Identification of Mathematical Aptitude of Girl Students of Upper Primary School

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Abstract:
Mathematics is used in day-by-day life. Everyone does calculation in various form example-during purchasing, during cooking and during travelling. Everywhere calculation is required. Oftenly, it found that in school time some students are caught in mathematic phobia. Generally, girl student faced to mathematics phobia. Therefore, researcher is done a study on mathematical aptitude of girl students of upper primary school students. Identification of mathematical aptitude of girl student is necessary for removing the mathematics phobia and anxiety from them. Researcher developed a mathematical aptitude test and study was conducted on VIIth standard girls student of upper primary school and categorized them Girl students, who have below average mathematical aptitude can be improved their aptitude after getting required treatment and can be get success in mathematics.

Keywords: Girl student, mathematics, aptitude, mathematical aptitude, category.

Women education has a very importance place for development of society. A literate woman can contribute at home and professional fields. She can be helpful for improving economically and socially of country. A study by Hadiza Adamu (1996) described the various advantage of women's education, these were followings
a) An educated women helps to improve the family's health and diet.
b) Educated women increase women's productive ability, thus raising their families' standard of living.
c) Educated women access to appropriate technologies, management of cooperatives and use of loan facilities.
d) Educated women improve women's social and culture status.
e) Educated women discharge their responsibilities more effectively.
f) Educated women fight their own fears and feelings of inadequacy or inferiority.
g) Educating women in all around development like mentally, socially, physically, psychologically, religiously and economically.
h) Educating women able to acquire their own basic needs of the society, like food, shelter, fuel, clothes and nurturing.

i) Educating women participate fully in all the affairs of their nation and be at centre of sustainable development.

j) Educating women enhance nation building in the terms of economic and human development.

India knows it very well so it gave more effort for improving girl education and take new policy time to time. In 1991 girls' literacy rate was 39.29% while in 2001, literacy rate reached to 54.16% and in 2011 it reached to 65.5% as per census report (Sanjukta Sahoo, 2016). The enrolment of girl student is also increasing in primary and upper primary school. But a misconception is spread that most of girl students have phobia in mathematics subject. They are anxiety about mathematics. But the importance of mathematics keeps in mind, this is mandatory for removing their phobia and anxiety about mathematics. A study by Richard B. Felson and Lisa Trudeau,(1991) examined socialization model which described the reason of anxiety, lose interest and lack of confidence in mathematics subject in girl students. That is becoming a reason for dropping the mathematics in higher classes. Attitudes are different between parents of girls and parents of boys. One hand parents of boys give more importance to mathematics other than subjects. While parents of girls accepted that mathematics subject as a difficult subject for their daughters. A study by Dheva Ranjan.S (2022) mentioned about the declination of mathematical education by the Indian school students(hemalatha,2013).

Mathematics develops power of thinking, mental ability, problem solving skill, analyzing capacity and logical ability in the students. Mathematics keeps activate both parts of the brain left and right hemisphere by giving numerical and conceptual base exercises. It is mother of all sciences so it is the base of all sciences, without knowledge of mathematics it is difficult to understand other sciences. Mathematics is also basic of art faculty. Economics, Psychology, Drawings and History etc all subject will be difficult without knowledge of mathematics because these are based on calculation.

Aims of teaching mathematics at upper primary level (Innovate Learning Strategies, Dr. Shireesh Pal Singh, Dr. Kiran Lata Dangwal, 2011, page 38)

1. To develop a strong foundation for future learning. Strong foundation buildup confidence in student, which help to develop a love for it.

2. To make a positive association between learning and real-word context.

3. To prepare, how the different concepts can be applied to his or her daily interactions.

4. To create an enduring interest and faith in the subject.

5. To ensure, accuracy, certainty and efficiency in fundamental processes and to develop appreciation for accuracy.

6. To acquaint them with the relation of mathematics with their present as well as future life.

7. To prepare them for the learning of mathematics of higher classes.

8. To develop in student the habits like systematic, organized and exact regularity, practice, patience, self -reliance, verification of results and hard work.

9. To develop abstract concept, mathematics may be regarded as a science of abstract form.

10. To develop the inductive and deductive quality, where inductive means that a particular property is true in a sufficient number of cases, then can conclude that it will be true in all similar cases. And deductive indicates axioms, postulates, self-evident truth, undefined terms and definitions.

Aptitude:

According to Traxler (1957)

Aptitude is a condition, a quality or a set of qualities in an individual which is indicative of the probable extent to which he will be able to acquire under suitable training, some knowledge, skill or composite of knowledge, understanding and skill, such as ability to contribute to art or music, mechanical ability, Mathematical ability or ability to read and speak a foreign language.

According to Cambridge dictionary, the meaning of aptitude is natural ability or skill.

According to Britannica dictionary the meaning of aptitude is a natural ability to do something or to learn something.

Every person has some specific and special capacity, which is dormant state but these are helpful to be acquired to require degree of proficiency in getting some specific training and learning of skills and knowledge for specific field. These special or specific ability or capacity is called aptitude. But when we referred to aptitude, our mind connected to aptitude in term of interest, ability, talent, skill, capacity, genius, proficiency, achievement and intelligence etc.

Mathematical aptitude:

Mathematical aptitude- 1973 Factors of mathematical aptitude (Christine Leigh Taylor Iowa State University) - mathematical manual as viewed by Cronbach (1967, p. 27) "we haven't the faintest evidence, for example, what constitutes mathematical aptitude, save for the obvious fact that a person who has mastered one mathematical fact or process has an advantage in learning the next process in a hierarchy."

Mathematical aptitude can be defined as "The special ability or skill to solve the mathematical problems and predicted to get success in mathematic subject in future life"

Areas of Mathematical Aptitude for study:

a) Logical ability: The ability of an individual to solve the problem by abstract thinking and logical thinking or his thoughts on facts and evidence is called as logical ability.

b) Numerical ability: Such type of ability is considered the knowledge of number system, knowledge of basic operations on the numbers and doing proper calculation related to the number. eg. to search the serial numbers, to calculate average mean, square, square root, cube, cube root etc.

c) Ability of concept understanding: The knowledge of the basic concept related to Algebra and Geometry is called as concept understanding ability. Algebra and geometry are the branch of mathematics, which are understandable through basic concept. The ability to understand these basic concepts is called as concept understanding ability.

Mathematical aptitude has various aspects but researcher selected logical ability, numerical abilities and concept understanding.

Objective of the study:

To identify the different categories (high mathematical aptitude, average mathematical aptitude, and lower mathematical aptitude) of mathematical aptitudes of of girl students of class VII of upper primary school.

Research Methodology:

In this study survey method is used for data collection. Researcher developed a questionnaire which includes three aspects, logical ability, numerical ability and

conceptual understanding.

Research Tool:

Researcher constructed a questionnaire for this study. This questionnaire has 26 question and duration of the test was 35 minutes.

Population:

Population is VIIth standard girl students of SSC board English Medium schools in Uttar Pradesh.

Sampling:

Researcher selected purposive type non- probability technique of sampling method. 18 schools of urban and rural area have been selected. 12 schools from urban and 6 schools from rural area are selected. Thus, from the 18 schools 760 girl students have been selected by purposive sampling. Table-1 shows the list of schools selected in sample.

Data Analysis:

Scoring:

Questionnaire has 26 question and every question is of 1 mark. Number of correct answers indicate the total obtain marks.

In the identification or classification of the different level of Mathematical aptitude, test score of class 7th students of upper primary school is used and calculated their Z-score and Stanine Score.

Table -2 present mean score and SD

Sample (N)	Mean	SD
760	11.6342	4.4916

Z- score-

For the easy comparison, a Z-score used as a common way of standardizing data on a scale. It is used to measure for all types of data. Formula of Z-score is

$$Z\text{- SCORE} = \frac{SCORE - MEAN}{SD}$$

To find the z-score of scores of students from the selected sample, we need:

1. The student' marks
2. The mean score
3. The standard deviation.

Stanines:

A stanine, also known as a 'standard nine' score, is a way to convert raw test scores to a whole number on a nine-point scale, simplifying test interpretation. Like z-scores, stanines are a way to assign a relative numerical value to a member of a group.

Stanine scores are used in education to compare student performance over a normal distribution.

Typically, stanine scores between 4 and 6 are considered average, scores of 3 or less are below average, while scores of 7 or greater are above average. Table-3 shows the relationship between Z-score and Stanine score.

Interpretation:

The table-4 shows the level of mathematical aptitude for the entire sample (N=760). It indicates that 53.55 % students are in good to average category and 27.37% students have below average mathematical aptitude. While 19.08% students have very good or above mathematical aptitude, in which 3.68% outstanding aptitude students are also included. 35 girls having 4.61% percentage are in excellent category. 82 girl students having 10.79% percentage are categorized as very good mathematical aptitude. 203 girl students having 26.71% percentage are categorized as good mathematical aptitude. 114 girl students having 15% percentage are categorized as above average mathematical aptitude. 90 girl students having11.84% percentage are categorized as average mathematical aptitude. 88 girl students having11.58% percentage are categorized as below average mathematical aptitude. 96girl students having12.63% percentage are categorized as poor mathematical aptitude. 24 girl students having 3.16% percentage are categorized as very poor mathematical aptitude.

Conclusion:

The result of the study shows that 19.08% girl students are having high mathematical aptitude and 27.37% girl students are having below average mathematical aptitude. We can identify various category of mathematical aptitude of upper primary girl students with help of the result and result showed that 60.79% girls have above average mathematical aptitude. This data indicate that, scenario girl students have also above average mathematical aptitude at upper primary standard and if teachers and parents will give their attention to her aptitude then dropout of the subject at higher education can be reduced.

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Table-1

Table-1 shown: the list of schools selected in sample

SL NO	SCHOOL NAME	NO OF STUDENTS
1.	K P YADAV JAN SAHAYOGI INTER COLLEGE, TRIAMBI, HANSPURAM, CANAL ROAD, KANPUR	25
2.	PRIYADARSHINI PUBLIC INTER COLLEGE, GOPAL NAGAR/NEW AZAD NAGAR, KANPUR	45
3.	VIVEKANAND VIDYA NIKETAN, BARRA WORLD BANK, KANPUR	40
4.	NEW VISION INTER COLLEGE, CHANDRA NAGAR, CHAKERI ROAD, KANPUR	30
5.	J.K INTER COLLEGE, SAIBASU, KANPUR	45
6.	B.L.M CONVENT SCHOOL, AHIRWAN, KANPUR	40
7.	SUBHASH PUBLIC SR. SEC.SCHOOL, KANPUR	60
8.	SHIVAJI INTER COLLEGE, KESHAV NAGAR KANPUR	60
9.	M.D.M PUBLIC SCHOOL RAMA DEVI, KANPUR	25
10.	VIVEKANAND BALIKA INTER COLLEGE, KANPUR	105
11.	SHIVA JI CHILDREN ACADEMY JARAULI-2, KANPUR	40
12.	D.D VIDHYANIKETAN, KANPUR	30
13.	JAWAHAR LAL NEHERU SMARK INTER COLLEGE, UNNAO	40
14.	JANTA PURVA MADHYAMIK VIDHYALAYA, UNNAO	40
15.	S.G.D. PUBLIC SCHOOL, GANDHI NAGAR, BHARTHANA, ETAWAH	35
16.	S.A.V INTER COLLEGE, BHARTHANA, ETAWAH	45
17.	PT. BABU RAM MISHRA ADARSH INTER COLLEGE, BAMNIPUR, USRAHAR, ETAWAH	45
18.	BAL BHARTI VIDYALYA, SIDHARI, AZAMGARH	10
	TOTAL STUDENT	760

Table -3

Table-2 shows the relationship between Z-score and Stanine score

Z-Score	Stanine Score	Percentage of Scores
<-1.75	1	Bottom 4%
-1.75 to -1.25	2	Next bottom 7%
-1.25 to -0.75	3	Next bottom 12%
-0.75 to -0.25	4	Next Bottom 17%
-0.25 to 0.25	5	Middle 20%
0.25 to 0.75	6	Next top 17%
0.75 to 1.25	7	Next top 12%

1.25 to 1.75	8	Next top 7%
>1.75	9	Top 4%

Table- 4

Table- 3 shows student percentage and category of mathematical aptitude

SL	Raw score	Z-score	Limits of stanine in σ units	Stanine	F	%	CATEGORY
1	26-20	3.19 to 1.86	Above 1.75	9th	28	3.68	Out Standing
2	19-18	1.6 4to 1.41	1.75 to 1.25	8th	35	4.61	Excellent
3	17-16	1.19 to 0.97	1.25 to 0.75	7th	82	10.79	Very Good
4	15-13	0.74 to 0.30	0.75 to 0.25	6th	203	26.71	Good
5	12-11	0.08 to -0.14	0.25 to -0.25	5th	114	15	Above Average
6	10-9	(-0.36) to (-0.59)	-0.25 to -0.75	4th	90	11.84	Average
7	8-7	(-0.809) to (-0.1.032)	-0.75 to -1.25	3rd	88	11.58	Below Average
8	6-4	(-1.254) to (-1.699)	-1.25 to -1.75	2nd	96	12.63	Poor
9	3-1	(-1.92) to (-2.37)	-1.75 below	1st	24	3.16	Very Poor
				Total	760	100	