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SPATIAL ABILITY OF HIGHER SECONDARY SCHOOL STUDENTS

Dr. Smitha Eapen*

Assistant Professor in Education, Mount Tabor Training College, Pathanapuram, Kollam, Kerala.

*Corresponding Author: socialscience2008@gmail.com

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Abstract

The future of the country lies in the classrooms of today is a true statement that drives us to aim for holistic development. The government of India has realized the fact that employability depends upon skills and not knowledge alone. The Indian Express reported on November 4th, 2022 that the introduction of the Common University Entrance Test instead of class 12 board exam scores for admission changed the admission intake of Bachelor of Arts (Hons) Political Science from Kerala state from 120 to 1. This shows that our education system does not train our students to cope with the standards of entrance examinations. The state of Kerala has introduced vocational higher secondary schools with this perspective. The multiple intelligence theory gave importance to spatial intelligence which is a basic skill for a high remuneration. The technique of normative survey was used. Sample for the study is restricted to 200 higher secondary school students of Niranam Panchayath only. Three components of spatial ability selected namely pattern recognition, classification, and visualization were studied. The attempt here is to look into how male and female students differ in spatial intelligence.

Keywords: *Spatial Ability, Pattern Recognition, Visualisation, Classification, Higher Secondary School Students.*

1. INTRODUCTION

The future of the country lies in the classrooms of today is a true statement that drives us to aim for holistic development. The Government of India has realized the fact that employability depends upon skills and not knowledge alone. The Indian Express reported on November 4th, 2022 that the introduction of the Common University Entrance Test instead of class 12 board exam scores for admission changed the admission intake of Bachelor of Arts (Hons) Political Science from Kerala state from 120 to 1. This shows that our education system does not train our students to cope with the standards of entrance examinations (Ishikawa, T. & Newcombe, N. S. 2021). The State of Kerala has introduced Vocational Higher Secondary Schools with this perspective. The multiple intelligence theory gave importance to spatial skills which is a basic skill that becomes a skill required for high remuneration (Song, Q., & Su, J., 2021). The technique of normative survey was used. Sample for the study is restricted to 200 higher secondary school students of Niranam Panchayath only. Three components of spatial ability namely pattern recognition, classification, and visualization were studied. The attempt here is to look into how male and female students differ in spatial ability. When packing a bag, deciphering graphs,

sculpting a marble block, landing a flip, utilizing a physical or mental map to navigate, merging into traffic, or combing your hair, spatial abilities come in handy **(Porter, D. & Glick. S. 2022)**. The ability to comprehend, justify, and recall the visual and spatial relationships between items or spaces is known as visuospatial ability. What do a radiologist, engineers, baseball players, and cartographers have in common? They are all people who must have some pretty good spatial abilities. A person who exhibits the ability to mentally create, modify, and rotate a visual picture and grasp and remember the spatial connections between actual and imagined things is said to have the spatial ability. **https://study.com/learn/lesson/spatial-ability-skills.html.** The child needs the ability to cognitively manipulate spatial patterns in areas such as architecture, engineering, science, mathematics, art, games, and activities of life. Spatial ability has a major part in analytic functions and software that have a complex structure. The idea of spatial ability is the capacity to correctly comprehend and derive knowledge from visual information.

2. OPERATIONAL DEFINITIONS

2.1. Spatial Ability

The capacity to build well-constructed visual forms, remember them, and then organize and transform them is known as spatial ability **(Lohman, 1996)**. The ability to observe shapes or objects and analyze the similarities or differences can be called spatial ability.

2.2. Higher Secondary School Students

The students of higher secondary classes of regular schools.

3. NEED AND SIGNIFICANCE OF THE STUDY

Researchers have identified 86 career options where spatial visualization skills are required. Gardner locates spatial intelligence as the ability to discern similarities across diverse domains. Einstein, Thurstone, Darwin, and Freud are personalities who were highly visual thinkers. Research has progressively shown that spatial aptitude is crucial for academic success, particularly in the study of STEM subjects (Science, Technology, Engineering, and Mathematics) **(National Research Council 2006; Newcombe 2010).** Spatial ability may vary by gender, according to research on individual variations in spatial ability **(Casey, Nuttall, Pezaris, & Benbow, 1995; Linn & Petersen, 1985; Maeda & Yoon, 2013; Reilly & Neumann, 2013; Turut & Yenilmez, 2012; Yurt & Sünbül, 2011)**. Numerous studies have shown that men are more gifted than women, particularly in the area of mental rotation, which has led to this development.

4. OBJECTIVE

To find out the spatial ability of Higher Secondary School Students.

5. HYPOTHESES

There is a significant difference in the means of scores of Spatial abilities of higher secondary school students.

6. DELIMITATIONS

1) The investigator studied only spatial ability.
2) Sample for the study is limited to 200 higher secondary school students only.
3) The study is limited to higher secondary school students of Kollam District only.
4) The study is limited to three dimensions of spatial ability namely pattern recognition, classification, and visualisation.

7. METHODOLOGY

Normative survey method was used to collect data with regard to the study. A sample of 200 students was selected from higher secondary schools of Niranam Panchayath. The tool prepared was named Spatial Intelligence Test with components selected using literature review. The components selected were Pattern Recognition, Classification, and Visualisation. The final draft of the questionnaire consisted of 10 pictorial items for each component. To analyze the results, descriptive statistics were used– Mean, Median, Mode, Standard Deviation, and Skewness. The data was collected by administering the Spatial Intelligence Test to 200 higher secondary school students. The test consisted of 30 questions with ten questions for each component. The questionnaire consisted of four pictorial options along with each of the total thirty questions. Each option was numbered from 1-4 and the respondent had to select the correct option number and mark it adjacent to the correct answer. For each correct answer marked, 1 point would be awarded.

8. ANALYSIS AND INTERPRETATION

The objective was to find the spatial ability of students in higher secondary schools. In order to analyze these objective descriptive statistics, the mean and standard deviation were calculated.

Table -1: *Mean, Median, Standard Deviation, and Skewness of the distribution of the scores on Spatial Ability of Higher Secondary Schools students*

Tool	M	Mdn	SD	SK
Spatial Ability Test of Higher Secondary School Students	15.99	16.35	4.89	-0.22

From the above table, it is observed that the mean value of scores is 15.99 and the median value is 16.35. the standard deviation of the score is 4.89. The skewness for the curve was -0.22. Since the obtained mean value is lesser than that of the median, the frequency polygon had a negative skewness. It can be concluded that scores of higher secondary school students on Spatial Intelligence are more or less normally distributed.

Table -2: *Component-wise distribution of scores of Spatial Ability of Higher Secondary Schools students*

Components	Scores Obtained	Percentage
Pattern Recognition	1248	40.4
Classification	1202	38.91
Visualisation	639	20.68

From the table above for the scores of higher secondary school students on the Spatial Ability Test, it was observed that 40.4% scored in pattern recognition, 38.91 % in classification and 20.68% for visualization.

9. FINDINGS

The study's major findings are:

1) Spatial ability of higher secondary school students is more or less distributed.
2) Pattern recognition ability of higher secondary school students is better than classification while visualization ability is the least among the components of Spatial Ability.

10. EDUCATIONAL IMPLICATIONS

1) The activities to develop spatial ability should be included in the curriculum.
2) Classrooms and schools can be designed to reflect various intelligences.
3) The ability to think in terms of pictures is of prime importance in areas of architecture, engineering, science, arts, games, etc.
4) Career counseling must be given to higher secondary school students at this stage to help them decide on career options according to their skills.
5) A good curriculum, pedagogue, and pedagogy can help to improve these qualities and succeed in the future.

11. CONCLUSION

Holistic development is the key factor for a competent personality. The identification of abilities and attitudes plays a significant role in achieving success. Policymakers, curriculum designers, and career experts should play their roles to mold an employable workforce. Spatial ability is one such skill acquired and required by professionals to succeed and climb up the professional ladder. Vocational and skill enhancement initiatives are undertaken by the government to create a productive workforce.

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