Research Paper | Education | E-ISSN : 2454-9916 | Volume : 1 | Issue : 5 | Dec 2015

MNEMONICS: A REMEDIAL METHOD FOR TEACHING SCIENCE

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ABSTRACT

Learning is the acquisition of knowledge and skills. Students find it difficult to learn and remember science vocabulary, names and years which are the inevitable parts of science education. Hence it became necessary to find an alternate way of teaching and learning. Mnemonics, an ancient art of memoryproved to be a technique that aids in learning and remembering could be employed as the remedial method in science education. The present study was an attempt to find the effectiveness of this technique among Standard VIII students in science. This was an experimental study of equivalent group pretest-posttest design. It was found out that mnemonic instruction has resulted in more effective learning and retention of the learnt material.

KEYWORDS: Mnemonic devices,academic achievement, ASAT, SPM

1. INTRODUCTION

Learning is not exclusive to the domain of education system. It begins a very long before school, takes place rapidly in school and continues even longer after school in a number of ways and settings (Pritchard, 2013). Learning is the acquisition of knowledge and skills(David, 2002).

Science is flooded with a lot of factual information. Name and functions of different tissues found in human body, different cell organelles, names of scientists, parts of organs and adaptations of organisms present a pool of vocabulary for the students to get acquaint with. To learn new vocabulary items, students are made to memorize words by repeating them several times but after a few days, they may forget the words. The ability to recall information forms a key component of academic success. So students had to retrieve the facts and concepts they have learnt when needed. This created an aversion towards science and hence science teachers among the students. This problem may stem from the lack of appropriate teaching strategies. It demands a need for the introduction of a different strategy in teaching science.

Research clearly shows that mnemonic techniques are superior to conventional methods of instruction with the acquisition and recall of highly factual information like science and social science. According to Thompson (1987), mnemonic devices help learners to learn faster and recall better. Moreover, mnemonic devices can make students motivated and make the classroom very interesting (Groeger, 1997). It was also shown that mnemonic strategies improve recall of important information in life sciences (Mastropieri, Enerick & Scruggs, 1988).Mnemonics could be included in the teaching science as it helps in easy learning and make learning more enjoyable (Anandhi & Raja, 2014).

Researchers were very much interested to know the effectiveness of this approachon the academic achievement ofStandard VIII students.

2. OBJECTIVES OF THE STUDY

Main objective of the study is to find out the effectiveness of mnemonic techniques on academic achievementand retaining capacityofStandard VIII students in science.

3. HYPOTHESES FORMULATED

In accordance with the objectives of the study following hypotheses were formulated.

- There is no significant difference in pretest, pretest-posttest and delayed posttest scores between control group and experimental group.
- There is no significant difference in gain scores between control group and experimental group.

4. VARIABLES

In the present study the independent variable of the study is mnemonic techniques and dependent variable is achievement inscience.

5. METHOD

This is a carefully planned quantitative research using experimental method. In this a large number of experimental units or subjects are studied, the subjects are randomly assigned to the treatment groups, independent variable is manipulated by the researcher having complete control over the scheduling of independent variable (Broota, 2003).The researcher attempted to hold all variables constant that might influence the outcome of the study by allowing only dependent variable to vary based on participants' responses to the treatment. For keeping both the groups equivalent, pretesting, matching, blocking and covariants were used as controls. Time table was modified to keep the time of study same for both the groups. To avoid the differences in the teaching competency of teachers, first author handled the classes for both groups. Moreover the environment of study for the two groups were also maintained to be the same.

5.1 Sample

Sample consisted of two large homogeneous groups with 31 students in the control group and 32 students in the experimental group,which belonged to the same school.

5.2 Tools Used

Tools used for the study includedStandard Progressive Matrices (SPM) by J. C. Raven and a researchers-made tool, AnWi's Science

Achievement Test (ASAT)to measure the achievement of students.SPM,an IQ tool appropriate for 14 years age group consisted of 60 problems (five sets of 12), all of which involve completing a pattern or figure. ASAT contained 40 questions of objective type each with four alternatives. SPM was used for the identification of the two homogeneous groups (control and experimental) for the study.ASAT was used in the pretest (to know the level of students before treatment), posttest (to know about the effectiveness of the treatment) and in the delayed posttest (to know about the retention of the effect of treatment after 15 days interval).

5.3 Treatment

To compare the achievement of two groups of students,both the groups were taught the content portion using same teaching aids like models, charts, pictures and blackboard. As a reinforcement activity for learning was provided by the conventional method of repetition and drilling for the memorization of the content for the control group. For the experimental group, in addition to the teaching aids, mnemonic techniques such as acronym, acrostics, key word, peg word, method of loci, numeric method, rhymes and story telling were used for aiding the memory of the learned material. So they were introduced while teaching the relevant portion. As the reinforcement activity, these devices were reminded. Hence the control group was taught with the conventional method and the experimental group with the manipulated method by incorporating mnemonic devices in conventional teaching.

5.4 Statistical Methods Employed

For analysing data, independent samples t-test and paired samples t-test were used. Two samples t-test is helpful to test whether two population means are different, where an experiment is done with limited number of students (Rumsey, 2007). In pretest/posttest design, the data are paired where the measurements of the same variable at two different points are compared (Plichta & Garzon, 2009).

6. Design of the Study

Research design is the conceptual structure within which research would be conducted. The experimental design used in the study is pretest-posttest control group design (Gliner et. al., 2009). In this design, a treatment group is compared with a control across two period – pretest and posttest. This design helps to check the equivalence of the groups before intervention.

Detailed procedure followed for the present study is presented in the following figure.

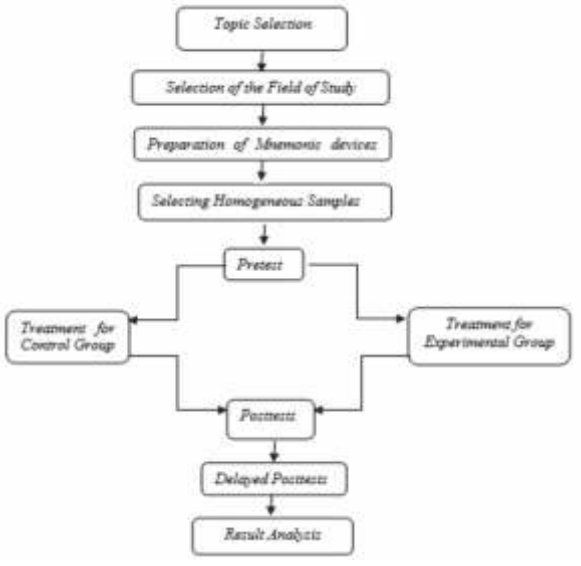

Figure 1. Experimental Design of the study

7. RESULTS

The scores of pretest, posttest and delayed posttest were analysed as summarised below.

Table 1. Significance of Difference between Control and Experimental Groups in Pretest, Posttest and Delayed Posttest Scores

Test	Group	Size	Mean	SD	t value	p value
Pretest	Control	31	11.23	3.712	1.795	0.078NS
	Experimental	32	12.88	3.581		
Posttest	Control	31	21.06	3.623	4.949	0.000**
	Experimental	32	27.78	6.661		
Delayed Posttest	Control	31	13.58	4.326	5.901	0.000**
	Experimental	32	21.56	6.211		

NS - Not significant
** Significant at 1% level

Table2.Significance of Difference between Pretest-posttest Scores of Control and Experimental Groups

Group	Test	Size	Mean	SD	r value	t value	p value
Control	Pretest	31	11.23	3.712	0.723	20.039	0.000**
	Posttest	31	21.06	3.623			
Experimental	Pretest	32	12.88	3.581	0.730	17.838	0.000**
	Posttest	32	27.78	6.661			

** Significant 1% level of significance

Table 3. Significance of Difference between the Gain Scores of Control and Experimental Groups

Group	Size	Mean	SD	t value	p value
Control	31	9.84	2.734	5.187	0.000**
Experimental	32	14.91	4.727		

**Significant at 1% level of significance

8. FINDINGS

Important findings of the study are summarized below.

1. Control group and experimental groups show higher achievement in the posttest as a result of the treatment given.

2. In the posttest and delayed posttest higher achievement was shown by the experimental group than the control group which was the effect of the treatment given to the group.

3. Experimental group has gained more from the given treatment.

9. DISCUSSION

The pretest analysis showed that the control and experimental groups are equal before the treatment.The improved pretest – posttest paired match test score of the control group and experimental group evidenced that teaching in general helped in the academic achievement of the eighth standard students in science.

It was inferred from posttest analysis that experimental group performed better than the control group. Since both were equivalent groups and same test was used for the pretest and posttest in both groups, the difference in the achievement level was attributed to the difference in the teaching methodology. Hence it was evident

that mnemonics instruction resulted in the better achievement. This finding coincides with the finding that mnemonics are very effective for meeting one critically important aspect of school learning - memory for academic content (Mastropieri, Scuggs & Graetz,2005).For teaching new scientific vocabulary, names and year, mnemonics proved to be an effective tool. The observation that mnemonic strategy helped in the academic achievement of the students was confirmed strongly by the gain score analysis. Hence mnemonic strategy could be used by teachers for teaching science.

Mnemonic strategy helped in the retention of information in 15 days interval of time. As retention of facts plays a very important role in the academic achievement of the students.These results agree with that of Amiryousefi, & Kedabi (2011) thatteachers can attempt to include mnemonic devices in their classes as they are useful ways of enhancing vocabulary learning and recall.

10. CONCLUSION

Main objective of the study was to find out the effectiveness of mnemonics in teaching Standard VIII science. From the study, it was concluded that teaching with mnemonic technique was more effective than the conventional method for teaching science to standard VIII students. It was also found out that mnemonic techniques helped in the retention of learned materials. Hence, this method of teaching could be used as an alternate method of teaching science especially when learning and retention of science vocabulary, facts and years is needed to master the skills prescribed for the particular class.

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