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CHAPTER-2
REVIEW OF RELATED LITERATURE

2.1.0 Introduction

Main objective of the study is to study spatial reasoning ability in reference to intelligence and achievement. So this chapter is very important to understand the base of spatial reasoning ability, intelligence, theories of intelligence given by psychologist described in this chapter. For this investigator refer related literature of intelligence and websites. According to Mouley George J. (1978)¹,

“The review of the reference literature is essential to the development of the problem and to the deviation of effective approach to its solution”

2.2.0 Importance of Reviews of Related Literature

A review of literature is an integral part of the thesis or dissertation. It may also required part of proposal. The main purpose of the review of related literature is to analyze scientific work in other researches that is used for investigation critically. Every piece of ongoing research need to be connected with work already done to get an overall relevance and purpose of current research. So, it is very important. Its importance can be expressed by the help of following facts:

1. Reviewing related literature serve abridge between the research proposed and studies already done.

2. It acquaints the researcher about aspects that have been already been established

3. It also gives an opportunity to appreciate the evidences that has already been collected by the previous research.

4. Reviewing related literature sharpens the vision of the researcher and helps to differentiate the present research form the past.

5. It helps to see the problem with new dimensions and find something that is fruitful for present society and this is only
possible if the researcher is well-acquainted with past related literature.

To summarize, there is hardly any research project which cannot be related with research that has already taken place usually all research projects add to the plethora of evidence on a particular issue. Thus, review of related literature is very important aspect of any research both for planning work as well as to show its relevance and significance. It further enables the researcher and the reader to acknowledge completely with the variable or the factor or the terms in the study.

2.3.0 Theoretical Information about Intelligence

2.3.1 Meaning of Intelligence

There are probably as many definitions of intelligence as there are experts who study it. Simply putting it, however, intelligence is the ability to learn about, learn from, understand, and interact with one’s environment. This general ability consists of a number of specific abilities, mentioned as under:

- Ability to evaluate and judge.
- Capacity for knowledge and the ability to acquire it.
- Adaptability to a new environment or to changes in the current environment.
- Ability to comprehend relationships.
- Capacity for reason and abstract thought.
- Capacity for original and productive thought.

Additional specific abilities might be added to the list, but they would all be abilities allowing a person to learn about, learn from, understand, and interact with the environment. Environment in this definition doesn’t mean the environment of the earth, such as the desert, the mountains, etc., although it can mean that kind of environment. It has a wider meaning that includes a person’s immediate surroundings, including the people around him or her. Environment in this case can also be something as small as a family, the workplace, or a classroom. Definition of intelligence given below:
Definitions of Intelligence:

- “Innate general cognitive ability”
- “Intelligence is a relational thinking”
- “Intelligence is the ability to carry out abstract thinking.”
- “Intelligence is the ability to adjust one-self to a new situation”
- “Intelligence is the aggregate or global capacity of an individual to act purposefully, to think rationally and to deal effectively with his environment”
- “Intelligence is simply the ability to learn.”

2.3.2 Types of Intelligence

There are three type of intelligence:

1. Abstract Intelligence
2. Social Intelligence
3. Mechanical Intelligence

1. ABSTRACT INTELLIGENCE

Abstract intelligence is the ability to respond to words, numbers and letters etc. All tests of intelligence which require manipulation of symbols are tests of abstract intelligence. Abstract intelligence is required in ordinary academic subjects in schools, such as reading, writing, history and so on. The highest level of abstract intelligence is manifested in the thoughts of philosophers and in the use of mathematical formula.

2. SOCIAL INTELLIGENCE

Social intelligence means the ability of an individual to react to social situation of daily life. Social intelligence would not include the feelings of emotions aroused in us by other people, but merely our ability to understand others and to react in such a way towards them that the desired ends should be attained. High social intelligence is possessed by those who are able to handle people well. Adequate adjustment in social situations, as is made by the politicians, the social workers and the media persons, is the index of social intelligence.
3. MECHANICAL INTELLIGENCE

Mechanical intelligence is the ability to adopt with machines. On the basis of these abilities, an individual could be a skilled labour, driver, mechanic or engineer. Thus, such circumstances which are related with machine and physical equipments, they adjust and adopt themselves. This ability can be increased by practice. People, who do not possess this ability, will not be able to do even their daily works and remains outshines.

2.3.3 Theories of Intelligence

It is apparent from the definitions of intelligence that psychologists have different opinions about intelligence. Hence, in order to understand the nature of intelligence, one has to go through the different theories of intelligence. But the question arises: What is the difference between the nature and theory of intelligence? Theory tells us about the structure of intelligence, while nature tells us about the functions of intelligence. Hence psychologists started concentrating on two questions:

(1) What is the structure of intelligence?
(2) What are the elements involve in intelligence?

In order to answer these questions, intelligence is defined on the basis of different factors. Theories of intelligence are mentioned as under:

(I) Binet’s Uni-Factor Theory
(II) Spearman’s Two-Factor Theory
(III) Thorndike’s Multi-Factors Theory
(IV) Thurston’s Multi-Factor Theory
(V) Guilford’s Three Dimensional Theory

(I) Binet’s Uni-Factor Theory

The theory was originally developed by Binet and supported by Stern, Terman and Ebbinghouse. The supporters of theory considered intelligence as a faculty which affect all the mental activities. According to this theory, if a person is proficient in one area, he should be proficient in other areas as well. Hence, the originator of this theory tried to prove that intelligence can be defined as uni-factor. It is on this basis that intelligence is defined by Binet as
‘ability’ to reason and by Terman as ‘ability to think’ and by Stern as ‘ability to adjust to the new circumstances’.

(II) Spearman’s Two-Factor Theory

Two-Factor theory was given in 1904 by Spearman. Spearman’s basic assumption is that all mental tasks need two kinds of abilities or factors. The first factor is general capacity or general ability called ‘G’ and a specific ability or factor called ‘S’. ‘G’ is common for all tasks, while ‘S’ as there are different intellectual tasks. All intellectual tests centre on ‘G’. Spearmen postulated the existence of specific factors called ‘S’ factors each of which is specific to a particular type of activity. No person performs the same task in the same manner. The performance on a particular task is determined by the amount of ‘G’ and ‘S’ in different intellectual activities. Diagrammatically it can be shown by the following diagram:

![Diagram of Spearman's Two-Factor Theory](image)

\[ \text{Figure-2.1} \]

‘G’ and ‘S’ Factors of Spearman’s Two Factor Theory

1. **G-factor (General Factor)**
   - Spearman considers this component as mental energy.
   - It existed from birth in every individual.
   - It remains equal for lifelong.
   - It is found different in quantity while doing various works.

2. **S-factor (Special Factor)**
   - For some work specific efficiency or intelligence needed.
   - It is not gifted by birth. It can be attained from environment, education and training. For example: music, dancing.
This principle is not widely welcomed.

Spearman’s theory is able to explain the observed fact that children who show ability in one intellectual area also show ability along other lines. Such fluctuations in abilities are most marked in the case of highly specific aptitudes, such as musical or mechanical abilities. Highly specific aptitudes may be poorly developed in individuals of relatively high general intelligence. He also found that the test of mental abilities which are highly similar correlate to a greater extent than can be accounted for by their common overlap of ‘G’. He later acknowledged the existence of group factors like verbal ability and spatial ability. He also made a mention of additional general factor – p, o and w.i.e. preservation, oscillation and will.

The practical application of Spearman’s two factor theory in test construction is that a test general intelligence will have parts which are highly loaded with ‘G’ and there would be several parts so that the effects of specific factors s1, s2, s3 etc. will be cancelled out. The net result of such a test will be that it measures ‘G’.

(III) Thorndike’s Multi-Factors Theory

Thorndike divided intelligent activity into three types: (I) Social Intelligence or the ability to understand and deal with persons; (II) Concrete intelligence or ability to understand and deal with things, as in skilled trades and scientific appliances and (III) Abstracts intelligence, or ability to understand and deal with verbal and mathematical symbols. According to this theory, intelligence is said to be constituted of a multitude of separate factors or elements. Any mental act according to this theory involves a number of these minute elements, operating together. If performance on two tasks is positively correlated, the degree of correlation is due to the common elements involved into two tasks. According to this theory, there is no such factor as ‘General Intelligence’. Thorndike’s test of intelligence is composed of four parts:

1. Sentence Completion (C)
2. Arithmetical Reasoning (A)
3. Vocabulary (V)
4. Following Direction (F)

Thorndike does not claim that these four types of test items encompass the entire range of abstract intelligence. They represent and sample only certain parts but because of very significant correlation between all types of measures within tested range it is held that the other aspects of abstract intelligence can be estimated with satisfactory accuracy.

(IV) Thurston’s Multi-Factor Theory

Thurston’s multi factor theory, as a matter of fact is midway between Spearman’s two factor theory and Thorndike’s ability theory. Thurston is famous for this factor analytic approach. According to him, intelligence is neither the projection of general ability nor of specific factor. He does not recognize the existence of ‘g’ and ‘s’ factor. He talked about primary mental abilities in mental activities.

On the basis of one factor analytical study Thurston solved about 12 primary mental abilities for the structure of intelligence. Some of them combine together from the group factor, which reveal the intelligence of an individual for a specific area. Main abilities among them used by Thurston are eight given below:
Table No-2.1

Mental Abilities Used by Thurston

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Verbal Ability (V)</td>
</tr>
<tr>
<td>2.</td>
<td>Word Fluency (W)</td>
</tr>
<tr>
<td>3.</td>
<td>Number Ability (N)</td>
</tr>
<tr>
<td>4.</td>
<td>Spatial Ability (S)</td>
</tr>
<tr>
<td>5.</td>
<td>Memory (M)</td>
</tr>
<tr>
<td>6.</td>
<td>Perceptual Speed (P)</td>
</tr>
<tr>
<td>7.</td>
<td>Reasoning Ability (R)</td>
</tr>
</tbody>
</table>

Today there is rather general agreement among the psychologist that there are many intellectual dimensions. However, there remains a factor that might be called general scholastic aptitude, a conclusion supported by the fact that factors on such tests as the Primary Mental Ability (PMA) are not completely independent but are correlated to some extent with each other. Despite the analytic nature of the multifactor approach, it is still based on a limited conception of intelligence since little weight it is given to social intelligence, mechanical intelligence and to the abilities in special fields such as athletic, music and drama etc.

(V) Guilford’s Three Dimensional Theory

On the basis of 20 years research work, Guilford (1967) gave a box model of intelligence. This is known as Structure of Intellect Model. As shown in model in Figure-2.2.
Operations:
Operational include cognition, memory, divergent production, convergent production and evaluation and operations includes:

1. Evaluation
2. Convergent Production
3. Divergent Production
4. Memory
5. Cognition

Products:
Products mean the information about the nature on which operations are to be carried out. Products include:

1. Units
2. Classes
3. Relations
4. Systems
5. Transformations
6. Implications
Content:
The form of information as in the mind of the subject is explained under these dimensions. Content include:
1. Figural
2. Symbolic
3. Semantic
4. Behavioural

2.4.0 Theoretical Information about Spatial Reasoning Ability

2.4.1 Meaning

Reasoning ability is a mental process which is used to argue or to prove anything. It is useful to take further decision on the basis of decisions which are to be taken. It is defined as “to understand relations between decisions or to examine decisions already taken before or acceptance or rejections on decisions.” Generally, reasoning has relation with common rules or formulas of logic but logic, which is used by people, especially children is without consciousness. For example, logic consists in activities like child runs away to doors hearing the voice of a hawker, someone decides name of food item by its sweet smell, to practice mass strategy while playing games etc. reasoning is a process or adjustment toward any innovative situation and it aims at solving problems at some higher level. Analysis of reasoning made by experts is stated in five steps.

○ To experience difficulty or manifestation of any problem. As far as problem is not experienced, we never use reasoning.
○ To examine situation or circumstances minutely. In this step, sometimes exposition of problem is in form of a decision series of decisions.
○ To try to solve problem or sifting the problem. Here probable causes of difficulty and their prospective solutions are searched and developed.
○ To accept any one of solution temporarily and try to test it. In such state of action, all possible matters are to be examined or compared with facts.
Finally, to accept or reject any solution based on proofs. This state is called as thinking process of taking a decision.

Final decision can be taken after minute testing of facts. Inductive reasoning means method of reaching universal decisions based on definite facts. If we start from eternal truth or statement and achieve determined aim or object by using it, it is called deductive reasoning.

By reasoning process, teaching policy or technique can be decided before it is implemented in practice. Reasoning use other’s experiences in problem solving process. Reasoning is foundation of cultural development and source of individual ability and prosperity.

There are so many meanings and usage of the word ‘reasoning’ in English language. Its hidden meaning expounds many meanings in view of philosophy. They often seem to be mutually contradictory. In short, the term ‘reasoning’ is associated with mental ability.

What do we want to achieve by reasoning? Are actions or processes occurring while reasoning actual reasoning or anything else? It is not cleared soon what reasoning takes place while doing any action or process or any incident. If we want to think impartially or neutrally about reasoning, it will be a controversial matter because it is not clear whether that thing is achieved by reasoning or not. Hence, the nature of reasoning is controversial. Like intelligence, differences are found among psychologists about reasoning.

2.4.2 Nature and Development of Reasoning

According to N. R. F. Maiser,

"The most complex form of adjustment of which human beings are capable is reasoning. Reasoning is productive thinking in which previous experience are reorganized, or combined in new ways, to solve a problem."  

Reasoning is a tool for solution of problems as well as it is a form of learning also. Following aspects are included in reasoning.

(1) Selection of previous experiences or systematic search of innovative information about the goal.
(2) Perception of relations.

(3) Intentionally adjustment with means of achieving the goal.

2.4.2.1 Differences in Reasoning

Question is this, is every person is able to do reasoning? Certain persons are found having somewhat logical ability. Like other psychological characteristics, differences are found in reasoning ability among different persons. It is difficult to divide people having and not having reasoning ability into separate groups. Variety in reasoning ability is a kind of proportional difference. Some people can solve more problems in comparison with others. Some can solve problems within fixed time period and some people are subjected to prejudices, internal concepts and exuberance of feelings. Certain people are not having specific attitude in all matters or they have too little experiences in these fields. All these aspects of problem solving ability indicate that human being, more or less, differs in case of reasoning ability.

2.4.2.2 Development of Reasoning Ability

Often it is established that problem solving ability develops naturally and training of reasoning is unnecessary. It is true that, mostly, problem solving ability is depended on attained natural intelligence and education. Quality of education cannot produce intelligent acquisition beyond certain limit, but we have evidences to believe that some of us make better use of his fundamental ability of learning. On the other hand, some persons learn to use logic and solve problems by active experiences without systematic training.

2.4.2.3 Methods of Successive Development of Reasoning

It was believed that reasoning ability develops suddenly and later. This belief was based on inference that only after development of abilities like specific skills and memorizing information, child can be able to make any reasoning. this concept has been found for years. As a result of it, efforts of developing higher mental processes were neglected till student reaches the secondary level. Continuous repetitions of any content were made which is risky in developing higher level mental abilities. If we consider about
differences of knowledge, experiences and language development, children as well as matured people use equally reasoning. **According to N. L. Munn,**

"The errors which young subjects make are not different in kind from those which adults exhibit when they meet very unfamiliar situation".⁹

Now, it is seen that primary school children are found asking questions, finding out facts from related sources, evaluating authenticity of sources, re-constructing information and finding out facts in relation to their problems. Such activities should be implemented on wide scale in primary schools on the condition that situations should be made meaningful and useful for children.

**2.4.2.4 Difficulties face in developing Reasoning Ability**

Human being has attained thinking power and reasoning ability. Due to lack of evidences about nature of reasoning and problem solving improvement, teachers feel it difficult to provide guidance for development of critical thinking among students.

Even if we have no scientific information and feel problems in teaching techniques, there are some other practical approaches for development of reasoning ability. For this purpose, problem solving process should be defined more clearly and we should be informed about available psychological sources and literature related to reasoning process.

**2.4.2.5 Reasoning Process**

Definitions given by some psychologists can throw light on meaning and process of reasoning. some of definitions are stated as below. **According to Garrett,**

"Reasoning is a stepwise thinking with a purpose of goal in mind”

According to Woodworth, ¹⁰

"In reasoning items (facts or principles) finished by recall, present observation or both, are combined and examined to see what conclusion can be drawn from the combination.” ¹¹
In the words of Skinner,

“Reasoning is the word used to describe the mental recognition of cause and effect relationships. It may be prediction an evident form an observed cause or the inference of a cause from an observed event.”  

Reasoning follows certain logical and systematic steps which are stated below.

- Acquaintance of that objective or goal for which reasoning is to be made.
- Mental search for various probabilities, causes and consequences, relations or situations for achieving goals or determined objectives based on observation or efforts.
- Selection of best probability or solution by careful mental analysis of all available options.
- To examine reliability of each selected probability/solution by entirely mental practices and finally to accept or reject it for solution of problem.

In this way, reasoning is regarded as a higher type of thought which helps the person in his mental search of solution of problem. According to Hazlitt,

“Intelligence is the problem solving organization of the mind.”

Above definitions clear that reasoning is an idea in which way to solution is indicated.

2.4.3 Reasoning Ability

Reasoning ability plays an important role for a person in adjustment with environment. It does not control only cognitive activities, but it influences whole interaction and personality of a person by proper or improper development of reasoning ability. Really it is a cognitive ability and resembles to thinking power in many aspects, such as…

- Like real thinking, it has certain aims and objectives.
- It is an implied work and includes problem-solving within itself.
- Like thinking, it uses pre knowledge and experiences of a person.
- Instead of practical search, it is a mental quest because mental search of causes or incident is included in it.
- Like thinking, reasoning is a higher level of resistance action. Interpretation power of various symbols, concepts and language development helps reasoning.
- It is not possible to separate thought and reasoning as separate affairs. Reasoning is called an excellent and progressive phase in complex process of thinking, comparatively, it can be considered as more important and more complex mental process.

2.4.3.1 Types of Reasoning Ability

Reasoning ability is an important factor for problems created in practical life by using mixture of thinking and experiences. Reasoning ability leads to depth of root matter in study of any subject.

Reasoning ability is useful to understand inter relations among subjects and their concepts.

If we try to understand reasoning ability in term of psychology, reasoning directly relates to information consisted in human mind. The ability of recalling this information when it is needed and utilization in certain situation entirely depends on attitude and aptitude of that person. In this way, reasoning is a specific behavior of that individual. Reasoning ability depends on reasoning generalization system. There are two types of reasoning.

(1) Inductive reasoning

(2) Deductive reasoning

(1) **Inductive reasoning**

When the statement is based on general observation or experience, it is called inductive reasoning. In this type of reasoning, we follow inductive process. Induction is connected to any statement, rule or principle. In inductive reasoning, we can reach any general conclusion or principle by using certain facts or specific examples. Thus, inductive reasoning is a specific kind of thought which is aimed at searching common doctrine or forming any rule through certain cases, specific examples, identification of facts or use of relations. Induction has an important place in the whole process of inductive reasoning. Inductive
reasoning is a natural reasoning by which we can reach any definite assumption or experience by co-coordinating common matters produced from practices. Generally, in human behavior-pattern, assumption is made by generalization process on normal matters.

(2) **Deductive reasoning**

In deductive reasoning, reasoning is self-evident, true and based on hypotheses. When any scientific process occurs on the basis of any principle, it is called deductive process. In this type of reasoning, solution of problem is made by unifying all probable aspects based on established rules or principles. Deductive reasoning is inverse process from inductive reasoning. In this process, use of known established statement or theory is used for certain definite cases. It is futile to say that we solve problems by using what we know because all assumptions are toward definite matters. Deduction is called inverse process of induction because the process of reasoning in it is to go to assumption from general established theory by observation of definite happenings.

In practical life, there is no any matter or behavior which is based on reasoning. Behind any matter or behavior, a thought is hidden.

**2.4.3.2 Measurement of Reasoning Ability**

The term ‘intelligence’ is widely used in the fields of education and psychology. A large series of definitions of intelligence is used.

Group Ability Tests provide information about working ability of persons. The verbal section of tests measure vocabulary, word similarity, simple Mathematical reasoning ability, and background of information.

**Differential Aptitude Test (DAT)**

This test is constructed for students of Std. 8 to Std.12 in which test questions on Verbal Reasoning, Abstract Reasoning, Spatial Reasoning, Mechanical Reasoning, Clerical speed and accuracy, language in use, spellings and sentences are included. Higher correlation is found between scores of students in this test and their achievement in schools and colleges. But scores obtained by differential presumption have comparatively lower validity.
We know that Reasoning Ability Test is a kind of an Intelligence Test. Such Intelligence Test is similar to Reasoning Ability Test - RAT. Intelligence is measured by using revision of Stanford of Benet - Simon Test (Stanford Test). Intelligence is also measured by Group Intelligence Test, Performance Test, the California Mental Maturity Test, Wechsler – Bellevue Scale, the Detroit Learning Aptitude Test and Coalman Mental Development Test. There are some other individual tests for Intelligence measurement. Their execution is done by test-executives.

2.4.3.3 Aptitude Tests

During 20th century, efforts of measuring intelligence have played an important role in the field of psychological tests. According to Bingham Walter,

“Intelligence like so many other terms in psychology is meaningful to most people but difficult to define precisely. Many, definition have been proposed like, the ability to learn, adaptability to new situations, reasoning ability and facility in the use of symbols. Some writers broaden the definition, for example, Thorndike’s use of the term abstract, Mechanical and Social intelligence and Vernon’s distinction between verbal, educational and concrete, mechanical intelligence.”

Like other conceptions in psychology, intelligence is meaningful for many people but defining it properly is too difficult task. Many definitions like learning ability, ability to adjust in new environment, reasoning ability and ability to use symbols etc are presented. Some experts make this definition more extensive. For example, Thorndike ha used concepts of abstract, mechanical and social intelligence and differentiated between verbal-academic and real mechanical intelligence.

In 1927, Spearman had considered intelligence as general mental aspect and named it ‘g’. Thurston had considered aptitude as integrated aspect in mental traits. In any performance, more mental abilities such as Verbal Reasoning Ability, Abstract Reasoning Ability or Mathematical aptitude are included.
If the test is multinomial, student obtains better score on some related content but found weak in some other related content. It is concluded that intelligence is consisted many specific abilities or aptitudes.

2.5.0 Review of Related Previous Study

The reviews of the related literature which are directly or indirectly connected with the topic related to the present problem are as follows:

National Researches on Spatial Reasoning, Spatial Ability, Intelligence and Achievement

- Study : 1
- Title : Effect of Select Correlates of Achievement Motivation on Academic Achievement in Biology Among the Students At Higher Secondary Level

- Researcher : Sivprasad K.
- Degree : Ph.D.
- Year : 2012
- University : Mahatma Ghandhi University, Kerla

Objectives

1. To find out the status of the select correlates of achievement motivation and achievement in Biology among the higher secondary school students for the sample and for the relevant sub samples.

2. To find out the relationship between the select correlates of achievement motivation and achievement in Biology among the higher secondary school students for the total sample and for the relevant sub samples.

3. To find out the effect of the select correlates of achievement motivation on achievement in Biology among the higher secondary school students.

Population:

In this study, the population comprised of standard-9th Students were selected from Kollam, Pathanamthitta, Alappuzha, Kottayam, Idukki and Ernakulam districts.
Sample:
For the Present Study sample consists of 740 higher secondary science students. Out of which 282 are boys and 485 are girls, 277 are from urban areas and 463 are from rural areas. With regard to the Type of Management of the institution 297 students are from government schools, 278 from aided schools and 165 from unaided schools.

Research Method:
In the present research the researcher used survey research method for data collection.

Research Tool:
For the present study following tools were used:
1. Examination Anxiety Scale
2. Study Habits Inventory
3. Self-Concept Scale
4. Home Learning Environment Inventory
5. Achievement Test in Biology

Method of Analysis:
In the present study, t-test, ANNOVA, Mean, Median, mode, SD, Skewness, kurtosis and SEM were calculated.

Findings:
1. Analysis of variance from table 5.99 revealed that, levels of Examination, Anxiety has significant effect on Achievement in Biology. This implies that High, Average and Low achievers in Biology differ significantly with the three levels of Examination Anxiety.

2. Analysis of variance from table 5.101 revealed that, levels of Study Habits has significant effect on Achievement in Biology. This implies that High, Average and Low achievers in Biology differ significantly with the three levels of Study Habits.

3. Analysis of variance from table 5.103 revealed that, levels of Home Learning Environment has significant effect on
achievement in Biology. This implies that High, Average and Low achievers in Biology differ significantly with the three levels of Home Learning Environment.

Study: 2

Title: A Comparative Study of Blood Groups with Regards to Academic Achievement, Intelligence and Personality of Arts

Researcher: Rakeshkumar Sharma
Degree: Ph.D.
Year: 2012
University: CH. Charan Sinh University, Meerut

Objectives
1. To Compare Academic Achievement in Maths of secondary students belong to A, B, AB & O blood groups.
2. To Compare Academic Achievement in Science of secondary students belong to A, B, AB & O blood groups.
3. To Compare Academic Achievement in English of secondary students belong to A, B, AB & O blood groups.
4. To Compare Intelligence of secondary students belong to A, B, AB & O blood groups.
5. To Compare Personality of secondary students belong to A, B, AB & O blood groups.

Population: The population for the purpose of this study has been defined as all the XI graders students studying in schools situated in Meerut Educational District (U.P.) and affiliated to CBSE New Delhi.

Sample: For this purpose 10 schools were selected randomly and their principals were approached for the collection of data. The principals of the schools were also informed regarding the nature of the research work in brief. Most of the schools were located in Meerut City (Mahanagar Palika
Area). The tests for collection of data were administered on the dates for which the researcher already got the permission from the concerned school authorities. From 10 schools a sample of 1014 students were selected randomly (almost 100 from each school).

Research Method:
In the present research the researcher used survey research method for data collection.

Research Tool:
For the present study following tools were used:
1. To identify the blood group of the students a Performa of general information used.
2. The Group Test of Intelligence used in the study is prepared by Dr. G.C. Ahuja

Method of Analysis:
In the present study, t-test and F- Value were calculated.

Findings:
1. Secondary students belonging to A blood group show comparatively better performance in Mathematics with respect to the secondary students belonging to B blood group.
2. Secondary students belonging to AB blood group show comparatively better performance in Mathematics with respect to the secondary students belonging to A blood group.
3. Secondary students belonging to A blood group show comparatively better performance in Mathematics with respect to the secondary students belonging to O blood group.
4. Secondary students belonging to AB blood group show comparatively better performance in Mathematics with respect to the secondary students belonging to B blood group.
5. Secondary students belonging to B blood group show approximately similar performance in Mathematics with respect to the secondary students belonging to O blood group.
6. Secondary students belonging to AB blood group show comparatively better performance in Mathematics with respect to the secondary students belonging to O blood group.

7. Secondary students belonging to A blood group show comparatively better performance in Science with respect to the secondary students belonging to B blood group.

8. Secondary students belonging to AB blood group show comparatively better performance in Science with respect to the secondary students belonging to A blood group.

9. Secondary students belonging to A blood group show approximately similar performance in Science with respect to the secondary students belonging to O blood group.

10. Secondary students belonging to AB blood group show comparatively better performance in Science with respect to the secondary students belonging to B blood group.

11. Secondary students belonging to O blood group show comparatively better performance in Science with respect to the secondary students belonging to B blood group.

12. Secondary students belonging to AB blood group show comparatively better performance in Science with respect to the secondary students belonging to O blood group.

13. Secondary students belonging to A blood group show comparatively better performance in English with respect to the secondary students belonging to B blood group.

14. Secondary students belonging to A blood group show approximately similar performance in English with respect to the secondary students belonging to AB blood group.

15. Secondary students belonging to A blood group show approximately similar performance in English with respect to the secondary students belonging to O blood group.
16. Secondary students belonging to AB blood group show comparatively better performance in English with respect to the secondary students belonging to B blood group.

17. Secondary students belonging to O blood group show comparatively better performance in English with respect to the secondary students belonging to B blood group.

18. Secondary students belonging to AB blood group show approximately similar performance in English with respect to the secondary students belonging to O blood group.

19. Secondary students belonging to A blood group are more Intelligent than the secondary students belonging to B blood group.

20. Secondary students belonging to A blood group are more Intelligent than the secondary students belonging to AB blood group.

21. Secondary students belonging to A blood group are as equally Intelligent as the secondary students belonging to O blood group.

22. Secondary students belonging to AB blood group are more Intelligent than the secondary students belonging to B blood group.

23. Secondary students belonging to O blood group are more Intelligent than the secondary students belonging to B blood group.

24. Secondary students belonging to AB blood group are as equally Intelligent as the secondary students belonging to O blood group.

25. Secondary students belonging to A blood group are as equally Active in terms of Activity-Passivity Trait of their Personality as secondary students belonging to B blood group.

26. Secondary students belonging to A blood group are as equally Active in terms of Activity-Passivity Trait of their Personality as secondary students belonging to AB blood group.
27. Secondary students belonging to O blood group are more Active in terms of Activity-Passivity Trait of their Personality than secondary students belonging to A blood group.

28. Secondary students belonging to B blood group are as equally Active in terms of Activity-Passivity Trait of their Personality as secondary students belonging to AB blood group.

29. Secondary students belonging to O blood group are more Active in terms of Activity-Passivity Trait of their Personality than secondary students belonging to B blood group.

30. Secondary students belonging to AB blood group are as equally Active in terms of Activity-Passivity Trait of their Personality as secondary students belonging to O blood group.

31. Secondary students belonging to A blood group are as equally Enthusiastic in terms of Enthusiastic-Non-enthusiastic Trait of their Personality as secondary students belonging to B blood group.

32. Secondary students belonging to AB blood group are more Enthusiastic in terms of Enthusiastic-Non-enthusiastic Trait of their Personality than secondary students belonging to A blood group.

33. Secondary students belonging to A blood group are more Enthusiastic in terms of Enthusiastic-Non-enthusiastic Trait of their Personality than secondary students belonging to O blood group.

34. Secondary students belonging to AB blood group are more Enthusiastic in terms of Enthusiastic-Non-enthusiastic Trait of their Personality than secondary students belonging to B blood group.
Study : 3
Title : Examination Stress in Relation to Intelligence, Personality and Achievement Motivation Among School Children

Researcher : Hira Singh
Degree : Ph.D.
Year : 2012
University : Punjabi University, Patiala

Objectives
1. To study the level of stress among school children.
2. To know the gender difference in the impact of examination stress among school children.
3. To find out the influence of intelligence on the examination stress among school children.
4. To study the influence of personality on the examination stress among school children.
5. To explore the influence of achievement motivation on the examination stress among school children.
6. To know the interactive affect of intelligence and personality on the examination stress among school children.
7. To explore the interactive affect of personality and achievement motivation on the examination stress among school children.
8. To find out the interactive affect of intelligence and achievement motivation on the examination stress among school children.
9. To explore the interactive affect of intelligence, personality and achievement motivation on the examination stress among school children.

Population :
Population of the present study includes Students of Standard-10th of Patiala and Faridabad District of Punjab state.
Sample: To collect the sample for the study, two districts of Punjab i.e. Patiala and Faridkot were randomly selected out of the 22 districts of Punjab. Then four sub-divisions of Patiala district and two sub-divisions of Faridkot district were chosen on random basis. From Patiala district 223 subjects were taken randomly whereas 177 subjects were selected from Faridkot district. Therefore, total size of the sample was 400 school children from urban schools of Punjab.

Research Method: In the present research the researcher used survey research method for data collection.

Research Tool: For the present study following tools were used:
2. Indian Adaptation of Contact Personality Factor Test prepared by S.S. Srivastava.
3. Indian Adaptation of TAT prepared by Uma Choudhary according to the procedure laid down by McClelland by using TAT cards of Murray.
4. Examination Stress Scale developed by the investigator.

Method of Analysis: In the present study, Mean scores, Standard Deviations and Percentages were computed. To find out the significance of difference between means of different groups under study test was applied, ANOVA was used to find out difference within different variables of the present study.

Findings: 1. The mean score of male students was less than the mean scores of female students indicating that female students feel more examination stress than male school children.
2. Variation in the examination stress due to intelligence or personality or because of both has been found to be statistically significant.

3. There is no significant interaction found between achievement motivation and intelligence.

4. There exists insignificant interactive affect of personality, intelligence and achievement motivation on examination stress.

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**Study** : 4

**Title** : Effect of yoga exercises on achievement memory and reasoning ability

**Researcher** : Nileshkumar B. Gajjar

**Degree** : Ph.D.

**Year** : 2012

**University** : Sardar Patel University, Vallabh Vidhyanagar

**Objectives**

1. To construct and try out the Yoga exercises programme for the students of standard 11th Commerce and subject of Commerce.

2. To examine the effect of Yoga exercise on Achievement of Commerce subject of the students of standard 11th Commerce.

3. To examine the effect of yoga exercise on verbal reasoning Ability of the students of standard 11th Commerce.

4. To construct and try out Short-term Memory pre test and post test for measurement of short-term memory of the students of 11th commerce.

5. To examine the effect of Yoga exercises on Short-term Memory of the students of standard 11th Commerce.

6. To construct and try out of Academic Achievement pre test and post test on the subject of Commerce for measurement of Academic Achievement in Commerce subject of the students of 11th commerce.

7. To try out of Verbal Reasoning Ability pre test and post test for measurement of Verbal Reasoning Ability of the students of 11th Commerce.
Population:
For the present study, selected students of standard-11th commerce of Gujarati medium schools of Mehsana Taluka of Gujarat State were considered as the population for the study.

Sample:
From Two schools, 80 students were selected by using purposive sample method were selected for the present study.

Research Method:
In the present research the researcher used experimental research method for data collection.

Research Tool:
For the present study following tools were used:
1. Verbal Reasoning Ability test was constructed and standardized by Dr. D.S.Patel.
2. Academic Achievement test
3. Short-term Memory measurement test and Verbal Reasoning Ability test.

Method of Analysis:
In the present study, mean, standard deviation, quartile deviation, and t-value to check hypothesis were calculated.

Findings:

Findings Regarding to the Effect of Yoga exercises on Academic Achievement of the Students of Rural Area
1. No significant difference was seen between the Mean scores of the pre test and the post test of the students of controlled group at 0.05 and 0.01 levels. So it was concluded that the students of controlled group were equal in the Academic Achievement in the pre test and the post test.
2. Significant difference was seen between the Mean scores of the pre
test and the post test of the students of experimental group 201 at 0.05 and 0.01 levels. So it was concluded that positive effect of Yoga exercises was seen on the students of experimental group.

3. No significant difference was seen between the Mean scores of the pre test of controlled group and experimental group 0.05 and 0.01 levels. So it was concluded that both the groups were equal in the Academic Achievement before treatment of Yoga exercises.

4. Significant difference was seen between the Mean scores of the post test of controlled group and experimental group at 0.05 and 0.01 levels. So it can be said that the Academic Achievement of the students can be increased by Yoga exercise.

🎯 Findings Regarding to the Effect of Yoga exercises on Verbal Reasoning Ability of the Students of Rural Area

5. No significant difference was seen between the Mean scores of the pre test and the post test of the students of controlled group at 0.05 and 0.01 levels. So it was concluded that the students of controlled group were equal in the Verbal Reasoning Ability in the pre test and the post test.

6. Significant difference was seen between the Mean scores of the pre test and the post test of the students of experimental group at 0.05 and 0.01 levels. So it was concluded that the positive effect of Yoga exercises was seen on the students of experimental group.

7. No significant difference was seen between the Mean scores of the pre test of controlled group and experimental group at 0.05 and 0.01 levels. So it was concluded that both the groups were equal in Verbal Reasoning Ability before the treatment of Yoga exercises.

8. Significant difference was seen between the Mean scores of the post test of controlled group and experimental group at 0.05 and 0.01 levels. So it can be said that the Verbal Reasoning Ability of students can be increased by Yoga Exercise.
Findings Regarding to the Effect of Yoga exercises on Short-term Memory of the Students of Rural Area

9. No significant difference was seen between the Mean scores of the pre test and the post test of the students of controlled group at 0.05 and 0.01 levels. So it was concluded that the students of controlled group were equal in the Short-term Memory in the pre test and the post test.

10. Significant difference was seen between the Mean scores of the pre test and the post test of the students of experimental group at 0.05 and 0.01 levels. So it was concluded that positive effect of Yoga exercises was seen on the students of experimental group.

11. No significant difference was seen between the Mean scores of the pre test of controlled group and experimental group at 0.05 and 0.01 levels. So it was concluded that both the groups were equal in the Short-term Memory before treatment of Yoga exercises.

12. Significant difference was seen between the Mean scores of the post test of controlled group and experimental group at 0.05 and 0.01 levels. So it can be said that the Short-term Memory of the students can be increased by Yoga exercise.

Findings Regarding to the Effect of Yoga Exercise on Academic Achievement of the Students of Urban Area

13. No significant difference was seen between the Mean scores of the pre test and the post test of the students of controlled group at 0.05 and 0.01 levels. So it was concluded that the students of controlled group were equal in the pre test and the post test of Academic Achievement.

14. Significant difference was seen between the Mean scores of the pre test and the post test of the students of experimental group at 0.05 and 0.01 levels. So it was concluded that positive effect of Yoga exercises was seen on the students of experimental group.
15. No significant difference was seen between the Mean scores of the pre test of controlled group and experimental group at 0.05 and 0.01 levels. So it was concluded that both the groups were equal in the Academic Achievement before treatment of Yoga exercises.

16. Significant difference was seen between the Mean scores of the post test of controlled group and experimental group at 0.05 and 0.01 levels. So it can be said that the Academic Achievement of the students can be increased by Yoga exercises.

† Findings Regarding to the Effect of Yoga exercises on Verbal Reasoning Ability of the Students of Urban Area

17. No significant difference was seen between the Mean scores of the pre test and the post test of the students of controlled group at 0.05 and 0.01 levels. So it was concluded that the students of controlled group were equal in the pre test and the post test of Verbal Reasoning Ability.

18. Significant difference was seen between the Mean scores of the pre test and the post test of the students of experimental group at 0.05 and 0.01 levels. So it was concluded that positive effect of Yoga exercises was seen on the students of experimental group.

19. No significant difference was seen between the Mean scores of the pre test of controlled group and experimental group at 0.05 and 0.01 levels. So it was concluded that both the groups were equal in the Verbal Reasoning Ability before treatment of Yoga exercises.

20. Significant difference was seen between the Mean scores of the post test of controlled group and experimental group at 0.05 and 0.01 levels. So it can be said that the Verbal Reasoning Ability of the students can be increased by Yoga exercises.

† Findings Regarding to the Effect of Yoga exercises on Short-term Memory of the Students of Urban Area

21. No significant difference was seen between the Mean scores of the pre test and the post test of the students of controlled group at 0.05
and 0.01 levels. So it was concluded that the students of 205 controlled group were equal in the Mean scores in Short-term Memory in the pre test and the post test.

22. Significant difference was seen between the Mean scores of the pre test and the post test of the students of experimental group at 0.05 and 0.01 levels. So it was concluded that positive effect of Yoga exercises was seen on the students of experimental group.

23. No significant difference was seen between the Mean scores of the pre test of controlled group and experimental group at 0.05 and 0.01 levels. So it was concluded that both the groups were equal in the Short-term Memory before the treatment of Yoga exercises.

24. Significant difference was seen between the Mean scores of the post test of controlled group and experimental group at 0.05 and 0.01 levels. So it can be said that the Short-term Memory of the students can be increased by Yoga exercises.

Findings Regarding to the Effect of Yoga Exercises on Academic Achievement of the Students of Rural Area in Relation to Sex

25. Significant difference was seen between the Mean scores of Boys of controlled group and Girls of experimental group in the post test at 0.01 and 0.05 levels. The Mean value of the Girls of experimental group in the post test was seen 43.5 whereas it was 32.8 of the Boys of controlled group. So it was concluded that the effect of Yoga exercises was seen in favour of the Girls.

26. Significant difference at 0.05 level was seen between the Mean scores of Girls included in controlled group and Boys of experimental group in the post test. The Mean value of the Boys of experimental group in the post test was seen 42.5 whereas it was 38.2 of the Girls of controlled group. So it was concluded that the effect of Yoga exercises was seen in favour of the Boys.

27. No significant difference was seen at 0.05 and 0.01 level between the Mean scores of the Boys and Girls of experimental group. So it
was concluded that the effect of Yoga exercises was seen equally on sex.

Findings Regarding to the Effect of Yoga exercises on Verbal Reasoning Ability of the Students of Rural Area in Relation to Sex

28. Significant difference at 0.01 and 0.05 level was seen between the Mean scores of the Boys of controlled group and Girls of experimental group in the post test. The Mean value of the Girls of experimental group in the post test was seen 60 where as it was 47.80 of the Boys of controlled group. So it was concluded that the effect of Yoga exercises was seen in favour of the Girls.

29. Significant difference at 0.05 level was seen between the Mean scores of the Girls of controlled group and Boys of experimental group in the post test. The mean value of the Boys of experimental group in the post test was seen 57.1 where as it was 46.8 of the Girls of controlled group. So it was concluded that the effect of Yoga exercises was seen in favour of the Boys.

30. No significant difference was seen at 0.05 and 0.01 level between the Mean scores of Boys and Girls of experimental group. So it was concluded that the effect of Yoga exercises was seen equally on sex.

Findings Regarding to the Effect of Yoga Exercise on Short-term Memory of the Students of Rural Area in Relation to Sex

31. Significant difference at 0.05 and 0.01 level was seen between the Mean scores of Boys of controlled group and Girls of experimental group in the post test. So it can be said that the effect of Yoga Exercise was seen in favour of the Girls.

32. No significant different at 0.05 and 0.01 level was seen between the Mean scores of Girls of controlled group and Boys of experimental group. So it was concluded that the equal effect of Yoga Exercise was seen on Boys and Girls.
33. No significant difference at 0.05 and 0.01 level was seen between the Mean scores of the Boys and Girls of experimental group in the post test. So it was concluded that effect of Yoga exercises was seen equally on sex.

Findings Regarding to the Effect of Yoga Exercise on Academic Achievement of the Students of Urban Area in Relation to Sex

34. Significant difference at 0.01 and 0.05 level was seen between the Mean scores of the Boys of controlled group and the Girls of experimental group in the post test. The Mean value of the 208 Girls of experimental group in the post test was seen 44 where as it was 36.50 of the Boys of controlled group. This value was in favour of Girls. So it was concluded that the effect of Yoga exercise was seen in favor of the Girls.

35. No significant different at 0.05 and 0.01 level was seen between the Mean scores of Girls of controlled group and the Boys of experimental group. So it was concluded that the equal effect of Yoga Exercise was seen on the Boys and the Girls.

36. No significant different at 0.05 and 0.01 level was seen between the Mean scores of Boys and Girls of experimental group in the post test. So it was concluded that effect of Yoga Exercise was seen equally on sex.

Findings Regarding to the Effect of Yoga Exercise on Verbal Reasoning Ability of the Students of Urban Area in Relation to Sex

37. Significant difference at 0.01 and 0.05 level was seen between the Mean scores of Boys of controlled group and Girls of experimental group in the post test. The mean value of Girls of experimental group in the post test was seen 60.70 where as it was 47 of the Boys of controlled group. This value was in favor of the Girls. So it was concluded that the effect of Yoga exercise was seen in favor of the Girls.
38. No significant difference at 0.05 and 0.01 level was seen between the Mean scores of Girls of controlled group and Boys of experimental group. So it was concluded that effect of Yoga exercises was seen equally on Boys and Girls. 209

39. No significant difference at 0.05 and 0.01 level was seen between the Mean scores of the Boys and the Girls of experimental group in the post test. So it was concluded that effect of Yoga exercises programme was seen equally on sex.

 FETCH Findings Regarding to the Effect of Yoga Exercise on Short-term Memory of the Students of Urban Area in Relation to Sex

40. Significant difference at 0.01 and 0.05 level was seen between the Mean scores of the Boys of controlled group and the Girls of experimental group in the post test. The mean value of the Girls of experimental group in the post test was seen 40.45 where as it was 28.85 of the Boys of controlled group. This value was in favor of the Girls. So it was concluded that the effect of Yoga exercise was seen in favor of the Girls.

41. No significant difference at 0.05 and 0.01 level was seen between the Mean scores of the Girls of controlled group and the Boys of experimental group. So it was concluded that the effect of Yoga exercises programme was seen equally on the Boys and the Girls.

42. No significant difference at 0.05 and 0.01 level was seen between the Mean scores of the Boys and the Girls of experimental group in the post test. So it was concluded that effect of Yoga exercises was seen equally on sex.

 FETCH Study : 5
Title : A Comparative Study of the Achievement in Science In relation to Intelligence, Academic Anxiety and Regarding interest of the X class students in Government and Private Schools of Hariyana
Objectives

1. To compare the Academic Anxiety of the students of Xth class in Government and Private Schools.
2. To compare the Academic Anxiety of the male and female students of Xth class in Government Schools.
3. To compare the Academic Anxiety of the male and female students of Xth class in Private Schools.
4. To compare the Academic Anxiety of the male students of Xth class in Government and Private Schools.
5. To compare the Academic Anxiety of the female students of Xth class in Government and Private Schools.
6. To compare the intelligence of the students of Xth class in Government and Private Schools.
7. To compare the intelligence of the male and female students of Xth class in Government Schools.
8. To compare the intelligence of the male and female students of Xth class in Private Schools.
9. To compare the intelligence of the male students of Xth class in Government and Private Schools.
10. To compare the intelligence of the female students of Xth class in Government and Private Schools.
11. To compare the Reading interest of the students of Xth class in Government and Private Schools.
12. To compare the Reading interest of the male and female students of Xth class in Government Schools.
13. To compare the Reading interest of the male and female students of Xth class in Private Schools.
14. To compare the Reading interest of the male students of Xth class in Government and Private Schools.
15. To compare the Reading interest of the female students of Xth class in Government and Private Schools.
16. To compare the Achievement in Science of the students of Xth class in Government and Private Schools.
17. To compare the Achievement in Science of the male and female students of Xth class in Government Schools.
18. To compare the Achievement in Science of the male and female students of Xth class in Private Schools.
19. To compare the Achievement in Science of the male students of Xth class in Government and Private Schools.
20. To find the relationship between Academic Anxiety and Academic Achievement in Science of the X Class students.
21. To find the relationship between Intelligence and Academic Achievement in Science of the X Class students.
22. To find the relationship between Reading Interest and Academic Achievement in Science of the X Class students.
23. To compare the Achievement in Science of the female students of Xth class in Government and Private Schools.

❖ **Population**

In this study, the population comprised of X Grade students of Rohtak and Sonepat districts belonging to the formal/regular streams of Education and list of schools was obtained from D.E.O. Rohtak and Sonepat.

❖ **Sample**

Total 200 students from Government Schools and 200 students from private schools were selected. The sample consists of 400 students of Rohtak and Sonepat District’s Private and Government schools.
Research Method:
In the present research the researcher used survey research method for data collection.

Research Tool:
For the present study following tools were used:
1. Academic Anxiety: Dr. A. K. P. Sinha and Dr. I. N. K. Sinha
2. General Intelligence Test: Dr. S. M. Mohsin
3. Achievement Test in Science: Self constructed
4. Reading interest inventory: Self Constructed

Method of Analysis:
In the present study, t-test, ANNOVA, r, Chi Square co relation, R-Multiple Regression were calculated.

Findings:
1. There is a significant difference in the mean scores of academic anxiety of government and private schools students. It may therefore be concluded that government school students have less academic anxiety in comparison to private school students.
2. There is a significant difference in the mean scores of academic anxiety of government school male and female students. It may therefore be concluded that male government school students have less academic anxiety in comparison to government female schools students.
3. There is a significant difference in the mean scores of academic anxiety of private school male and female students. It may therefore be concluded that male private school students have less academic anxiety in comparison to private female schools students.
4. There is a significant difference in the mean scores of academic anxiety of government school male and private school male students. It may therefore be concluded that male government school students have less academic anxiety in comparison to private male schools students.
5. There is a significant difference in the mean scores of academic anxiety
of government school female and private school female students. It may therefore be concluded that female government school students have less academic anxiety in comparison to private female schools students.

6. There is a significant difference in the mean scores of intelligence of government school and private school students. It may therefore be concluded that government school students have less intelligence in comparison to private schools students.

7. There is a significant difference in the mean scores of reading interest of government school and private school students. It may therefore be concluded that government school students have less reading interest in comparison to private schools students.

8. There is significant difference in the mean scores of reading interest of male government school and female government school students. It may therefore be concluded that male government school students have less reading interest in comparison to female government schools students.

9. There is a significant difference in the mean scores of reading interest of male students of private school and female students of private schools. Female students of private schools have good reading interests in comparison to their male counterparts.

10. There is a significant difference in the mean scores of reading interest of male students of government school and male students of private school. It may therefore be concluded that male students of government school students have less reading interest in comparison to male students of private schools.

11. There is a significant difference in the mean scores of reading interest of female students of government school and female students of private school. It may therefore be concluded that female students of government school students have less reading interest in comparison to female students of private schools.

12. There is significant difference in the mean scores of academic
achievement of government school and private school students. It may therefore be concluded that government school students have less academic achievement in comparison to private schools students.

13. There is a significant difference in the mean scores of academic achievement of male students of government schools and female students of government schools. It may therefore be concluded that male students of government schools have less academic achievement in comparison to female students of government schools.

14. There is a significant difference in the mean scores of academic achievement of male students of private school and female students of private schools. Female students of private schools have much academic achievement in comparison to their male counterparts.

15. There is a significant difference in the mean scores of academic achievement of male students of government school and male students of private school. It may therefore be concluded that male students of government school students have less academic achievement in comparison to male students of private schools.

16. There is a significant difference in the mean scores of academic achievement of female students of government school and female students of private school. It may therefore be concluded that female students of government school students have less academic achievement in comparison to female students of private schools.

17. Academic anxiety and Academic Achievement in Science of secondary school students are positively correlated with each other.

18. Intelligence and Academic Achievement in Science of secondary school students are positively correlated with each other.

19. Reading Interest and Academic Achievement in Science of secondary school students are positively correlated with each other.
Study : 6
Title : A Study on Emotional Intelligence, Multiple Intelligence, Socio Economic Status and Academic Achievement of Higher Secondary Students
Researcher : P. SO. Keshavan
Degree : Ph.D.
Year : 2009
University : Periyar University, Tamilnadu

Objectives
2. To Study the Multiple Intelligence of the Higher Secondary Students.
3. To Study the relationship between Emotional Intelligence and Multiple Intelligence of the Higher Secondary Students.
4. To find out if there is any significant difference in Emotional Intelligence among the sub samples based on the selected variables.

Population :
Population of the present study includes the entire XI standard students in schools under different management in Namakkal District.

Sample :
The study was conducted in Namakkal District of Tamilnadu State in India. The data for the study has been derived from a representative sample of size 1300 obtained from standard XI students attending the Higher Secondary Schools in Namakkal District of TamilNadu in India. The sample obtained using stratified random sampling technique by giving proportional representation to aspects like sex, place of residence, group of study, institutional type, socio economic status etc.

Research Method :
In the present research the researcher used survey research method for data collection.
Research Tool:

For the present study following tools were used:

1. Self made Emotional Intelligence Inventory
2. Multiple Intelligence inventory was developed by Thomas Armstrong
3. Percentage of Marks taken to decide Achievement

Method of Analysis:

In the present study, t-test, ANNOVA, r, Chi Square correlation, R-Multiple Regression were calculated.

Findings:

1. There is no significant difference between male and female higher secondary students in their perception of parent and school relationship but there is significant difference between male and female higher secondary students in their perception of parenting, parent and academic involvement, parent and multi skill development and overall parental influence.

2. There is no significant difference between Tamil medium and English medium higher secondary students in their perception of parenting and parent and multi skill development but there is significant difference between Tamil medium and English medium higher secondary students in their perception of parent and school relationship, parent and academic involvement, and overall parental influence.

3. There is no significant difference between rural and urban higher secondary students in their perception of parenting, parent and school relationship, parent and academic involvement, parent and multi skill development and overall parental influence.

4. There is no significant difference among science, arts and vocational group higher secondary students in their perception of parenting, parent and school relationship, parent and multi skill development and overall parental influence but there is significant difference among science, arts
and vocational groups of higher secondary students in their perception of parent and academic involvement.

5. There is no significant difference among government, aided and matriculation higher secondary students in their perception of parenting and parent and multi skill development but there is significant difference in their perception of parent and school relationship, parent and academic involvement, and overall parental influence.

6. There is no significant difference among SC/ST, MBC, BC and OC higher secondary students in their perception of parenting, parent and school relationship, parent and academic involvement, parent and multi skill development and overall parental influence.

Study : 7

Title : Construction and Standardisation of Spatial Reasoning Ability Test for the Secondary Schools Students and Study of Spatial Reasoning Ability in the context to Some Variables

Researcher : Hareshkumar B. Vadhel

Degree : Ph.D.

Year : 2006

University : Gujarat University, Ahmedabad

Objectives

1. To Construct Spatial Reasoning test for Standard-8th,9th and 10th students.

2. To standardize Spatial Reasoning test for Standard-8th,9th and 10th students.

3. To check the effect of Spatial Reasoning on gender for Standard-8th,9th and 10th students.

4. To check the effect of Spatial Reasoning on grade for Standard-8th,9th and 10th students.

5. To check the effect of Spatial Reasoning on area for Standard-8th,9th and 10th students.
6. To check relation between of Spatial Reasoning and mathematical achievement of Standard-8th, 9th and 10th students.

7. To check relation between of Spatial Reasoning and overall mathematical achievement of Standard-8th, 9th and 10th students.

❖ Population:
Secondary schools students of Gujarat State’s Gujarati Medium were the population for the study.

❖ Sample:
For the present study stratified clustered sampling technique was adopted for the selection of sample. Total 24 secondary schools were selected. The sample comprised of 4396 students. Total 2390 students from urban area (1664 boys and 726 girls) and 2006 (1338 boys and 668 girls) were selected for the sample.

❖ Research Method:
In the present research the researcher used descriptive method for data collection.

❖ Research Tool:
For this study investigator used self-prepared and standardize spatial ability reasoning test. This test is in the form of MCQ with four options. The final test contains five sections and 10 questions in each section total 50 questions consist in the test.

❖ Method of Analysis:
In the present research the researcher used T-Score, Percentile rank, average, standard deviation, correlation, F-values and t-values for testing the null hypothesis.

❖ Findings:
1. Total 50 questions were selected in the test. Difficulty value between 0.40 to 0.60. Average difficulty value of all questions was 53.3.

2. Discriminate Value of 50 questions between 0.35 to 0.68. Average difficulty value of all questions was 0.44.
3. Reliability value was 0.79 to 0.97.
4. Validity value was (1) Correlation with Desai Verbal non verbal Group intelligence test was: 0.65 (2) T-Score with first term examination percentage was: 0.80 (3) T-Score with first term examination percentage of mathematics subject was: 0.69 (4) Factor analysis value as 0.9514.
5. Significant Effect of gender on spatial ability test scores.
6. Significant Effect of area on spatial ability test scores.
7. Significant Effect of grade on spatial ability test scores.

Study : 8
Title : Construction and Standardisation of Reasoning aptitude Test for the Trainees of B.Ed. colleges

Researcher : Kaushal A. Desai
Degree : Ph.D.
Year : 2006
University : Gujarat University, Ahmedabad

Objectives

1. To Construct Reasoning Aptitude test for Trainees of B.Ed. colleges.
2. To standardize Reasoning Aptitude test for Trainees of B.Ed. colleges.
3. To determine norms for Reasoning Aptitude test for Trainees of B.Ed. colleges.
4. To check the difference between boys and girls trainees on Reasoning aptitude.
5. To check the difference between urban and rural area trainees on Reasoning aptitude.
6. To check the difference between arts, commerce and science faculties trainees on reasoning aptitude.

Population :
B.Ed. college Trainees of different universities of Gujarat state were considered as the population for the study.
Sample:
Form the B. Ed. college of Gujarat state sample was selected by using random sampling technique. Total 1739 trainees were selected. Out of 1739 trainees 859 boys and 880 girls were selected for sample.

Research Method:
In the present research the researcher used descriptive method for data collection.

Research Tool:
For the present study two standardize test were selected. (1) reasoning aptitude test (2) Desai Verbal Non Verbal Group Intelligence Test.

Method of Analysis:
In the present research the researcher used T-Score, S-Score, Percentile rank and correlation for reliability and validity were used. t-value was calculated to check null hypothesis.

Findings:
1. Test retest reliability of was calculated after 20 days which found 0.84, KR$_{20}$ was 0.92, KR$_{21}$ was 0.91, corrected formula of K-R by tuckers was 0.92, reliability by split half method was 0.83.
2. Validity with first term examination marks was 0.28 and validity with Desai verbal non verbal group intelligence test was 0.76.
3. Effect of gender found on boys and girls students of arts faculty of B. Ed. colleges
4. Effect of gender not found on boys and girls students of commerce faculty of B. Ed. Colleges.
5. Effect of gender not found on boys and girls students of science faculty of B. Ed. Colleges.
7. Students of urban area found superior then students of rural area thus, effect of area not found of B. Ed. Colleges.
Study : 9
Title : The Impact of Anxiety, Frustration, Level of Aspiration and Intelligence on Academic Achievement

Researcher : Vibha Talwar
Degree : Ph.D.
Year : 2006
University : Bundelkhand University, Jhansi

Objectives
1. To Study the intelligence of higher secondary students in relation to gender, faculty and locale.
2. To Study the educational aspiration of higher secondary students in relation to gender, faculty and locale.
3. To Study the anxiety of higher secondary students in relation to gender, faculty and locale.
4. To Study the frustration of higher secondary students in relation to gender, faculty and locale.
5. To Study the academic achievement of higher secondary students in relation to gender, faculty and locale.
6. To Study the effect of intelligence, educational aspiration, anxiety and frustration on academic achievement of higher secondary students.

Population :
The population the present study was of both male and female students of intermediate class of the different college of Jhansi district of U.P.

Sample :
The Sample for the present study was selected randomly. Total 300 male and female students were selected for the present study.

Research Method :
In the present research the researcher used normative survey research method for data collection.
Research Tool:
For the present study following tools were used:

1. Standardize Group Mental Ability test prepared by Sri Mohan Chandra Joshi.
2. Standardize Educational Aspiration Scale prepared by Dr. S. K. Saxena
3. Standardize State Anxiety Scale prepared by Govind Tiwari and Roma Pal
4. Standardize Frustration Test prepared by Dr. N. S. Chauhan.
5. Self Prepared Achievement Test.

Method of Analysis:
In the present study, Mean, SD, Zero order correlation, t-test and F-test were calculated.

Findings:
Findings as per intelligence:

1. The urban students were found better than sub urban rural students.
2. The sub urban students were found better than the rural students.
3. The difference between mean of urban arts – male and female group was significant.
4. The difference between mean of urban science – male and female group was significant.
5. The difference between mean of sub-urban arts – male and female group was significant.
6. The difference between mean of sub-urban science – male and female group was significant.
7. The difference between mean of rural arts – male and female group was significant.
8. The difference between mean of urban rural – male and female group was significant.
9. The difference between mean of sub-rural arts – male and female group was significant.

10. The difference between mean of sub-rural science – male and female group was significant.

**Findings as per Educational Aspiration:**

1. The urban students were found better than sub urban rural students.
2. The sub urban students were found better than the rural students.
3. The difference between mean of urban arts – male and female group was significant.
4. The difference between mean of urban science – male and female group was significant.
5. The difference between mean of sub-urban arts – male and female group was significant.
6. The difference between mean of sub-urban science – male and female group was significant.
7. The difference between mean of rural arts – male and female group was significant.
8. The difference between mean of urban rural – male and female group was significant.
9. The difference between mean of sub-rural arts – male and female group was significant.
10. The difference between mean of sub-rural science – male and female group was significant.
11. The value of ‘F’ test of urban, sub-urban and rural samples were highly significant.
12. The value of coefficient of correlation between achievement and educational aspiration is 0.39 which is highly significant.

**Findings as per Anxiety:**

1. The urban students were found better than sub urban rural students.
2. The sub urban students were found better than the rural students.
3. The difference between mean of urban arts – male and female group was significant.
4. The difference between mean of urban science – male and female group was significant.
5. The difference between mean of sub-urban arts – male and female group was significant.
6. The difference between mean of sub-urban science – male and female group was significant.
7. The difference between mean of rural arts – male and female group was significant.
8. The difference between mean of urban rural – male and female group was significant.
9. The difference between mean of sub-rural arts – male and female group was significant.
10. The difference between mean of sub-rural science – male and female group was significant.
11. The value of ‘F’ test of urban, sub-urban and rural samples were highly significant.
12. The value of coefficient of correlation between achievement and anxiety is 0.25 which is highly significant.

Study : 10
Title : Construction and Standardisation of Reasoning aptitude Test for the Trainees of Primary Teacher training college based on Item Response Theories
Researcher : Haribhai M. Patel
Degree : Ph.D.
Year : 2004
University : Gujarat Vidhyapith, Ahmedabad
Objectives

1. To Construct Reasoning Aptitude test for Primary Teacher Training Trainees.
2. To Calculate Characteristic of item response theories and personality Characteristic.
3. To study of Characteristic of item response theories.
4. To determine reliability and validity for reasoning aptitude test

Population :
Trainees of Ahmedabad and Ghandhinagar of PTC college of during educational year-2002-03 were considered as the population for the study.

Sample :
Form the urban and rural area of ahmedabad and ghandhinagar sample was selected by using stratified clustered sampling technique. Total 600 trainees were selected from first and second year for the sample.

Research Method :
In the present research the researcher used descriptive method for data collection.

Research Tool :
For this study investigator used self prepared and standardize test. Total 16 factors were selected i.e. classification of co relation, complete the series, puzzle, mathematics sign, identification, complete the remain part of figure, reflection depended of mirror. Total 80 items were considered.

Method of Analysis :
In the present research the researcher used T-Score, S-Score, Percentile rank and correlation were used.

Findings :
1. Values of cronbanch alpha was 0.65.
2. Validity of the test found 0.39.
Objectives

Linear Justice logical problems and sadarsh mulak problem solving by children. Internal presentation, evaluation and analysis and use this information for strategic planning. In this reference generalization should be done.

Population

For the present study, students of age group 11 to 13+ were considered as the population for the study.

Sample

Form the standard-9th students of ahmedabad city were selected by using random sampling technique. Total 120 boys and 120 girls of Age group of 11 to 13 were selected from the present study.

Research Method

In the present research the researcher used descriptive method for data collection.

Research Tool

For the present study, ‘Revan’s Metrosize Test’ translated in Hindi was used.

Method of Analysis

In the present study, co relation were calculated.

Findings

1. Significant co relation between Scores of ability measurement test and linear justice reasoning measurement.
2. Group of High Ability students solve their problem speedily than low ability students.

3. Reponses of high ability group was high than low ability group students.

Study : 12
Title : Construction and Standardisation of Reasoning aptitude Test for Children’s of Primary Schools of Gujarat State
Researcher : Chimanlal K. Patel
Degree : M.Phil.
Year : 1991
University : Gujarat Vidhyapith, Ahmedabad

Objectives
1. To Construct Reasoning Aptitude test for children’s of standard-5 to 7th.
2. To standardize Reasoning Aptitude test for children’s of standard-5 to 7th.
3. To determine norms for Reasoning Aptitude test for children’s of standard-5 to 7th.

Population :
For the present study standard-5th to standard-7th students of Primary schools were considered as the population for the study.

Sample :
Form the primary schools students of standard-5th to standard-7th ahmedabad city was selected by using random sampling technique.
Total 10 private schools were selected from the present study.

Research Method :
In the present research the researcher used descriptive method for data collection.

Research Tool :
For the present study self made reasoning aptitude test was used.
Method of Analysis:

In the present research the researcher used T-Score, S-Score, Percentile rank and correlation for reliability and validity were used.

Findings:

1. Mean of standard-5th boys was 30.80 while mean of girls was 30.90. there is no significant difference between mean scores.
2. Mean of standard-6th boys was 34.60 while mean of girls was 34.30. there is no significant difference between mean scores.
3. There is no significant difference between boys and girls of standard-7th.
4. There is no significant difference between boys and girls of standard-5th and standard-7th.
5. Reliability by split half method was found 0.98 on the 139 students sample.
6. Reliability by KR20 formula was found 0.78.
7. Co relation with teacher opinion found standard-5th, standard-6th and standard-7th respectively 0.97, 0.90 and 0.90.

Study: 13

Title: Construction and Standardisation of Mathematical Reasoning Test for Secondary Schools Students

Researcher: Asha A. Patel
Degree: M.Phil.
Year: 2010
University: Gujarat University, Ahmedabad

Objectives

1. To Construct Mathematical reasoning ability test for Secondary School Student.
2. To determine reliability of Mathematical reasoning ability test.
3. To determine validity of Mathematical reasoning ability test.
4. To determine norms for Mathematical reasoning ability test.
5. To check the effect of standard, area and gender on mathematical reasoning ability test of secondary schools students.

6. To check the effect of interaction of standard, area and gender on mathematical reasoning ability test of secondary schools students.

❖ **Population**

For the present study, students of Secondary schools of Ahmedabad city were considered as the population for the study.

❖ **Sample**

Form the secondary schools students of Ahmedabad city 2 schools from east and 2 schools from west zone total 4 secondary schools were selected by using random sampling technique. Total 686 students from standard-8\(^{th}\), standard-9\(^{th}\) and standard-10\(^{th}\) were selected from the present study.

❖ **Research Method**

In the present research the researcher used descriptive method for data collection.

❖ **Research Tool**

For the present study self made mathematical reasoning ability test was used.

❖ **Method of Analysis**

In the present study, mean, standard deviation, median, kurtosis, quartile deviation, percentile rank, co-relation and norms were calculated. Test-retest method and split half method was used to determine reliability. Asang correlation method was used to determine validity of the test.

❖ **Findings**

1. Standard-9\(^{th}\) and standard-10\(^{th}\) students were more superior than standard-8\(^{th}\) students as far as their mathematical reasoning ability concern.

2. West zone students were more superior than east zone students as far as their mathematical reasoning ability concern.
3. Standard-9th and standard-10th student were equal as far as their mathematical reasoning ability concern.

4. Girls of standard-9th were more superior than standard-8th as far as their mathematical reasoning ability concern.

5. Reliability by test retest method was found 0.835, by split half method 0.54, by spearman brown method 0.90, by flanegon method 0.69 and Kruder Richardson 0.94.

6. Validity of Mathematical reasoning ability test with first term examination percentage was 0.8367 and with Dr. J. K. Talati test was 0.8546.

International Researches on Spatial Reasoning, Spatial Ability, Intelligence and Achievement

- **Study**: 14
- **Title**: Gender Differences in Gifted Children’s Spatial, Verbal, and Quantitative Reasoning Abilities in Taiwan
- **Researcher**: Wen-Ling Wang
- **Degree**: Research Paper, Taiwan

**Objectives**

The purpose of this study was to investigate if the verbal, spatial, and quantitative reasoning abilities of young gifted Taiwanese children exhibit gender differences.

**Population**

This study, the population targeted approximately 80 children accepted for early entrance from among 1000 applicants or so, in May 2002 in Taoyuan County.

**Sample**

A sample of 32 young children identified as academically gifted were administered individual intelligence tests in order to find out their verbal and spatial IQ scores, as well as their arithmetic scores.
Research Method:

In the present research the researcher used descriptive method for data collection.

Research Tool:

For the present study, ‘Revan’s Metrosize Test’ was used.

Method of Analysis:

In the present study, Mean, standard Deviation and t-value were calculated.

Findings:

Score differences for gender were examined for statistical significance with t-tests. Examination of the means for the two genders regarding WPPSI-R VIQ showed that Verbal IQs for boys (M = 119.15, SD = 10.65) versus girls (M = 116.17, SD = 12.90) were not significantly different (t = .71, p > .05). Likewise, there were no significant differences between boys’ mean scores and girls’ mean scores across any of the verbal subtests in WPPSI-R (see Table 1). The mean TONI IQs for boys was 139.15 (SD = 2.92) and for the girls it was 139.50 (SD = 1.73). The significance test showed no gender differences in performance on the TONI (t = -.38, p > .05). After further exploring the subjects’ spatial reasoning as assessed by the WPPSI-R Performance scale, the score differences according to gender were not significant in any of the following tests; including Geometric Design, Block Design, Matrix Reasoning, and Picture Completion subtests (see Table 1). On the Object Assembly subtest however, boys scored higher overall than the girls (t = 2.22, p < .05). In addition, on 4 of the 5 subtests of the Performance scale, boys scored higher than girls (ranging from substantial to slight).

Regarding quantitative measures, the girls’ score (M = 14.25, SD = 1.48) was slightly higher than that of the boys (M = 14.00, SD = 2.08) based on the Arithmetic subtest scores, but the score difference was not significant (see Table 1). On the other hand, the CSS subtest scores of boys (M = 6.75, SD = 2.12) was significantly higher than those of girls (M = 4.92, SD = 1.73) (t =...
2.52, p < .05), revealing gender differences in favor of boys in number series ability.

The tests for homogeneity of variance (Levene’s test) and for normality (Shapiro-Wilk) were conducted for all scores. The results of these tests indicated that the TONI IQ and CSS scores did not satisfy the assumption of normality (ps < .01) and the TONI IQ did not satisfy the assumption of homogeneity of variance (Levene (1,30) = 6.009, p = .020). Thus, the Mann-Whitney U tests were employed to analyze the data again. The results were similar to those for the t-tests, revealing that young boys only had statistically higher mean scores of object assembly and CSS compared to the girls (U = 71.00, p = .054, and U = 50.50, p = .006, respectively).

Study : 15
Title : Investigation of High School Students’ Spatial Ability
Researcher : EMINE BANU KAYHAN
Degree : Mater of Science
Year : 2005
University : Middle East Technical University, Turkey

Objectives

The purposes of the study were to investigate high school students’ spatial abilities with respect to school types, to investigate the relationship between the students’ mathematical achievement, logical thinking abilities and their spatial ability, to investigate the relationship between the technical drawing achievement of students enrolled to Industrial Vocational High School and their spatial ability, and to investigate the difference between the students’ spatial ability before and after taking the technical drawing course.

Research Method :

In the present research the researcher used descriptive method for data collection.

Research Tool :

For the present study, ‘Spatial Ability Test’ used.
Method of Analysis:
In the present study, one way Analysis of Variance, Pearson product moment correlation, t-test were calculated.

Findings:
There is no significant effect of type of high school on students’ spatial abilities; there is a significant positive relationship between spatial ability and mathematics achievement; there is a significant positive relationship between spatial ability and logical thinking ability; there is a significant positive relationship between the spatial ability and technical drawing achievement; and there is a significant development in spatial abilities of the students in the technical drawing course.

Study: 16
Title: Educational Achievement of Elementary School Students from two Cultural Groups as Related to Reasoning Ability and Classroom Learning Environment
Researcher: Marilyn A. Morrow
Degree: Ph.D.
Year: 1979
University: University of Saskatchewan, Canada.

Objectives
To assess the relationship between thirteen independent variables and academic achievement of Indian and Non-Indian students to make comparisons between the two cultural groups.

Population:
For the present study, students of federal schools were considered as the population for the study.

Sample:
The sample included 75 Indian and 95 non-Indian students in Grades 4, 6, and 8 in three schools, one federal school and two provincial (joint) schools.
Research Method:
In the present research the researcher used descriptive method for data collection.

Research Tool:
For the present study, following tools were used:

1. Achievement test having five different subtests of basic skills for measurement of achievement.
2. Raven’s progressive matrices for measurement of Reasoning Ability.

Method of Analysis:
A stepwise multiple regression programs were used to analyze the data.

Findings:
1. Reasoning Ability was related with achievement of the students.
2. Classroom environment, Grade and school were effective variables on Indian students’ achievement.
3. Average achievement of non-Indian students was significantly higher than the Indian students due to environment and language skills.
4. Non Indian group obtained significantly higher mean achievement test scores than the Indian group.
5. Reasoning Ability was a significant predictor of all achievement test scores for both Indian and non-Indian students.
6. Classroom environment variable was significant predictor of
7. Achievement scores.
8. School and Grade was a significant predictor of Indian students’ achievement.
9. Sex was a significant predictor of non-Indian students’ achievement.
Study : 17
Title : A Study of Academic Achievement, Socio Economic Status, Intelligence, Gender and their Relation to General and Academic Self-Concept to Twelfth Grade Students in the United Arab Emirates

Researcher : Abdulqader Aal-Hussain
Degree : Ph.D.
Year : 2006
University : University of Hall, England

Objective

1. To examine the relationship between self-concept and socioeconomic status.
2. To investigate the relationship between self-concept and intelligence.
3. To test the assumption of the multidimensional structure of self-concept.
4. To determine which of the variables contributed most to the achievement of the students.
5. To translate and develop an instrument to measure self-concept for high school students in the United Arab Emirates.
6. To develop an instrument to assess socioeconomic status within the society of the United Arab Emirates.

Population :
The population the present study was This research involves Twelfth Grade students from the United Arab Emirates. During the academic year 1989-90.

Sample :
Total sample numbered 334 Twelfth Grade students (Science branch) comprising 157 boys 62 and 177 girls. The ages of these students ranged between 17 and 20 years.

Research Method :
In the present research the researcher used survey research method for data collection.
Research Tool:
For the present study following tools were used:

1. Self Depression Questionnaire Herbert W. Marsh.
2. Academic Ability Scale
3. Coopersmith Self-Esteem Inventory
4. Socio Economic Status Index
5. Self prepared Achievement test

Method of Analysis:
In the present study, Mean, SD, Zero order correlation, t-test and F-test were calculated.

Findings:
1. Boys had higher self-concept of physical ability than girls whereas girls had significantly higher self-concept of general academic ability, mathematics, chemistry and physical appearance. No sex differences, however, were recorded in the areas of Arabic language, parent relation, peer relation and general self-concept.

2. Significant positive relationships were found between IQ and each of the self-concepts of mathematics, general academic ability and general self-concept for the total group. Also, significant relationships existed for the girls but not for the boys between IQ and each of the self-concepts of peer relation, physical appearance and ability.

3. Significant positive correlations were found between SES and each of the self concepts of general academic ability and general self-concept.

4. Each of the self-concepts of mathematics and chemistry significantly correlated with and contributed to its corresponding academic achievement.

5. SES has no effect on students' academic achievement but IQ has a little effect on such achievement.
2.6.0 Comparative Summary of the Previous Studies

Total 17 previous studies were reviewed related to the present study. Comparison as per objectives, population, research method, research tool and as per data analysis method discussed below:

❖ Comparison as per Objective:

Sivprasad K. (2012) To find out the effect of the select correlates of achievement motivation on achievement in Biology among the higher secondary school students and To find out the status of the select correlates of achievement motivation and achievement in Biology among the higher secondary school students for the sample and for the relevant sub samples, for the total sample and for the relevant sub samples. Sharma R. (2012) To Compare Academic Achievement in Maths of secondary students belong to A, B, AB & O blood groups, belong to A, B, AB & O blood groups, belong to A, B, AB & O blood groups and A, B, AB & O blood groups, Singh H. (2012) To study the level of stress, gender difference, influence of intelligence, personality, achievement motivation, interactive affect of intelligence and personality, interactive affect of personality and achievement motivation, interactive affect of intelligence and achievement motivation, interactive affect of intelligence, personality and achievement motivation on the examination stress among school children, Gajjar N. (2012). To construct and try out the Yoga exercises programme for the students of standard 11th Commerce and subject of Commerce, To examine the effect of Yoga exercise on Achievement of Commerce subject of the students of standard 11th Commerce, verbal reasoning Ability, To construct and try out Short-term Memory pre test and post test for measurement of short-term memory of the students of 11th commerce, To examine the effect of Yoga exercises on Short-term Memory of the students of standard 11th Commerce, To construct and try out of Academic Achievement pre test and post test on the subject of Commerce for measurement of Academic Achievement in Commerce subject of the students of 11th commerce, To try out of Verbal
Reasoning Ability pre test and post test for measurement of Verbal Reasoning Ability of the students of 11th Commerce, Dhull J. (2012). To compare the Academic Anxiety of the students of Xth class in Government and Private Schools., male and female students of Xth class in Government Schools, Private Schools, Government and Private Schools, female students in Government and Private Schools, To compare the intelligence of the students of Xth class in Government and Private Schools, male and female, male and female students of in Private Schools, To compare the intelligence of the male students of Xth class in Government and Private Schools, To compare the intelligence of the female students of Xth class in Government and Private Schools, To compare the Reading interest of the students of Xth class in Government and Private Schools, Reading interest of the male and female students of Xth class in Government Schools, Reading interest of the male and female students of Xth class in Private Schools, Reading interest of the male students of Xth class in Government and Private Schools, Reading interest of the female students of Xth class in Government and Private Schools, Achievement in Science of the students of Xth class in Government and Private Schools, Achievement in Science of the male and female students of Xth class in Government Schools, Achievement in Science of the male and female students of Xth class in Private Schools, Achievement in Science of the male students of Xth class in Government and Private Schools, To find the relationship between Academic Anxiety and Academic Achievement in Science of the X Class students, Intelligence and Academic Achievement , Reading Interest and Academic Achievement , Achievement in Science of the female students of Xth class in Government and Private Schools. Keshvan P (2009), To Study the Emotional Intelligence of the Higher Secondary Students.the Multiple Intelligence, relationship between Emotional Intelligence and Multiple Intelligence ,Emotional Intelligence among the sub samples based on the selected variables, Vadhel H. B. (2006) To Construct Spatial Reasoning test for Standard-8th,9th and 10th students, To standardize Spatial Reasoning test for Standard-8th,9th and 10th students, To check the effect of Spatial Reasoning
on gender for Standard-8th, 9th and 10th students, grade for Standard-8th, 9th and 10th students, on area for Standard-8th, 9th and 10th students, relation between of Spatial Reasoning and mathematical achievement of Standard-8th, 9th and 10th students, relation between of Spatial Reasoning and over all mathematical achievement of Standard-8th, 9th and 10th students, Desai K. A. (2006) To Construct Reasoning Aptitude test for Trainees of B.Ed. colleges, To standardize Reasoning Aptitude test for Trainees of B.Ed. colleges, norms for Reasoning Aptitude test for Trainees of B.Ed. colleges, difference between boys and girls trainees on Reasoning aptitude, between urban and rural area trainees on Reasoning aptitude, between arts, commerce and science faculties trainees on reasoning aptitude, Talwar V. (2006). To Study the intelligence of higher secondary students in relation to gender, faculty and locale. educational aspiration the anxiety, frustration, academic achievement, effect of intelligence, educational aspiration, anxiety and frustration on academic achievement of higher secondary students, Patel H. M. (2004), To Construct Reasoning Aptitude test for Primary Teacher Training Trainees, Characteristic of item response theories and personality Characteristic, item response theories and determine reliability and validity for reasoning aptitude test, Malhotra K. (1982), Liner Justice logical problems and sadarsh mulak problem solving by children. Internal presentation, evaluation and analysis and use this information for strategic planning. In this reference generalization should be done, Patel C. K. (1991) To Construct, standardize and establish norms for Reasoning Aptitude test for children’s of standard-5 to 7th, Patel A. A. (2010), To Construct, reliability, validity and determine norms Mathematical reasoning ability test for Secondary School Student, To check the effect of standard, area and gender, interaction of standard, area and gender on mathematical reasoning ability test of secondary schools students, Wen-Ling Wang, to investigate if the verbal, spatial, and quantitative reasoning abilities of young gifted Taiwanese children exhibit gender differences, EMINE BANU KAYHAN (2005), high school students’ spatial abilities with respect to school types, to investigate the relationship between the students’ mathematical achievement,
logical thinking abilities and their spatial ability, to investigate the relationship between the technical drawing achievement of students enrolled to Industrial Vocational High School and their spatial ability, and to investigate the difference between the students’ spatial ability before and after taking the technical drawing course. Morrow M.A. (1979) To assess the relationship between thirteen independent variables and academic achievement of Indian and Non-Indian students to make comparisons between the two cultural groups, Hussain Abdulqader (2006) To examine the relationship between self-concept and socioeconomic status, relationship between self-concept and intelligence, assumption of the multidimensional structure of self-concept, variables contributed most to the achievement of the students, To translate and develop an instrument to measure self-concept for high school students in the United Arab Emirates, To develop an instrument to assess socioeconomic status within the society of the United Arab Emirates.

**Comparison as per Population:**


**Comparison as per Research Method:**


**Comparison as per Research Tools:**

Sivprasad K. (2012) Examination Anxiety Scale, Study Habits Inventory, Self-Concept Scale, Home Learning Environment Inventory and Achievement Test in Biology, Sharma R. (2012) To identify the blood group of the students a Performa of general information used,The Group Test of Intelligence used in the study is prepared by Dr. G.C. Ahuja, Singh H. (2012) Cattell’s Culture Fair Intelligence Test Scale 2 (Cattell, 1973), Indian Adaptation of Contact Personality Factor Test prepared by S.S. Srivastava, Indian Adaptation of TAT prepared by Uma Choudhary according to the procedure laid down by McClelland by using TAT cards of Murray Examination Stress Scale developed by the investigator, Gajjar N. (2012). Verbal Reasoning Ability test was constructed and standardized by Dr. D.S.Patel, Academic Achievement test and Short-term Memory measurement test and Verbal Reasoning Ability test, Dhull J.(2012). Academic Anxiety : Dr. A. K. P. Sinha and Dr. I. N. K. Sinha, General Intelligence Test :Dr. S. M. Mohsin. Achievement Test in Science : Self

❖ Comparison as per Method of Data Analysis :


2.7.0 Significance of the Present Study

In India, spatial reasoning ability is in its infant stage. In Gujarat State, only few researchers have started doing research in this field. There is very less researches conducted in reference to spatial reasoning ability, intelligence and achievement. So that in this context this study is very significant as its main objective is to study spatial reasoning ability in reference to intelligence and achievement. Furthermore, following are some points, which make this study more significant in comparison with past researches done in the field:

❖ Sample was selected through stratified random and cluster sampling technique.
❖ Standardize tool was used for data collection
❖ No researches were conducted in Gujarat for spatial ability in context to intelligence and achievement.

Thus, present study was different and significant from previous studies in context to population, tools and sample.
2.8.0 Conclusion

In this present chapter, importance of Reviews of Related Literature, theoretical information related to this study is discussed in detail like meaning of intelligence, types of intelligence, theories of intelligence with figures and about spatial reasoning ability and review of past studies, comparative summary of the past studies, significance of the present study was discussed. In the next chapter-3, research design is described in detail.
REFERENCES


24. Haribhai M. Patel (2004). *Construction and Standardisation of Reasoning aptitude Test for the Trainees of Primary Teacher training*


