Research Guru
Online Journal of Multidisciplinary Subjects (ISSN : 2349-266X)
Volume-13, Issue-1, June 2019
Impact Factor: 4.081
www.researchguru.net

A Comparative Study of Spatial Ability of Commerce and Science Students of Higher Secondary Schools in Patan District

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Abstract

Spatial Ability presents an important component of human intelligence. A child should possess good Spatial Ability so that he can correlate things with his present situation. Spatial Ability appears to be central to many scientific domains. The present study was undertaken with a view to find the level of Spatial Ability between Commerce and Science Students of Patan district. Mathew's Test of Mental Abilities was used to collect the data. Results showed that Spatial Ability of both Commerce students and Science Students is only at an average level. It was also found that there is no significant difference in Spatial Ability between Commerce and Science Students based on Gender.

KEYWORDS: Spatial Ability, Commerce students , Science Students.

INTRODUCTION: In this present scenario, we cannot constrain learning inside the four walls of a classroom. Digitalization has a great influence over this younger generation. They get a wide range of knowledge from different sources .There are many factors influence learning such as teachers, parents, family, environment, classrooms and many more. Individual Difference also influences learning.

A devoted teacher should always identify the capabilities of his students. A teacher must understand that a student's mind is not an empty pot. A child possesses a variety of abilities. Gardner (1999), proposes eight different intelligences to account for a broader range of human potential in children and adults. These intelligences are Linguistic Intelligence, Logical-Mathematical Intelligence, Spatial Intelligence, Bodily Kinesthetic Intelligence, Musical Intelligence, Interpersonal Intelligence, Intrapersonal Intelligence and Naturalist Intelligence.

Our schools and culture focus most of their attention on linguistic and logical-mathematical intelligences. We should also place equal attention on individuals who show gifts in the other abilities: artists, architects, musicians, naturalists, designers, dancers, therapists and others who also enrich the world in which we live. Unfortunately, many children who have these gifts don't receive much reinforcement for them in school.

Spatial Ability can be said as the capacity to perceive the visual world accurately, to perform transformations and modifications upon one's initial perceptions, and to be able to re-create aspects of one's visual experience, even in the

absence of relevant physical stimuli. A spatial learner is a student who learns holistically rather than in a step-by-step fashion. Visual imagery plays an important role in the student's learning process, because the individual is processing primarily in pictures rather than words. Such students are usually gifted with well integrated abilities.

NEED AND SIGNIFICANCE OF THE STUDY :

Traditional education was imparted on the assumption that the time consuming steps of learning could be bypassed and the final knowledge could be transmitted to the learners by a sort of intravenous behaviour feeling process. Schools were considered as knowledge shops and teachers as information managers. Subjects were taught according to logical method of presentation and little attention was paid to the eagerness, curiosity and capacity of the pupil.

In most of the cases of traditional education, spatial learning style is not addressed in school, and there students self-esteem suffers accordingly. Traditional teaching techniques are designed for the learning style of sequential learners. Concepts are introduced in a step-by-step fashion, practiced with drill and repetition, assessed under timed conditions, and then reviewed. By way of contrast, spatial learners are systems thinkers- they need to see the whole picture they can understand the parts. They are likely to see the forest and miss the trees.

Spatial Ability presents an important component of human intelligence. A child should possess good Spatial Ability so that he can correlate things with his present situation. Spatial Ability appears to be central to many scientific domains. In this present world, "Spatial Ability" has got that much importance. It is even relevant in each and every simple aspect of our everyday activities of life like driving, household work, cleaning, reading, orienting oneself, in a strange environment, rearranging furniture, fitting a lot of things into the apt place. It also helps to understand three dimensions formations without physically examining them.

So it is very necessary to think that whether we are occupied with necessary level of Spatial Ability or not. National Curriculum Framework (2005) has mentioned about Spatial Ability; 'areas of Mathematics is such as Spatial Thinking are not developed enough in the curriculum'.

It has been revealed from the review of related studies that Spatial Ability has influence in learning subjects like Mathematics, Geography, Science, History, Bussiness Management, Engineering, Mechanical, Technical and Design field. Although there are many studies related to 'Spatial Ability', only very few studies are conducted in our country. To improve the level of Spatial Ability, studies and researches has to be done in this field.

STATEMENT OF THE PROBLEM : "A Comparative Study of Spatial Ability of Commerce and Science students of Higher Secondary Schools in Patan District".

DEFINITION OF KEY TERMS:

The key terms of the title of the study are defined as follows:

SPATIAL ABILITY:

Despite the prominent role of the Spatial Ability, review of literature in this field indicates that there is no precise definition of the concept.

The first identifiable study to examine and define Spatial Ability appeared when Thurstone (1938), who was studying primary mental abilities, defines as "space" factor. Thurstone classified spatial-visual aptitude as one of the primary mental abilities, generally defined as the ability to mentally manipulate shapes, sizes and distances in the absence of verbal or numerical symbols.

COMMERCE AND SCIENCE STUDENTS OF HIGHER SECONDARY SCHOOLS:

It denotes those schools which are imparting instruction for XI to XII standard for Commerce stream and Science stream in Patan district.

VARIABLES OF THE STUDY :

- Criterion Variable : "Spatial Ability"
- Classificatory Variables : 1. Gender 2. Locale 3. Types of Management

OBJECTIVES OF THE STUDY :

1. To find out the level of Spatial Ability of Commerce and Science students of Higher Secondary Schools for the total sample and the subsamples based on Gender of students.
2. To find out whether there is any significant difference between the percentage of Commerce and Science students of Higher Secondary Schools for the total sample and the subsamples.

HYPOTHESES OF THE STUDY :

1. The Spatial Ability of Commerce and Science students will be 80 percentage and above.
2. There exists a significant difference in the Spatial Ability between the Commerce and Science students of Higher Secondary Schools for the total sample and all the subsamples selected for the study.

METHODOLOGY :

The methodology used for the present study is given briefly under the following headings.

Sample: The sample selected for the study was the students of Commerce and Science streams of Higher Secondary Schools of Patan district. Representative sample included 600 students, i.e., 300 Commerce students and 300 Science students taken from among 18 schools of Patan district of Gujarat State.

Tool Used for the Study :

The tool used for the study is Spatial Ability Test of "Mathew's Test of Mental Abilities" (V.George Mathew, 1973).

Method : The descriptive survey method is used to

Statistical Techniques Adopted for the Study :

In order to find out the level of Spatial Ability between Commerce and Science students, the following statistical techniques were used.

1. Estimation of Percentage
2. Test of Significance of Difference in Percentage between the Comparable Subsamples.

Results And Discussion :

The statistical analysis was conducted in two sections. At first, the percentage of Spatial Ability of total sample and that of subsamples were estimated separately. Secondly, each of the percentage thus obtained was compared between equivalent subsamples, by testing the significance of difference in percentages.

TABLE 1:

Percentage of Spatial Ability of Commerce and Science Students for the Total sample And Subsamples based on Gender, Locale and Types of Management

Sample		Commerce Students			Science Students		
		N	Percentage of Spatial Ability	Percentage in population	N	Percentage of Spatial Ability	Percentage in population
Total Sample		300	67.91	62.62 – 73.19	300	60.13	54.59 – 65.67
Gender	Boys	135	68.74	60.92 – 76.55	162	60.78	53.26 – 68.29
	Girls	165	67.23	60.06 – 74.39	138	58.19	49.66 – 66.42
Locale	Urban	147	68.94	61.46 – 76.42	157	59.93	52.26 – 67.59
	Rural	153	67.06	59.61 – 74.50	143	60.34	52.32 – 68.35
Types of Management of Schools	Govt	165	68.95	61.89 – 76.01	181	59.28	52.12 – 66.44
	Aided	94	65.46	55.84 - 75.07	72	59.04	47.68 – 70.39
	Unaided	41	69.34	55.23 – 83.45	47	65.05	51.42 – 78.68

From the Table 1, it is clear that the percentage of Spatial Ability for commerce students is 67.91 and Science students is 60.13. Based on this, the investigator inferred the percentage for the population. It was found to be 62.62 – 73.19 for Commerce students and 54.59 – 65.67 for Science students.

To study whether significant difference exists in Spatial Ability between two categories, the data was analyzed by test of significance of difference between percentages. Difference in Spatial Ability between Commerce and Science students in each category was compared.

TABLE 2:

Comparison of Spatial Ability between Commerce and Science Students

Variable	Sample				Critical Ratio	Level of Significance
	Commerce Students		Science Students			
	P1	N1	P2	N2		
Spatial Ability	67.91	300	60.13	300	1.986	0.05

From Table2, it is clear that the critical ratio of Spatial Ability between the total sample of Commerce and Science students is 1.986. It indicates that there is significant difference in the Spatial Ability between the Commerce and Science students because, the difference is 1.986 which is considered to be significant at 0.05 level.

TABLE 3:

Comparison of Spatial Ability between Commerce Boys and Science Boys

Variable	Sample				Critical Ratio	Level of Significance
	Commerce Boys		Science Boys			
	P1	N1	P2	N2		
Spatial Ability	68.74	135	61.78	162	1.252	NS

Note : NS = Not Significant

From Table 3, it indicates that there is no significant difference in Spatial Ability between Commerce Boys and Science Boys because, the critical ratio is 1.252 which less than the table value for significance even at 0.05 level.

TABLE 4:

Comparison of Spatial Ability between Commerce Girls and Science Girls

Variable	Sample				Critical Ratio	Level of Significance
	Commerce Girls		Science Girls			
	P1	N1	P2	N2		
Spatial Ability	67.23	165	58.19	138	1.625	NS

From the Table 4, it indicates that there is no significant difference in Spatial Ability between Commerce Girls and Science Girls because, the critical ratio is 1.625 which is less than the table value for significance even at 0.05 level.

MAJOR FINDINGS :

Major findings of the study are:

1. The level of Spatial Ability for Commerce students is only at an average level. The level of Spatial Ability for Science Students is also at an average level.
2. There exists no significant difference in the level of Spatial Ability between Commerce Students and Science students based on Gender.

CONCLUSIONS :

From the study it was concluded that there is no much difference between the level of Spatial Ability between Commerce and Science .The level of Spatial Ability of Commerce students and Science students is only at an average level. The teachers should be enough capable to improve the Spatial Ability of Students. The curriculum designers should have a thorough understanding about the research outcomes and should make the timely changes in the curriculum. Spatial Ability can be improved through visual media. Visual programmes should be developed by expert team and should make available for topics like geometry, geography and science subjects.

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