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Effectiveness of Mnemonics on Achievement of Students in Mathematics at Highschool Level

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ABSTRACT: *This research is an experimental study which is intended to findout the effectiveness of mnemonics in teaching mathematics. The method adopted here is pretest post test nonequivalent group experimental design .To conduct the study two groups were selected from an intact class room one was treated as experimental group and other as control group. Both groups were pretested before the start of experiment. The experimental group was taught by mnemonics strategy and control group was taught by lecture method. Then they were given a post test. The result shows that mnemonic strategy is more effective than the lecture method.*

Keywords: *mnemonics, effectiveness, strategy, instruction*

I. INTRODUCTION

Education is the backbone of every nation. It plays an important role in the overall development of individual and in the progress of the society. Mathematics is a fundamental part of human thought and logic, and it is a core subject in our education system both at primary and secondary levels.How here it has been found from experience that most of the students feel difficulty in learning Mathematics.It is because of the lack of interest and motivation. As a teacher it is our duty to foster the interest of students in Mathematics.

1.1 Mnemonics Background

The word mnemonic is derived from the Greek word Mnemosyne, referring to the ancient Greek goddess of memory. The use of mnemonic dates back to 500B.C [1]. Mnemonics are memory aids that assist one in remembering specific information by using a process, strategy, or technique that enables a person to improve memory [2]. Solso (1995),noted that mnemonics are techniques or devices, either verbal or visual in nature, that serve to improve the storage of new information, and the recall of information contained in memory[3]

Mnemonic devices have been differently classified by different scholars. There are three main types of mnemonics described in the literature [4]. These include the method of loci (Yates, 1966), the pegword method (Roediger, 1980), and the keyword method (Atkinson, 1975).[4]

The Method of Loci. The method of loci mnemonic is the oldest mnemonic, which involves three steps (Yates, 1966). First, learners are required to memorize a series of distinct loci along a familiar pathway . Second, learners are required to convert to-be remembered words, into mental representations. Next, learners are required to deposit the image along some salient location along the path . [5].The first used mnemonic device was an earlier form of the modern day method of loci and since then, numerous other devices have been developed (Higbee, 1987)[.2]

The Pegword Method. The pegword method is a two-stage process. In the first stage, learners are asked to learn 10 number-rhyme pairs (e.g., one is a bun, two is a shoe, and three is a tree, etc.). In the second stage, learners are given a picture or asked to visualize the to-be-remembered item linking the rhyming words. [6, 7, 8].

The Keyword Method.The keyword strategy is based on linking new information to keywords that are already encoded to memory. It takes unfamiliar information and makes it more meaningful and concrete and thus, easier to remember[9]. Scruggs and Mastropieri (1989),noted that the keyword strategyworks best when the information to be learned is new to students[10].The keyword mnemonic requires two stages: an acoustic link stage and an imagery link stage (Atkinson, 1975; Levin, 1981). First, the learner is given a 'keyword' that is acoustically similar to and that can be visualized as interacting with the item tobe-remembered [11] [12].

In 1967 from a study by Gerald R. Miller found that students who regularly used mnemonic devices increased test scores up to 77%.The 9 basic types of mnemonics presented in this handout include Music, Name, Expression/Word, Model, Ode/Rhyme, Note Organization, Image, Connection, and Spelling Mnemonics.[13]

Music Mnemonics

Music can used to help students recall important details to main ideas and many learners have made songs out of information when a list of items must be learned

Name Mnemonics

In a Name Mnemonic, the 1st letter of each word in a list of items is used to make a name of a person or thing. Sometimes, the items can be rearranged to form a more recollectable name mnemonic.

Expression or Word Mnemonic

This is by far the most popularly used mnemonic. To make an Expression or Word mnemonic, the first letter of each item in a list is arranged to form a phrase or word.

Model Mnemonics

In a Model Mnemonic, some type of representation is constructed to help with understanding and recalling important information.

Ode or Rhyme Mnemonics

An Ode or Rhyme Mnemonic puts information in the form of a poem.

Note Organization Mnemonics

The way textbook and lecture notes are organized can inhibit learning and recall or promote it. In the sense that the organization of notes can promote recall, it is a memory device.

Image Mnemonic

The information in an Image Mnemonic is constructed in the form of a picture that promotes recall of information when you need it. The sillier the Image Mnemonic is, the easier it is to recall the related information

Connection Mnemonics

In this type of mnemonic, the information to be remembered is connected to something already known.

Spelling Mnemonics

Spelling mnemonics is intended to help rememeber the spelling of words [13]

Gians and Redman believe that objects and pictures can facilitate recall[14] . Wright also believes that meaning cannot be derived only from verbal language.[15]

1.2 Objectives Of The Study

Objectives of the present study are

1. To compare the mean pre-test achievement scores of experimental group and control group.
2. To compare the mean post-test achievement scores of experimental group and control group.

1.3 Statement Of The Problem

The present study is intended to study the effectiveness of Mnemonics in Mathematics. Hence the problem under investigation is entitled as"Effectiveness of Mnemonics ,on Achievement of Students in Mathematics at Highschool Level**"**

1.4 Definition of Key terms

Effectiveness

The degree to which objectives are achieved and the extent to which targeted problems are solved.[16]. In this present study effectiveness is the desired result of, Mnemonics based teaching in Mathematics at high school level

Strategy

A method or plan chosen to bring about a desired future, such as achievement of a goal or solution to a problem[17]

Instruction

The act or practice of instructing or teaching; education[18].

1.5 Hypothesis

1. There will be significant difference between the mean pre- test scores of experimental group and control group.
2. There will be statistically significant difference between the mean post-test scores of experimental group and control group.

II. Limitations

The study is delimited to students of Kerala state syllabus of eighth standard . Sample is delimited to only 120 students . It is an experimental study, all units in the sampling were not taken. However an attempt was made to get a representative sample. As the study was confined to only in VIII standard students the result cannot be generalized. The study was limited to only some topic selected from the syllabus ofVIII standard. With in these limitations investigator tries the level best to find the effectiveness of Mnemonics.

III. Literature Review

Scruggs &Mastroprieri(2004)conducted a study on whether Mnemonic strategies would be used for high school students with learningdisabilities.Over a sixweek period students were taught the vocabulary words using either a traditional instuctional approach as pictorial Mnemonic keyword strategies at the end of the instructional period students had learned 92% of the words under Mnemonics[10]

Rummel,Levin and WoodWard(2003) conducted experiments in college students to read a historical passage on aspects of human intelligence.Students were randomly assigned to two different instructional conditions,Mnemonics and free study.Findings illustrate that Mnemonic techniques are useful in improving students memory for and application of central textual information [19]

Roediger (1980) looked at the method of loci along with three other well-known Mnemonic methods. Results of the study revealed that all four Mnemonic groups recalled the 20-word list better than the control group. However, the method of loci and the peg word system were found to be better methods to use when the order of words remembered was important [7].

IV. Methodology

Method adopted in this study was experimental method and the design adopted waspre-test ,post-test non equivalent group design .The study was conducted on a sample of 120 students of eighth standard .They were divided into two groups with sixty students in each group. One was treated as control group and other was taken as experimental group. The experimental group was taught using mnemonics strategy and control group by traditional method.An achievement tests were administered to both groups after the experiment. The scores obtained by the students of both groups in the pre-test and post-tests are statistically analyzed.

V. Data Analysis

The purpose of analysis is to reduce data to intelligible and interpretable form so that the relations of research problems can be studied and tested. Scores obtained were analysed in detail and given below.[20]

Comparison of pre- test scores in Achievement in Mathematics of pupils in the Experimental and Control groups

Analysis of pre test scores using the techniques of test of significance of difference between the groups revealed that the critical ratio obtained is 1.16 which is not even significant at 0.05 level. This shows that there is no significant difference between the means of the pre- test scores of pupils in the experimental group and control group. Therefore the two groups do not differ significantly in their Achievement in Mathematics. So it is inferred that before the experiment the two groups were more or less the same performance.

Table 4.5

Results of test of significance of pre- test scores in Achievement in Mathematics of the Experimental and Control groups

Groups	No. of pupils	Mean	Standard deviation	Critical ratio	Level of significance
Experimental group	60	11.03	3.41	1.16	Not significant at 0.05 level
Control group	60	11.77	3.495		

Comparison of post- test scores in Achievement in Mathematics of pupils in the Experimental and Control groups

Analysis of post test scores revealed that the mean scores of the experimental group (14.33) is greater than that of the control group (12.02). The critical ratio obtained is 4.31, which is highly significant even at 0.01 levels. Since the mean of experimental group is greater than that of the control group, it is inferred that experimental group is better than the control group.

Table 4.6

Results of test of significance of post- test scores inAchievement in Mathematics of the Experimental and Control groups

Groups	No. of pupils	Mean	Standard deviation	Critical ratio	Level of significance
Experimental group	65	14.33333	2.555596	4.31	Significant at 0.01 level
Control group	65	12.01667	3.280614		

VI. Findings And Conclusions

The details of the analysis of data shows that when compare to lecture method of teaching, there exist an effect of Mnemonics on, achievement of students in mathematics. From the analysis it is very clear that Mnemonics method of teaching is superior to lecture method of teaching.It also helps to reduce the difficulty of students in learning mathematics..Hence this strategy can be effectively used in our present classroom set up and the package is relevant and significant. It can make the students motivated and the classroom more interesting.

VII. Recommendations And Suggestions

The study showed that Mnemonic Instruction is superior to the lecture method .Mnemonic instruction can be used in other subjects such as science, arts etc for effective teaching.

The present study is a limited one due to the lack of time and other facilities. Some of the possible areas in which further studies can be carried out are listed below. Mnemonics starategieswill be very effective to all level of students, such as gifted, average, below average .Therefore it can be implement to students with disabilities gifted ,below average,averageetc

The study should be extended to large samples involving more number of units in order to examine the reliability of the results and ensure general applicability of findings.

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