude measurement. This factor affecting directly to both teacher and student sometimes remains in neglected state. As there is less knowledge or information about aptitude measurement the teachers do not understand to be more aware about its need and that is why still today the need of aptitude measurement has not been understood.

Educational research directs to collect the data in the original form for development of educations. Base becomes strong only when enough care is taken about the quality of research and its importance. For this the study of reference material is very necessary.

Before undertaking any new research if the earlier researches are studied then it becomes like a lighthouse.

According to W.R. Borg and M.D. Gall,

“The related literature in any field from the foundation upon which all future works will be built.”¹

Thus for proceeding further the research work and to do special work rather than the earlier researches, to study the reference materials and earlier researches is of fundamental importance.

2.2. Importance of Reference Literature:

Study of reference literature is undertaken to know the problem of the study field, for removal of the difficulties occurring in it, to select the topic of research and to get the direction about the subject. Moreover by the study of reference material the clear framework about objectives,
Hypotheses, Planning, Sample selection, Method of work difficulties during the research work limitations, method of analysis etc. can be obtained.

In educational research besides the study of only reference books, journals, reports of studies, encyclopaedia, dissertations of related research, surveys undertaken in related field etc provide the background of reference literature. By the study of which there may not be the reparation of the studies of fast and time, finance and human ability may not be wasted.

Hence the study of reference material becomes an important aspect of research.

Good, Barr and Scates\(^2\) (1954) mention that,

“The keys to the vast storehouse of published literature may open doors to sources of significant problems and explanatory hypotheses and provide helpful orientation for definitions and comparative data for interpretation of results. In order to be truly creative and original one must read extensively and critically as an stimulus to think”\(^2\)

Thus the study of reference material provides the thoughts to get clear, modern perfect knowledge about one’s own subject and it becomes the lighthouse for research.

2.3. Review of Related literature:

It is necessary to review the earlier related researches before studying any subject earlier researcher provide the guidance for the future researcher. The researchers can remora the difficulties deficiencies occurring in the past researches at the time of future research.

Review of the researches of Ph.D. level undertaken earlier related to the present study “construction and standardization of Aptitude test”.
1 Title: “Construction and Standardization of Aptitude test for the Teachers of primary school in Gujarat state”  
University: South Gujarat University  
Objectives: (1) To construct Aptitude Test for primary school teachers. (2) To standardize the test. This test was in Gujarati in which ten characteristics of teachers like Interest in job, attitude, towards community, mental competency, vocational information, attitude towards children, skill in teaching competency of maintaining discipline, Health and reading were covered. These characteristics were presented in groups and there were four sub-tests based on those groups. Reliability by split-half method was 0.70 & validity was 7.74 standard scores, T-scores, percentiles, and Grade norms were calculated. Main features of this test were as follows: (1) There were 125 items in the final form of the test. (2) Items having 0.20 & more than Discriminating value were selected in final test. (3) The test was standardized on the sample of 1700 student teachers (850 Male and 850 Female) of the first year of P.T.C.s of Gujarat State. (4) Mean score was 78.85 and Median was 80.59. (5) Frequency distributions of scores was negatively skewed and Platykertic.

2 Topic: “Construction and Standardization of Mechanics Aptitude Test for the Students of std-10 of Hariyana”  
University: Kurkohtra University  
Objective: (1) To construct Mechanical Aptitude test for the students of std-10 of Hariyana. (2) To standardize the test. (3) To establish reliability, validity and Norms for various sub-tests of the test battery. The factors of Mechanical aptitude test were: General Intelligence,
space ability, perception, mechanical adjustment, mechanical comprehension, mechanical information and Manual skill. After preparing the items on each factor it was administered to 10 students individuality and the time was fired. The final test was tried out on 1020 students selected from government as well as self-financed or private schools of 11 districts of Haryana. Main features of the test were as follows: (1) The time limit of various sub-test was 2 minutes to 15 minutes. (2) Reliability for General Intelligences was 0.74 for special ability 0.92, for perception ability 0.83, for mechanical adjustment 0.80, for mechanical comprehension 0.82, for mechanical information 0.82 and for Manual skill 0.78. (3) Validity was established with the scores of observation of the students of five vocations like pattern maker, Mechanical Draftsman, machines for aids and die and wireman coefficient of validity was expanded from 0.80 to 0.88. (4) Correlation were found out of the tests with the other subjects like sciences, Maths and Drawing etc. of school subjects.

3. **Title:** “Construction and Standardisation of an aptitudes test for secondary school teachers.”

**Researcher:** B.M.Upadhyay (1976)

**University:** Saurastra University

**Objectives:** (1) To Construct and standardize the aptitude test for secondary school teacher in Gujarati. (2) Correlations were studied with the variables such as sex, socio-economic status, educational branch and teaching experience of the teachers. Primary form of the test was prepared at first. It was flies out on 130 students of two education colleges. Item analysis was done by calculation difficulty values and discrimination values. The test having 210 items was tried out for pre-pilot testing. The test was tried out on the stratified sample of 771 students of nine. Education colleges for pilot testing. On the
basis of item analysis 125 items were selected from the final test. For implementation of the test the standard method was designed, lastly the final test was administered to 1409 student teachers from 11 education colleges. By Thurston method factor analysis was done for the study of sub groups. Reliability coefficient by test-retest method was 0.77. The coefficient of correlation between the ration ratings of the principals of the education colleges was between 0.32 & 0.48. General & specific norms were also established. They were presented in the form of percentiles, normal standard scores, stanine, scores and grade norms. There was no relation between scores & sex, socio-economic status and Teaching experience,. Whereas educations branch and teaching aptitude were correlated.

4. **Topic**: “Relation of Aptitude as Mathematical creativity for the Achievement in Mathematics and Attitude towards Mathematics”  

**Researcher**: Tulli M.R. (1979)  
**University**: Punjab University  
**the Main hypotheses of this study were.** (1) Mathematics creativity had been meaningfully connected or linked with aptitude of Mathematics. (2) There was meaningful relation between Mathematics creativity and aptitude towards Mathematics. (3) Mathematical creativity had given noteworthy contributions for the achievement in mathematics. (4) Aptitude of mathematics and attitude towards mathematics had jointly contributed in mathematical creativity. In the sample of this study 1000 students were selected from std-9 of Higher Secondary Schools of Punjab State. Creative Ability in Mathematic Tes of Balka, translated in Hindi by the researcher, Improved edition of J.M. Oza of different Aptitude test too the Higher Secondary Schools, Hinndi Adoption of formal of different aptitude Test battery prepared by bennet
westman and seasharo and self prepared by the researcher. mathematic attitude scale were all tried out tools of the research. In statistical analysis, Descriptive statistics, Factor analysis, Varionan rotation and regression analysis methods were used. **Finding of the researcher:** (1) Mathematical creativity was meaningfully positively related with mathematical aptitude. (2) attitude towards mathematics was seen as forecasting to mathematical creativity. (3) achievement of mathematics had meaningful relation with mathematical creativity. (4) In he present study there was no contribution jointly of mathematical aptitude and attitude towards mathematics for mathematical creativity.

5 Topic: “A comparative study of Scientific attitude, scientific aptitude and achievement in Biology at secondary school level”  
**Researcher:** Rao Digmurti Bhaskar (1990)  
**University:** Osmania University  
**Objectives:** (1) To find out scientific attitude and aptitude along with achievements in biology in students secondary school. (2) To compare scientific attitude, scientific aptitude and achievement in biology of the boys and girls, the schools of English medium and Telugu medium, Private and government schools, Residential and non-residential schools, Rural and Urban schools.  
**Research Method:** In the study 600 students of std-0 were included and they were selected by stratified sampling method. In the tools which were used. A series scientific aptitude test of J.K.Sud and R.P;Sandhya and Scientific Aptitude test of Nair Kerala University, were included. In statistical methods used for the study were, Mean, S.D., and test CR and correlation.  
**Findings:** (1) Scientific attitudes in the secondary school students was average. There was no effect of sex (boys and girls) on scientific attitude by the students studying in Private school in rural
schools, in English medium, and in residential schools had more scientific attitude as compared to their rival students. (2) Scientific aptitude was also arrange in secondary school students where as the students of private school o urban schools of English medium and of residents al school had some more scientific aptitude. (3) Achievement in Biology was average achievement of Rural schools, govt. Schools, English medium schools and residential schools was very good. (4) There was very important and intense correlation among scientific attitude, scientific aptitude and achievement in Biology.

Topic: “A research of Scientific Aptitude as seen in students of Higher Secondary Science Stream in Context to their mental competency”

Researcher: Shrivastav Madhulika (1996)
University: Rani Durgavati Uishasa vidhyalay

Objectives: To abscess scientific aptitude of the students who wanted to study in science stream incontext to their mental competency. Research Method: Total 500 students 250 boys and 250 girls of Higher Secondary schools were selected by Random Sampling method. In the tools used for the study scientific aptitude test of K.K.Agrawal, General Mental competency test of S.C.Joshi, Hindi Adjustment and Theoretical scale which is based on original seal “o” form of K.J.Rokich were included. In the present study descriptive and inferential statistics were used. Findings: In scientific aptitude boys were superior to girls because there was significant difference between the mean scores of scientific aptitude. (2) Both the groups of boys and girls had high scientific aptitude and there was was no significant difference. (3) There was significant difference between boys and girls having low scientific aptitude.
7. **Title**: “A study o creativity in context to Scientific Aptitude and Attitude of the students of Higher Secondary Schools”

**Researcher**: Shri Vastav Veena (1992)  
**University**: Agra University  
**Objectives**: (1) To assess the significance of difference between the groups of boys having more scientific aptitude and less scientific aptitude. (2) To assess the significance of difference between the creativity scores of two groups having unfavourable and unfavourable attitude in sciences. (3) To assess the significance of difference between the scores of creativity scores of scientific aptitude and score of scientific aptitude of boys and girls.  
**Research method**: The study was undertaken on the sample of total 1200 students i.e. 600 boys and 600 girls of higher secondary schools of agra. For the study creativity test of chauchan and Trivedi Scientific aptitude. Test Battery of K.K.Agrawal, Group mental aptitude test of R.K. Tandon and scientific aptitude test of A Garewal were used as tools. Data analysis was done statistically by using Mean, SD and CR. **Findings**: (1) Students having more scientific aptitude o higher secondary classed were more creative than those having less scientific aptitude. (2) In case of creativity, students having favourable attitude were some what better than those having unfavourable attitude, where as there was to difference between the girls having favourable and unfavourable attitude. (3) Girls were more creative than boys. (4) There was more scientific aptitude in boys as compared to girls. (5) Girls were having more positive attitude towards science than the boys.

8. **Title**: “A study of the scientific Aptitude of Tribal a and Non-tribal students of chattisgadh”

**Researcher**: Sharma Pushpalata (1989)  
**University**: Ravishanker University  
**Objectives**: (1) To study the relation between various components (of sinha &
recognized by sinha) of scientific aptitude. (2) To estimate the related effect of social group, sec and educational status on each component out of seven and scientist aptitude. (3) To recognise and diagnose various scientific aptitudes of the students of Tribal and specially Orion caste.(4) To compare a discriminate scientific aptitude of Tribal students (orion) and that of non tribal students at school and college level. Research Method: By Using random sampling method, 20 tribal higher secondary schools, 20 non-tribal higher secondary schools and 4 science colleges were selected from Bilaspur area and Guru Ghasidas University in north-east area of Chhatisgadhm from these institutions, secondary school level, 200 urban students (130 boys and 70 girls) and 200 Rural students (130 boys and 70 girls and at college level 150 boys and 50 girls thus total 600 students of oraon were selected randomly but having the limitation ( not make than 35 students from any school) . Then accordingly on the basis of age, sex and educational stated from the same area by nursing alliance method of one against one the same number (500 students) of non-urban caste were selected. Thus at school level according to volume ad regional difference the ration between tribal and non-tribal students was 1:1 and at college level the ration was 1:3. To measure scientific aptitudes the comprehensive scientific aptitude test of sinha and sinha was used, in which seven component having eight weight age such as experimental attitude, search of contra dictionary or illogical findings, competency of estimating findings from data, accuracy of interpretation, competency of reasoning and problem solving, alertness and perfectness, observation and joint scientific aptitude accuracy etc. were included. In statistical methods, relation of Individual product-moment proficiency was used along with
component analysis by Mean, SD and ‘t’ Value. **Findings:** (1) In marling of comprehensive, scientific aptitude test out of seven components, six component such as experiments attitude, search of contradictory or illogical findings, competency of estimating findings from data, competency of reasoning and problem solving, alertness and perfectness as well as accuracy of observation were related with the comprehensive scientific aptitude scores by accuracy of Interpretation had no relation with it. (2) Medium i.e. of normal level, inter competent relation could by estimated with competency of estimation findings out of the data of scientific aptitude and competency of contradictory or illogical findings with accuracy of observations. Where as there was very intensive relation between competency of findings from data and accuracy of observation. (3) In comprehensive scientific aptitude test, the conclusion of the four components respectively 38.70% for illogical thinking 22.85% at scientific comprehension, 22.80 for sensibility and 15.86 % a2 for generalization. Thus total variation difference was seen. Hence these researches have proved that scientific aptitude test is not a single component as test but a multi componential test in which four main components such as illogical thinking. Scientific comprehensive, ability, sensibility and generalization were included. The standardized study of comprehensive scientific aptitude test had not been completely accepted. (4) There are three main sources such as social groups, sec, educational status had noteworthy effect on all the eight components of comprehensive scientific aptitude. Mai effects out of than are as follows :(1) Experimental attitude – educational status (2) search of illogical findings- educational status (3) Competency of estimating findings out of data – social (4)
Accuracy of Interpretation – educational status (5) Competency of reasoning and problem solving- social group. (6) Alertness and perfectness- Educational status (7) Accuracy of observation - Educational status (8) Joint scientific aptitude – social group. Thus five sub variables were affected by educational status and three were affected by social groups. (1) In comprehensive scientific aptitude test Tribal students were of low level than non-tribal students. (2) All both the stages of education. Tribal students were superior note worthily to non-tribal students in Accuracy of interpretation. Though in std-10 non-tribal students were superior to tribal students in the following matters :.

(a) Search of contradictory or illogical findings
(b) Competency of estimating finding from data.
(c) Accuracy of interpretation
(d) Competency of reasoning and problem solving

Moreover at college level not-tribal students got noteworthy more marks than tribal students in the following matters.

(a) Experimental attitude
(b) Accuracy of Interpretation
(c) Alertness and perfectness.

(1) Very important relation has been established between comprehensive scientific aptitude and six component such as experiments attitude, search of contradictory or illogical findings, competency of estimate findings from data competency of reasoning and problem solving, alertness and performers as were as accuracy of observation. (7) Inter componential relation was seen of experimenting attitude with competences of estimating findings from data of search
of contradictory or illogical findings with the accuracy of observation.

(2) Comprehensive scientific attitude test was formed of four components such as (a) illogical thinking (b) scientific comprehension (c) sensitivity (d) generalization.

(3) In comprehensive scientific aptitude test, tribal students were note worthily inferior to non-tribal students. But at school and college level they were superiors in the accuracy of observation.

Even though non-tribal students were note worthily excellent at higher secondary school level in (a) Search of findings at contradictory and illogical level (b) in competency of estimating finding from data and at college level (a) in experimenting attitude (b) accuracy of interpretations and (c) Alertness and perfectness.

(4) In comprehensive scientific aptitude test, there was no noteworthy sex difference between boys and girls of any social groups.

Even though in each social group in a alertness and perfectness the girls were superior to the boys ; where as in competency of making findings from data he boys were superior.

(2) Non-tribal boys were forward than those girls (a) in competency of estimating findings from data (b) competency of reasoning and problem solving and in joint scientific aptitude. Whose as non-tribal girls were superior to those boys in competency of estimating findings from data and in joint scientific aptitude.

9 Title: “construction and standardization of the test to recognize creative children of the arrange of 14 to 16 years”11 Researcher : B. Kaul (1974) University : M.S. University This study had been
undertaken to construct and standardize the creativity test for the children of the age range of 14 to 16 years. There were five sub-tests in this test: (1) Sentence completion test (10 items) (2) Application test (10 items) (3) Creative written test (10 items) (4) Consequences test (10 items) (5) Problem solving test (9 items) By pilot testing it could be that the time limit for the test can be given of. Three and half hours. For any person/subject, this long time limit is boring and terseness, hence each sub-test was considered as separate test. And in each form test was administered to three group at a time such as subtests 1 to one group, subtest 3 to other group and sub test 4 & 5 to another group. Thus the test was administered to total 350 students selected as a sample. Item analysis was carried out and discriminating values were calculated for establishing norms 1000 students of various schools of Delhi were selected in the sample. For the present test standard scores were calculated. Reliability of the test by test-retest method was 0.75 (N=100), coefficient of correlation of the present test with rating scale of teacher was 0.73 (N=70) and with Torrance test and reverb progressive matrices 0.26 (N=50) it was 0.72. This test was also correlated with on the spot painting and writing test of sankrut.

10 Topic: “Construction and standardization of General Ability test for std 11 and std 12” 12 Researcher: R.P. Patel (1981) University: S.P. University Objectives: The main objective of this study was to develop non-reading test of general mental ability for the Gujarati speaking students of Higher Secondary schools of Gujarat State. There were two sections of this test. The first part was assessing the familiarity of the student with the world around by ones’ non experiences of Home, school and community. The
questions were about the Indian culture, science, social sciences the
matters of community and various fields of art. The second section
did not have the cultural contest. But there were geometrical
pictures constructed for measuring the ability of abstract argument.
This section was presenting the equal challenge to all the students
without keeping in mine their cultural past. In the sample for
standardization there were 5725 students studying in Higher
Secondary schools of Gujarat State. Coefficient of Correlation of
reliability was between 0.71 to 0.87 by various methods.
Coefficient o correlation of validity was 0.59 against ratings of
teachers, against the marks of examination 0.52, against the other
intelligence tests it was between 0.68 to 0.79. the test was very full
of ‘g’ factor. Age, std. and grade, norms were established
Intelligence norms and percentiles were calculated for the test.

Topic: “A study of the relation between Logical thinking and
achievement of concepts of biology”

Researcher: M.S.Chhikar (1985)
University: Jamia Milia Islamia
objectives: (1) To recognize the order of concepts of biology in seven steps of living
matters to measure the achievement of these concepts. (2) To recognize the reasoning ability of the students of secondary schools of 15 years with the help of convergent production relations and intelligence test of cognition semantic classed. (3) To find out the relation between conceptual achievement of biology and reasoning abilities. (4) It is possible to estimate the conceptual achievement in biology by reasoning ability test.
Tools: The batteries of
conceptual achievement tests and reasoning ability test were used.
Sample: This battery of seven tests was tried out on 200 students
of four government higher secondary schools.
Reliability: reliability coefficient of concept achievements test by KR20 was
0.848 and by split half method 0.886. **Findings:** (1) Some changes were made in order of the series of the matters of biology. The concepts of biology of secondary schools were recognized and the test was reliable as well as valid. (2) By factor analysis reasoning ability of the students studying in secondary schools above 15 years old can be recognized. (3) Accuracy between conceptual achievement of biology and reasoning ability is detrimental. (4) On the basis of reasoning ability test to estimate about conceptual achievement in biology is possible and mostly this has been agreed by regression analysis.

12 **Topic:** “Construction and standardisation of Numerical Aptitude test of students of secondary school”¹⁴ **Researcher:** R.P.Shah (1971) **University:** Gujarat University. In this study the test has been constructed to know the concepts of various methods about numbers. Students were allowed to respond freely. On the basis of wrong answers of the group representing the students the alternatives were prepared second tryout test or pilot test was about item analysis, in which there were 60 items in two parts. Difficulty and discriminating values were found out by using horst is formula, and then they were presented by chart with the help of Harper analysis table. Third administration matter ten action of the test was for the arrangements of items. In each matter ten items were arranged form of spiral omnibus format. The calculation of Norms of Percentile level for boys and girls done on the basis of the marks obtained by them in arithmetic algebra and geometry. For the technical group also the percentile norms have been calculated. Then for the final test total 3743 boys and 3249 girls were selected from the std 8 to std11 of the randomly selected schools out of the secondary schools of Gujarat State. Reliability coefficient by test
retest method was in the range of 0.523 to 0.880 and by split half method 0.755 to 0.934 Medium value for the students of std 8 9 10 and 11 was 0.835. **Main finding** was that the correlation of the scores of this test with verbal aptitude and score of school exam of Gujarati language was higher than those with the science examination and mathematics examination.

**Topic**: “Construction of a selection test battery for the students who wanted to admit in technical higher secondary schools of Delhi”

**Researcher**: D.C.Joshi (1978) **University**: Kurakshatra University.

The objective of this study was to develop a selection tests battery for the students who wanted to administer technical. Higher secondary schools of Delhi. It was estimated that the following matters were related to the success in technical curriculum. (1) Verbal ability, use of language Mathematical ability and general instruction (2) Mechanical knowledge and understanding imagination power and special ability and (3) school achievement and marks of school examination in mother tongue, mathematics and science. For the test battery verbal ability test, language usage test, mathematics ability test, general ability test and general instruction test were developed. Mechanical aptitude test of Atmanand Sharma was used for measuring mechanises aptitude marks of home exam of the students provided the achievement serious of the students. The sample selected for the study was of total 253 students studying in std–9 of technical Higher Secondary School. Reliability was calendared by the split-half method. Product moment coefficient of correlation an multiple regression analysis were used for the data analysis. For verbal ability test reliability by the split-half method was 0.816. For language usage test 0.839. For Mathematical ability test 0.851 &
for general instruction test 0.876. Verbal ability test had noteworthy relation with all the scales of school performance except workshop. Forecasting validity was 0.361, which was 0.356 is theory and 0.290 in practical language usage test had the relation with all the scales except workshop and practical in physics. Its forecasting validity was 0.304, for theory 0.032 and for practical it was 0.173. Mathematical ability test had relation wish all the scales. Its forecasting validity was 0.486, for theory 9.467 and for Paccar 0.356. General ability test had relation with all except practical’s of physics and chemistry. Its forecasting validity was 0.301, for theory 0.302 and for practical 0.225. While comparing joint distribution among forecasters. Four tests follow the pattern of forecasting of long time limit.

2.3. Speciality of the present study:

In the present study the research has studied researches done in the past but this study is different from them in many ways so the importance of the present study increases. It is different in the following ways: (1) In present study, the secondary schools of Gujarati medium of Gujarat state have been taken in view. (2) From the viewpoint of area, it has been divided in urban and semi urban area of the state. (3) Districts of Gujarat State have been covered. (4) The time limit of the test has been kept of 60 minutes, leaping in mind the components covered in the test. (5) Efforts have been done so that test administration can be carried out easily. (6) Reliability of the test has been found out various methods. (7) Validity of the test also has been found by various methods. (8) By establishing the norms of the test, they have been presented sex-wise. Area wise and std-wise separately. (9) Answer short of the test has been given separately so that the test can be used again.
2.4. Conclusion:

All the persons commented with education talk of teaching the child keeping in view the individual differences. Much has been spoken about this but the sin of teaching with one stick is going on in our schools without keeping in mind the interest. Attitude or aptitude of all the students bulldozer of the lectures of the teacher goes on working continuously from eleven to five and students remain sitting on the benches as it its. In such a situation the talk of arranging teaching related to interest, attitude and aptitude of the children is what a grand thing. Only then there is the right meaning of education.
References


2. Carter V. Good, A. S. Barr and D. E. Scates (1954); “Methods of Research”, New York; Appleton, Century Crofts; Inc; p. 109


