LEARNING OF MATHEMATICAL CONCEPTS IN RELATION TO PROBLEM   SOLVING SKILLS AMONG SECONDARY SCHOOL PUPILS

Dr. J. Shakila

Principal, DNR College of Education, Bhimavaram, Andhra Pradesh, India

ABSTRACT

Mathematics with all its branches plays an important role in everyday life. It is created to investigate the whole range of knowledge. Learning mathematics is basically a constructive process, which means that pupils gather, discover, create mathematical knowledge and skills mainly in the course of some social activity that has purpose consequently mathematics classroom instruction should move away from the information transmission model. Meaningful and authentic context should play a crucial role in mathematics learning and teaching, therefore, we need an integrated approach to mathematics teaching.

Problem solving is an integral part of developmental activities and provides opportunities for children to practice what they have learned by applying their learning situations. The amount of practice needed by any learner is reduced if he understands the concepts and skills to be practiced. How can we make our students good problem solvers in mathematics? This is possible only when we make mathematics education more meaningful and interesting. Mathematical abilities like logical thinking, rational reasoning, concentration of mind, orderly presentation, precision and accuracy, analytical and inductive skills, and above all general problem solving abilities. So the present study is intended to learning of mathematical concepts in relation to problem solving skills among secondary school pupils.

KEYWORDS: *Learning mathematical concepts, Problem solving skills, Secondary school pupils.*

INTRODUCTION

Mathematics is a subject of problems. Its teaching and learning demands solving of innumerable problems. Efficiency and ability in solving problems guarantee the success in learning of the mathematical concepts. Learning mathematics is basically a constructive process, which means that pupils gather, discover, create mathematical knowledge and skills. Problem solving skill is one of the most important life skills. Life is full of problems and challenges. It provides the ability to face the day-to-day complex situations or problems successfully and to adjust them efficiently. The pupil can develop the skills of problem solving at the school level. School has changed its purpose from just academic empowerment to life skills empowerment, which is much more comprehensive and useful in the world today.

REVIEW OF RELATED LITERATURE

In the present study the investigator has reviewed the researches done in the field of learning of mathematical concepts in relation to problem solving skills among secondary school pupils. SUMANGALA V. and MALINI, P.M. (1998) studied mastery learning strategy and achievement in mathematics at secondary school level. Gurusamy, S. (1991) did a diagnostic

study of the errors committed by students of standard IX in solving problems in Geometry .YADAV, P.S. (1984) studied the effect of Mastery Learning Strategy on pupils' achievement in mathematics, Wells (1981) in his study on "The processes involved in the activities of computer programming and mathematical problem solving", Mainka (1982) attempted to determine the ability of children to acquire mathematical concepts.' Hull (1979) in a study on "developing competency with problem solving ability in mathematics". Based on the above reviews the investigator also intended to study the learning mathematical concepts in relation to problem solving skills among secondary school pupils.

NEED AND IMPORTANCE OF THE STUDY

Mathematics helps to promote logical thinking, develops truthfulness in thinking, exactness and clarity of thought and promotes power of concentration. Problem solving skill involves the application of thinking and reasoning to various kinds of problems encountered in life. Life is ever changing day by day. Not only the individual is facing numerous problems in the society. To overcome this situation it is important to develop problem solving skills in students. IX class is the good representative class. This is the stage where the pupils have both physical and mental maturity. . In this process, secondary school pupils gain more problem solving skills and lead day to day life by solving the problems they are facing. Therefore secondary school children's learning of mathematical concepts in relation to problem solving skills among secondary school pupils is found very significant for the present study

       Title of the study: "Learning of mathematical concepts in relation to problem solving skills among secondary school pupils."

OBJECTIVES OF THE STUDY

1. To find out the level of learning of mathematical concepts of secondary school pupils and classify them.

2. To find out the level of problem solving skills among secondary school pupils and classify them.

3. To find out the relationship between learning mathematical concepts and problem solving skills among secondary school pupils.

HYPOTHESES OF THE STUDY

1. Secondary school pupils differ in their levels of learning of mathematical concepts.

2. Secondary school pupils differ in their levels of problem solving skills.

3. There would be no significant relationship between the learning of mathematical concepts and problem solving skills.

Sample of the Study

For the present study the investigator has taken up a stratified random sample of 31 schools and 620 IX class pupils of Krishna district and adopted normative survey method was used.

TOOL OF THE STUDY

Mathematical Concepts Test

A test was constructed on mathematical concepts in practical situations on three areas containing 60 items from VIII class

mathematics text book by the investigator.

Problem Solving Skill

The tool constructed by Dr. P. Martutham & Dr. C.G Venkatesha Murthy of R.I.E was adopted. The present questionnaire contains 22 items covering the three sub skills of problem solving skill.

DATA ANALYSIS

- **Objective 1:** To find out the level of mathematical concepts of the secondary school pupils and to classify them.

Table: 1 The Mean, % of Mean, S.D And 1/5th of Mean of the Total Sample in Learning of Mathematical Concepts.

N	Mean	% of Mean	SD	1/5th of Mean
620	21.5145	44.82	7.2270	4.3029

Interpretation

High school pupils are found to have average level of learning of mathematical concepts since 1/5th of mean value is less than the S.D value. The sample of pupils is heterogeneous in learning of mathematical concepts.

Table: 2 Classification of Pupils on the Basis of Their Level of Learning of Mathematical Concepts.

Category	Scale	No. of students	Percentage
Very Low	0-9	11	1.77
Low	10-19	247	39.83
Average	20-29	292	47.09
High	30-39	51	8.25
Very High	40-48	19	3.06

Interpretation

Most of the pupils, nearly half of them have average level of learning of mathematical concepts. Nearly two fifths of them have low level of learning and eighty seven percent of the pupils have only low and average learning of mathematical concepts.

- **Objective 2:** To find out the level of problem solving skills among secondary schools pupils and to classify them.

Table: 3 The Mean, % of Mean, S.D and 1/5th Mean of the Total Sample in Problem Solving Skill.

N	Mean	% mean	S.D	1/5th mean
620	94.4	71.51	12.53	18.88

Interpretation

The pupils are found to have high problem solving skill and the sample is found to be homogeneous since 1/5th of mean value is more than the S.D value.

Classification of the Pupils

The minimum possible score for problem solving skill is 22 and the maximum possible score is 132. The range is 110 and it is divided into five categories with an interval of 22 for each category, except for the average category which provides

for 23 scores.

Table 4: Classification of Pupils on The Basis of Their Level of Problem Solving Skill

Category	Score Scale	No. of students	Percentage
Very Low	22-43	Nil	0
Low	44-65	2	0.322
Average	66-88	180	29.03
High	89-110	356	57.41
Very High	111-132	82	13.22

Interpretation

More than half of the total sample of the secondary school pupils have high problem solving skill.

- **Objective 3:** To find out the relationship between learning mathematical concepts and problem solving skills among secondary school pupils.

Table: 5 Relationship between Mathematical Concepts and Problem Solving Skill

S.NO	Variable	N	df	r – value
1.	Mathematical concepts	620	620-2= 618	0.3259[**]
2.	Problem solving skill	620		

'**r**' value is significant at both the levels.

Interpretation

It can be inferred that there is significant positive relation between the learning of mathematical concepts and problem solving skills of secondary school pupils.

DISCUSSION AND CONCLUSIONS

Learning mathematics is basically a constructive process that extends beyond learning concepts, procedures and their applications .It attains higher intellectual and mathematical abilities like logical thinking, rational reasoning, attending to the essential aspects of the sum, orderly presentation, precision, accuracy, analytical and inductive skills. But it is sad to find that the IX class pupils have only average level of learning of mathematical concepts. Another appreciable finding is that most of the secondary school pupils have high level of problem solving skills. Another noticeable finding is that there is significant positive relation between the learning of mathematical concepts and problem solving skills .Most of the secondary school pupils are in the age group of 13+, this is the beginning of teenage. They are in the formal operational stage of cognitive development. After one more year, they enter X class which is the most importance stage in the educational life of students as it propels them into the realm of higher education. Therefore efforts are to be made caring these directions to improve learning mathematical concepts and problem solving skills by focusing more on concepts in mathematics related to real life problems rather than mere formulae and exercise and re-orienting the teachers and parents towards these aspects.

REFERENCE

1. *AGARWAL, J.C. (1966): Educational and Research, New Delhi. Arya Book Depot.*

2. *Anice James (2005): Teaching of Mathematics, Hyderabad.*

3. *GIRUSWAMY,S. (1991) : A diagnostic study of the errors committed by students of standard IX in solving problems in geometry in M.B BUCH (Ed), Fifth survey of research in Edn, (Vol.1) (1989-93), New Delhi, NCERT.*

4. *Hull (1979): developing competency with problem solving ability in mathematics in M.B. BUCH (Ed), Third survey of research in Edn, (Vol.1) (1978-83), New Delhi, NCERT.*

5. *MANIKA (1982): The ability of children to acquire mathematical concepts and to evaluate understanding and the acquisition of mathematical concepts of pupils in M.B. Buch (ed), Third survey of research in Edn, (Vol.1) (1978-83), New Delhi, NCERT.*

6. *Sumangala, (1995): study the relationship between mathematical aptitude and achievement in mathematics for IX class students in M.B.BUCH, (Ed) Sixth survey of educational research (1993-2000) [Vol:2] New Delhi, NCERT.*

7. *YADAV,P.S. (1984) : The effect of mastery learning strategy on pupils achievement in mathematics, their self concept and attitude towards mathematics in M.B BUCH (Ed), Fourth survey of research in Edn, (Vol.1) (1983-88), New Delhi, NCERT.*

8. *Peng, J. Design and Communication Strategy of Hubei's Tourism Brand Ad. Information Engineering Research Institute, USA. Proceedings of 2012 2nd International Conference on Social Sciences and Society (ICSSS 2012) Volume 6. Information Engineering Research Institute,USA,2012:5.*

9. *Shu, L. Beihai, a coastal tourist city. Urban and Rural Construction, 1995,08:38-39.*

10. *Sun, J. Research on the development of coastal tourism products based on tourist experience. Jinan University, 2014.*

11. *Xie, X. Atmospheric characteristics of coastline based on remote sensing images and tourism brand construction in coastal areas. Arabian Journal of Geosciences, 2021, 14(7): 588. https://doi.org/10.1007/s12517-021-06943-5*

12. *Zhang, G., Tian, J. Review and prospect of coastal tourism research at home and abroad. Journal of Ocean University of China (Social Science Edition), 2007,06:5-9.*

13. *Zhang, X. Research on brand building of coastal tourist cities. Hebei Normal University, 2021.*

14. *Zhang, Y., Tang, J., Yu, Z. Investigation and Development of Island Tourism Resources in Zhanjiang. Guangxi Urban Construction, 2021,10:10-14.*

15. *Zhang, W. Y. The Research of Digital Challenge to Tourism Destination Brand. Applied Mechanics and Materials,2014,596:976-980.https://doi.org/10.4028/www.scientific.net/AMM.596.976*

16. *Zhang, J. Discussion on Brand Image Design of Chinese Tourism City from Visual Symbol Management. Information Technology & Industrial Engineering Research Center. Results of 2016 International Conference on Tourism and Development (Tourism and Development) .Information Technology & Industrial Engineering Research Center,2016:5.*