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Mathematics

A STUDY THE DIFFICULTY LEVEL IN MATHEMATICS AND IN RELATION TO THEIR ACADEMIC ACHIEVEMENT OF THE STUDENTS.

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ABSTRACT The academic performance of students is affected by many factors, including Difficulties of content, effectiveness in teaching, the subjects taught and the environment as well as the facilities provided. The present study tries to find out the learning difficulties faced by students in Mathematics at Secondary level. The study intended to identify the actual content difficult areas, chapters, topics, attitude of the students towards learning mathematics, as well as Perceptions of the students towards content difficulty in mathematics. The study is also intended to investigate the level of difficulty in content areas and relation between academic achievements of the students based on academic standards of mathematics. The study was a descriptive study in which a survey research design was adopted. A total of students from the centre participated in the study. The data were collected through student's questionnaire. The findings revealed that there is a Relationship between the perception of high school students towards the difficult content areas in Mathematics and in their achievement with respect gender and management. The study also revealed that the difficulties faced by students in learning Mathematics is due to Lack of interest in subjects, Improper way of teaching, Mentally handicappers i.e. Low I.Q. Dyscalculia, Improper behavior of teacher, Lack of individual attention, Irregular attendance of Students, Uncongenial Environment at home, Paucity of Pre School experience and Lack of Proper Educational guidance. In this way students face learning difficulties in Mathematics.

KEYWORDS : Difficulty level, Content difficulty and Academic Achievement of Students.

INTRODUCTION:

Mathematics has always been regarded as a tool for sharpening the intellect. For this purpose one has to think systematically, logically and precisely. Brahmagupta, the great Indian mathematician of the eighth century quoted if you want to shine in the company of the learned, propose? Mathematical problems and solve them".

As we move into the 21st century, there is consensus among the experts about the necessity for all students to have string mathematical ability. Majority of eminent educationists of the past as well as the present, including Herbert, Froebel, Pestolozzi, Dr. Maria Montessori, etc., have advocated the importance of mathematics. In their words, the intellectual and cultural development of a person is not possible without the study of mathematics.

In several fields centered round human acuity such as Accountancy, Banking, and Shop-Keeping business, Tailoring, Carpentry, Taxation, Insurance, Post and Telegraphs and so on there is the use of Mathematics. It has become the basis of the world's entire business and commercial system. Thus Mathematics has become an inseparable part of human activity.

Learning difficulties in various content areas of mathematics subjects for students, the difficult area areas of Mathematics Viz., (1) Number System, (2) Airthematic (3) Algebra, (4) Geometry, (5) Mensuration, (6) Statistics / Data handling.

Statement of the Problem

The present study tries to find out the learning difficulties faced by students in Mathematics at Secondary level. The study intended to identify the actual content difficult areas, chapters, topics. The study is also intended to investigate the level of difficulty in content areas and relation between academic achievements of the students based on academic standards of mathematics.

Methodology:

This is a quantitative study which explores learning difficulties faced by high school students in mathematics. Population is under consideration is the 10 secondary school students of Chittoor district in Andhra Pradesh, to collect quantitative data, a survey was conducted. However, for the survey 200 students of 8th and 9th classes, the stratified random sampling technique.

Objective of the study:

1. To study the variations in the difficulty level of content areas in mathematics of high school students with respect variables like Gender, Management of School.
2. To know the Relationship between the perception of high school students towards the difficult levels in Mathematics and in their achievement.

Hypothesis of the Study

3. There will be no significant variations in the Difficulty Levels expressed by students in various content areas of Mathematics in relation to the personal and demographical variables like Gender, Management of the school.
4. There is a Relationship between the perception of high school students towards the difficult content areas in Mathematics and in their achievement with respect gender and management.

Tool: Learning difficulties in various content areas of mathematics subject for students, the investigator prepared the three point rating scales for each class mainly on six different areas of Mathematics Viz., (1) Number System, (2) Airthematic (3) Algebra, (4) Geometry, (5) Mensuration, (6) Statistics / Data handling.

The rating scale consists of 6 items (Rows) with 5 columns –first column is for serial number, second column contains area of mathematics and title of chapter, third to fifth columns are ment for content difficulty at three levels: High difficulty, Moderate difficulty and Low difficulty. For scoring the students are requested to mark the appropriate option in the space provided for each item. This scale takes 45 minutes to administrate the test. For the purpose of scoring Numerical values 3, 2 and 1 are assigned to each of the three categories namely High difficulty, Moderate difficulty and Low difficulty respectively and the percentile for each category is calculated

Academic Achievement

To Measure the academic achievement of and 9th class students, the Summative Assessment – 2 Examinations marks with reference to Academic Standard wise namely Problem solving, Reasoning-Proof, Mathematical Communication, Connection and Representation-Visualizations taken as the indices of the academic achievement of students from the school records.

Testing Hypothesis:

Ratings of Students towards Difficulty Levels in Various Content Areas of Mathematics

Table 1(a): Showing the Number and Percentage value of content difficulty level with respect to variable 'Gender' for Students.

Variable / Gender	Boys-Content difficulty						Girls- Content difficulty					
	H.	%	M.	%	L.	%	H.	%	M.	%	L	%
Number System	25	12.5	23	11.5	152	76	21	10.5	31	16	148	74
Air thematic	24	12	56	28	120	60	29	14.5	50	25	121	60.5

Algebra	26	13	34	17	150	75	24	12	39	20	137	68.5
Geometry	44	22	36	18	120	60	40	20	33	17	127	63.5
Mensuration	22	11	33	16.5	145	72.5	28	14	38	19	134	67
Statistics	18	9	33	16.5	149	74.5	19	9.5	31	16	150	75
Total	26	13.3	35	17.9	139	69.7	27	13.4	37	18.8	136	68.1

Above table1(a) shows that the overall Boys students facing High difficulty, Moderate difficulty and Low difficulty in content area is 13.3% , 17.9% and 69.7% whereas for Girl students 13.4%, 18.8% and 68.1% respectively. It means Boys students are slightly bright than Girl students.

Girls and Boys students are consider Number system, Algebra and Statistics topics were easy in mathematics rather than Geometry, Arithmetic and Mensuration. As per the scale manuuel the students who gets low score on 'Low difficult level' are considersed to be high difficulty in learining mathematics. Where as whose score is at higher level on 'High difficulty level' are considered to be high difficulty in learininmg mathematics.

Chi Square : In order to test above null hypothesis the Chi- Square test is empolyed. The Chi-Square test applied to calculate the differeence between the two group values of Boys and Girls of Secondary School students on content difficulty.

To test the above hypothesis the chi-square test was also employed to find out the association between the Boys and Girls of Secondary School students on content difficulty. The results of the test are given in table: 1(b)

Table 1(b): Showing the results of the test

Gender	Boys and girls of secondary school students on content difficulty			Total
	High difficulty	Moderate difficulty	Low difficulty	
Boys	26 26.50 (0.01)	35 36.00 (0.03)	139 137.50 (0.02)	200
Girls	27 26.50 (0.01)	37 36.00 (0.03)	136 137.50 (0.02)	200
	53	72	275	400

$\chi^2 = 0.107$, df = 2, $\chi^2/df = 0.05$, $P(\chi^2 > 0.107) = 0.9478$

The obtained chi-square value is not significant at any levels as it is below the table value, which indicates that the differeence between the scores of Boys and Girls of Secondary Schools is low, which is 3 points on Low difficulty level. In that Boys are having high score rather than Girls. Hence the hypotheis "There will be no significant variations in the content difficulty levels of students with respect to Gender" is *Accepted.*

Table 2(a): Showing the Number and Percentage value of content difficulty level with respect to variable 'Management' for Students.

Variable / Management	Government-Content difficulty						Private- Content difficulty					
	H	%	M	%	L	%	H	%	M	%	L	%
Number System	29	14.5	41	20.5	130	65	17	8.5	13	6.5	170	85.0
Arithmetic	28	14	76	38	96	48	29	14.5	45	22.5	126	63
Algebra	24	12	33	16.5	143	71.5	26	13.0	40	20.0	144	72.0
Geometry	37	18.5	40	20	123	61.5	47	23.5	29	14.5	124	62.0
Mensuration	39	19.5	38	19	133	66.5	14	7.0	33	16.5	146	73.0
Statistics	26	13	45	22.5	129	64.5	11	5.5	19	9.5	170	85.0
Total	30.5	15.3	46	22.8	124	62.8	23	11.7	27	13.7	150	74.9

It could be observed from the table 2(a) that the measures are listed out and the responses under three levels are given i.e. High difficulty, Moderate difficulty and Low difficulty. Here overall Government school students on High difficulty level possess (15.3%), where as Private school students possess (11.7.3%). It indicates that Private school students feel easy to learn mathematics compare to Government school students. From the Table it is also observed that for Government school students content Mensuration is difficult, whereas for Private school students Geometry is difficult content for .

Chi-Square : In order to test null hypothesis the Chi-Square test is empolyed. The Chi-Square test appilied to calculate the differeence between two group scores of Governament and Private school students on content difficulty in mathematics.

To test the above hypothesis the chi-square test was also employed to find out the association between the Government and Private Secondary School students on content difficulty. The results of the test are given in Table:2(b)

Table 2(b): Showing the results of the test

Management	Govt. and Private Management High School			Total
	High difficulty	Moderate difficulty	Low difficulty	
Government.	30 26.50 (0.46)	46 36.50 (2.47)	124 137.00 (1.23)	200
Private	23 26.50 (0.46)	27 36.50 (2.47)	150 137.00 (1.23)	200
	53	73	274	400

$\chi^2 = 8.337$, df = 2, $\chi^2/df = 4.17$, $P(\chi^2 > 8.337) = 0.0155$

The Chi-square value is significant at 0.05 level which indicates that there is a significant differeence between two groups i.e. Government and Private school students on difficulty level in content area of mathematics. The difference between two group scores is 26 points. As per the tool on low difficultylevel who got less score is considersed are considered to be more content difficulty in learning mathematics, where as whose score is higher level are considered to be less difficulty in mathemtaics. Hence the hypotheis "There is no significant variation in the content difficulties levels of High School students in learning mathematics with respect to Management" *Rejected.*

Relationship between the Difficulty Levels In Learning Mathematics And Achievement of the Students

To test the above relationship the simple **'r'** is calculated between the personal variables viz., Gender, Management of School and Locality on the Difficulty levels in learning mathematics and Achievements of students.

Table 3: Showing the results of 'r' between the difficulty levels in learning mathematics and achievements of students in relation to personal variable.

Sl.No	Name of the Variable	Category	N	r	Sign
1	Sex	Boys	200	0.22	*
		Girls	200	0.34	**
2	School Management	Government	200	0.29	**
		Private	200	0.10	NS

NS-Non Significant,*Significant at 0.05 level, **Significant 0.01 levels

The results presented in table- 4.9.1 reveals a positive significant relationship between difficulty levels in learning mathematics and achievements of students in relation to all personal variables is observed except type of Locality Urban and School Management Private school students has null relationship.

The relationship exit between the difficulty levels in learning mathematics and achievements of students by these categories viz., Boys, Girls, Rural, Government group. The calculated values are higher than the tabulated value at 0.01 level of significance and in Boys category, Rural Category in Locality variable has significant at 0.05 level. Remaining the categories of personal variables like urban category in locality variable and private category of Management of the School variable was not significant. Thus, validate the hypothesis of the study and therefore the hypothesis "There will be no significant relationship between the difficulty levels in learning mathematics and achievements of students" of stands is *Rejected.*

Finding of the Study:

1. For Boys students are facing High, Moderate and Low level of content difficulty is 13.3% , 17.9% and 69.7%, whereas for Girls i.e. 13.4%, 18.8% and 68.3% respectively. It means Boys students are slightly bright, both Boys and Girls are consider that the

chapter 'Geometry' has high level of difficulty.

2. The obtained Chi-square value is not significant at any level as it is below the table value. It indicates that the difference between the scores of Boys and Girls has slight difference which is nearly 3 points. It shows that Boys performance is slightly better than Girls. There is no significant variation in the content difficulty level of students.
3. For students the overall High difficulty level of Government school students is (15.3%) whereas for Private school students is (11.7%). It indicates that the Private school students express less difficulty in content areas of mathematics. For Government school students High difficult content areas are Mensuration and Geometry, whereas for Private school students High difficult content area is Geometry.
4. The Chi-square value is significant, which indicates that the variation in the score of Government and Private school students is very large which is 26 Points. The hypothesis "There is no variation in the content difficulty of students with respect to variable Management of School" is *Rejected.*
5. Positive significant relationship between difficulty levels in learning mathematics and achievements of students in relation to gender variables except Management of school (Private) for students is observed.
6. Private school students have no relationship in school Management variable for students.
7. There exists a relationship between the difficulty levels in learning mathematics and achievements of students by these categories i.e. Boys, Girls, Government school students. It reveals that "There is a significant relationship between the difficulty levels in learning mathematics and achievements of students of in mathematics".

CONCLUSION:

Students do not have the knowledge of primary level mathematics. They are not able to understand the problems unless every problem given in the exercise is worked out on the board; they think Mathematics is difficult because they are afraid of it. They do not try to ask the teachers to teach them again the problems which they do not understand, they do not understand some of the theorems, riders and constructions in Geometry even if they are taught effectively, and they commit mistakes while solving problems. Covering the syllabus in intimae is very difficult task for both students and teachers as there are a large number of topics, chapters which are above the cognitive level of students included in the curriculum. In addition to this there are additional exercises like Do this/these, Think Discuss and Write, Try this/these, on which students are not focusing their interest.

The difficulties faced by students in learning Mathematics is due to Lack of interest in subjects, Improper way of teaching, Mentally handicappers i.e. Low I.Q. Dyscalculia, Improper behavior of teacher, Lack of individual attention, Irregular attendance of Students, Uncongenial Environment at home, Paucity of Pre School experience and Lack of Proper Educational guidance. In this way students face learning difficulties in Mathematics. However the above mentioned list of causes should not be treated as complete in itself. The difficulties in learning Mathematics are individual problem. Hence it may have some unique causes depending upon the individuality and environment of the students. A wise teacher should try to find out all possible causes of backwardness of the child by developing intimacy with the child and his parents and then plan suitable remedies accordingly. For Gifted children a separate enrichment programs should be provided. The Gifted students try to show their unique characteristics right from the beginning. They are caught the better it is. But in practical sense a child is termed Gifted in a Subject only when he shows consistently remarkable performance.

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