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Effectiveness of Mnemonic Instructional Strategy for Enhancing Geography Achievement Among Standard IX Students

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Abstract
The researcher employed a quasi-experimental design to assess the effectiveness of mnemonic instructional strategies in enhancing geography achievement among standard IX students. Samples were selected using purposive sampling from one Government Girls Higher Secondary School in Namakkal District, Tamil Nadu. Two sections, A and C, were chosen via simple random sampling for the experimental and control groups, respectively. Each group comprised 40 regular students. Standardized achievement tests were conducted as pre-tests and post-tests to assess geography achievement. Four traditional lesson plans were prepared for the control group, while mnemonic instructional strategies in Tamil were developed and validated by six subject teachers for the experimental group. The intervention involved seven periods of mnemonic strategy-based teaching. Results indicate that students taught using mnemonic strategies outperformed those taught traditionally. Incorporating mnemonic strategies into geography teaching offers benefits such as improved retention, enhanced engagement, academic achievement, and the development of transferable skills beyond the geography classroom.

Keywords: Mnemonics, Geography achievement

INTRODUCTION

Mnemonic strategies are predominantly valuable when students need to order information for well-organized access. They can restructure the learning process by providing cues or relations or associations that help learners retrieve information quickly and efficiently. Teachers should equip their students with effective learning strategies that will enable them to implement their knowledge in the future (Young 2015). The ability to learn depends on one's capacity to process, store and retrieve information from memory and to facilitate the formation of deep, long-term memories (Cowan 2014; van Kesteren et al. 2018; Weiss 2000). Mnemonic strategies are powerful tools used in education to enhance memory and learning.

NEED AND SIGNIFICANCE OF THE STUDY

In high school geography, students delve into a diverse range of topics that encompass both physical and human geography. It is considered a fundamental subject in many countries, providing essential

knowledge about the world and its people. It plays a crucial role in shaping students' understanding of global issues and their ability to think critically about complex problems.

The need for a research study on mnemonic instructional strategies in high school geography education in India stems from the potential benefits these strategies offer. Mnemonic techniques, as highlighted in various studies, can significantly enhance retention and academic success. For example, research on inclusive secondary social studies classes reveals overall satisfaction among teachers and students with mnemonic strategies, suggesting their positive impact. Furthermore, the use of mnemonics in social studies has been associated with increased academic success and improved knowledge retention Kerem Colak & Rahman İbrahim Aydın (2022).

Mnemonic strategies are systematic methods of converting difficult-to-remember concepts into more memorable ones (Lubin and Polloway 2016). The stronger the connection between new information and prior knowledge, the easier it is for a person to retrieve that information, and the longer it will be retained in his or her long-term memory (Scruggs and Mastropieri 2000). Empirical research has found mnemonic strategies to be effective in teaching, insofar as they help students use their cognitive skills to form an acoustic imaginal link between a stimulus and a response (Bellezza 1981; Mastropieri et al. 1985;

Turk et al. 2015). Mnemonics incorporate a range of cognitive principles associated with memory enhancement, including effortful attention, deep elaborative encoding, organization, and dual coding (Bellezza 1996; Paivio 2014), and are, thus, particularly helpful for individuals who lack pre-existing knowledge that relates to the new information they testing the effectiveness of creative map mnemonic strategies are learning (Dehn 2008). Such strategies have also been found to enhance performance on most tasks that require recall of factual information, irrespective of academic subject (Therrien et al. 2011).

According to Thompson (1987), mnemonics are of five types: linguistic, spatial, verbal, visual, and physical. Linguistic mnemonics, such keywords, peg words, and acronyms, involve associating the new concept with familiar words. Spatial mnemonics include the loci method, which connects the new concept to a familiar place. Verbal methods use stories to help students remember, and include both storytelling and narrative chains. Visual mnemonics use pictures or visualizations to create an association with the target concept; and physical-response methods make use of one’s body to aid in remembering, either through movement or physical sensation (Lubin and Polloway 2016)

The effectiveness of mnemonic strategies, especially creative map mnemonic techniques, has been explored in geography classes, demonstrating potential benefits for learning performance, motivation, and creativity Liao et al. (2019) The significance of this research lies in its potential to inform teaching practices, curriculum development, and educational policies in India. Understanding the effectiveness of mnemonic instructional strategies in the Indian high school geography context can contribute to improved learning outcomes, increased student engagement, and the development of more effective teaching methodologies.

Memory-enhancing or mnemonic strategies refer to a “specific reconstruction of target content intended to tie new information more closely to the learners’ existing knowledge base and, therefore, facilitate retrieval” (Scruggs & Mastropieri, 1990). Geography achievement refers to the level of success or proficiency attained by individuals in the field of geography. It encompasses the understanding, knowledge, and application of geographical concepts, map reading skills, and spatial awareness. Achieving success in geography typically involves a combination of factors, including effective learning strategies, educational resources, teacher quality, and individual efforts.

STATEMENT OF THE PROBLEM

The social science teachers generally adopt traditional teaching methods such as the lecture method, chalk and talk method, role-play method, and demonstration methods for teaching geography at the standard IX level. These methods do not aid in encoding new information in memory and are not easy to retrieve. Hence, the researcher designed, developed, and evolved a mnemonic instructional strategy to improve the working memory of standard IX students while learning geography. This strategy aims to encode geography-related information in memory for easier retrieval. Moreover, the researcher conducted an experimental research study to determine the extent to which the mnemonic strategy could improve geography achievement among standard IX students. The effectiveness of the mnemonic strategy was measured over time through retention tests. Overall, the research study aimed to address the shortcomings of traditional teaching methods by introducing a mnemonic instructional strategy to enhance memory encoding and retrieval, ultimately improving geography achievement among standard IX students.

OBJECTIVES OF THE STUDY

General objective of the study: To determine the effectiveness of a mnemonic instructional strategy on Geography achievement among standard IX students.

Specific objectives of the study:

1. To assess the mean difference in geography achievement between standard IX students in the control and experimental groups during the pre-test.
2. To design, develop, validate, and implement a mnemonic instructional strategy for teaching geography.
3. To analyze the mean difference in geography achievement between standard IX students in the control and experimental groups during the post-test.
4. To determine the mean difference in geography achievement between standard IX students in the control and experimental groups during the retention test.
5. To compare the mean difference in retention ability for geography concepts between standard IX students in the control and experimental groups from the post-test to the retention test.

RESEARCH QUESTIONS

1. What is the mean difference in geography achievement of the IX standard students before the implementation of the mnemonic strategy in teaching geography between the control and experimental groups?
2. To what extent would the mnemonic strategy improve geography achievement among the IX standard students?
3. What would be the significant difference in the post-test mean score of geography achievement between the samples in the control and experimental groups of IX standard students?
4. What is the mean difference in geography achievement of the samples in the control and experimental groups between the post-test and retention test?

HYPOTHESES OF THE STUDY

1. There is no significant difference in the pre-test mean score of geography achievement between the control and experimental groups.

2. There is no significant difference in the post-test mean score of geography achievement between the control and experimental groups.
3. There is a significant difference in the retention test mean score of geography achievement between the control and experimental groups.
4. There is no significant difference in the mean score of geography achievement between the post-test and retention test scores of the control group and experimental group.

Limitation of the study

1. The study's sample is limited to ninth standard students from one school in a specific district, potentially limiting generalizability to broader populations.
2. The study may lack external validity due to its focus on a single geographic region, potentially limiting the applicability of findings to other contexts.
3. The study assesses retention ability only in the short term, which may not capture long-term effectiveness.
4. Conducting the study in a single school may limit access to diverse resources and perspectives, affecting the comprehensiveness of the instructional strategy.
5. External factors such as students' prior knowledge or teaching quality may influence geography achievement, potentially confounding the results.
6. There may be ethical considerations regarding the allocation of students into control and experimental groups, as some students may miss out on potentially beneficial interventions.

METHODOLOGY

Method: The researcher employed a quasi-experimental design for the study.

Population: The study focused on ninth-standard students studying in the Tamil medium under the state board of Tamil Nadu.

Sample Selection: Purposive sampling was used to select samples from a Government Girls Higher Secondary School in Namakkal District, Tamil Nadu. Among three sections for the ninth standard, Section A served as the experimental group, and Section C as the control group, chosen through simple random sampling. The study included 40 students from each of the selected sections, totalling 80 students.

Content Selection: The researcher chose Unit I of the ninth-standard Tamil medium Geography lesson, specifically "Lithosphere – I Endogenetic Processes." Content included spheres of the Earth, Earth's structure, rock types and cycles, internal Earth processes, earthquakes, and volcanoes.

Pedagogical process: The researcher developed four lesson plans based on traditional teaching methods for the control group, while for the experimental group, a mnemonic instructional strategy in Tamil was prepared and validated with six subject teachers.

Validation: The developed mnemonic strategy underwent validation by academic professionals with over ten years of experience in teaching social science subjects at the high school level in Salem and Namakkal Districts.

Achievement Test: The researcher constructed an achievement test with initially 46 multiple-choice questions, reduced to 40 after item analysis. The test's reliability, assessed using the split-half method, yielded an r value of 0.87.

TESTING THE HYPOTHESES OF THE STUDY

Hypothesis 1: There is no significant difference in the pre-test mean score of Geography achievement between control and experimental group.

Table 1 Paired sample t test to find out the significant difference in the pre-test mean score of Geography achievement between control and experimental group.

	Group	N	Mean	Standard Deviation	t value	P value	Result
Pre-Test	Control Group	40	37.66	15.83	0.033	0.97	NS
	Experimental Group	40	37.55	15.36			

The above table revealed that calculated P value 0.97 is greater than 0.05 and it is not significant at 0.05 level. Hence, the formulated hypothesis **"**There is no significant difference in the pre-test mean score of Geography achievement between control and experimental group" is accepted.

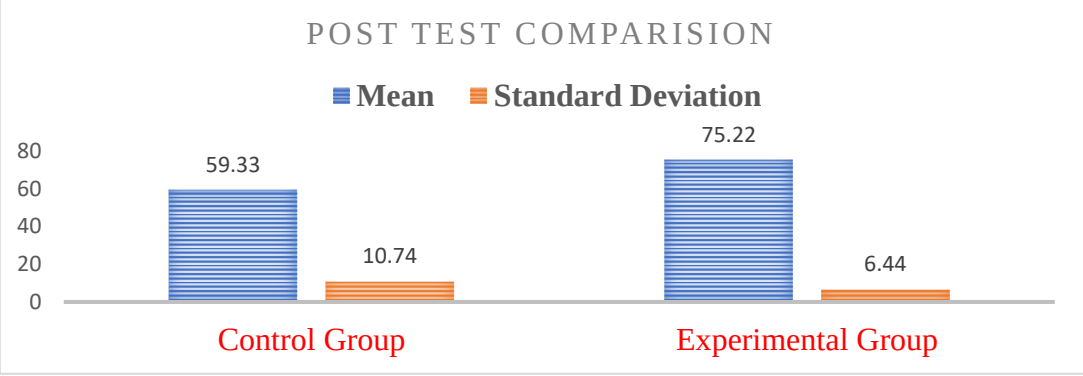
Hypothesis 2: There is no significant difference in the post-test mean score of Geography achievement between control and experimental group.

Table 2 Paired sample t test to find out the significant difference in the post-test mean score of Geography achievement between control and experimental group.

	Group	N	Mean	Standard Deviation	t value	P value	Result
Post-Test	Control Group	40	59.33	10.74	80.02	**0.00**	**Sig**
	Experimental Group	40	75.22	6.44			

The above table revealed that calculated P value 0.00 is less than 0.05 and it is significant at 0.05 level. Hence, the formulated hypothesis **"**There is no significant difference in the post-test mean score of Geography achievement between control and experimental group" is not accepted.

Figure 1 Comparison of Post-test mean score of Geography achievement between control and experimental group.



Inference: The samples of control and experimental group differ in their Geography achievement based on the post-test mean score. The mean value of the experimental group i.e., (75.22) is better than the control groups whose mean value is (59.33). The mean difference between control and exper4imental group in the post-test is 15.89.

Hypothesis 3: There is a significant difference in the retention test mean score of Geography achievement of between control and experimental group.

Table 3 Paired sample t test to find out the significant difference in the retention test mean score of Geography achievement of between control and experimental group

	Test	N	Mean	Standard Deviation	t value	P value	Result
Retention ability	**Control group**	40	54.02	12.59	9.34	**0.00**	**Sig**
	Experimental group	40	75.12	6.74			

The above table revealed that the calculated P value 0.00 is less than 0.05 and it is significant at 0.05 level. Hence, the formulated hypothesis **"**There is a significant difference in the retention test mean score of Geography achievement between control and experimental group" is not accepted.

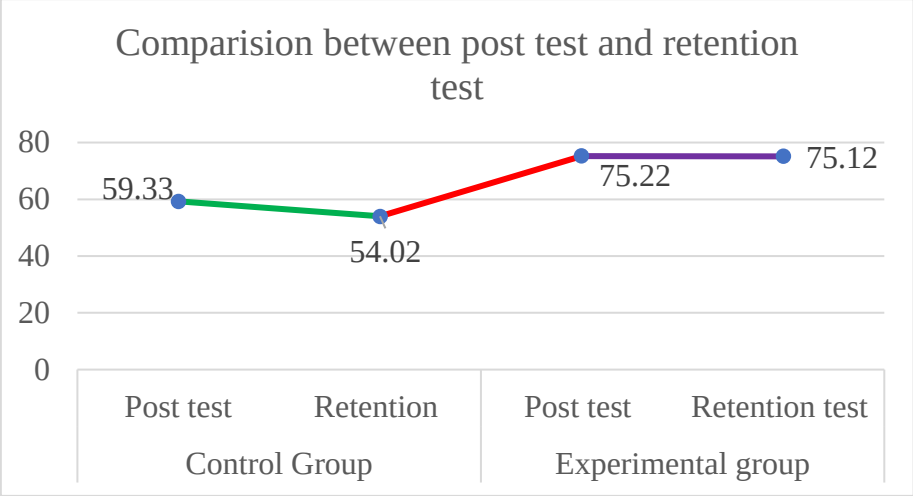
Hypothesis 4: There is no significant difference in the mean score of Geography achievement between post-test and retention test score of control group and experimental group.

Table 4 Paired sample t test to find out the significant difference in the mean score of Geography achievement between post-test and retention test score of control group and experimental group.

Group	Group	N	Mean	Standard Deviation	t value	P value	Result
Control group	Post test	40	59.33	10.74	2.02	**0.04**	**Sig**
	Retention	40	54.02	12.59			
Experimental group	Post test	40	75.22	6.44	**0.07**	**0.94**	Not sig
	Retention test	40	75.12	6.74			

The above table revealed that the calculated P value 0.04 is less than 0.05 and it is significant at 0.05 level for control group. Whereas the calculated p value 0.94 is greater than 0.05 and it is not significant for experimental group. Hence, the formulated hypothesis **"**There is a significant difference in the retention test mean score of Geography achievement between control is accepted whereas it is not accepted for experimental group.

Figure 2; showing the comparison of post-test and retention test mean difference in the Geography achievement of standard IX students between control and Experimental Group



Inference: in the comparison of post-test and retention test mean score of geography achievement of the samples between control and experimental group, the samples in the experimental are better retention ability than the samples in the control group

MAJOR FINDINGS OF THE STUDY

1. There is no significant difference in the pre-test mean score of Geography achievement between control and experimental group.
2. There significant difference in the post-test mean score of Geography achievement between control and experimental group.
3. There is a significant difference in the retention test mean score of Geography achievement of the samples between control and experimental group
4. There is a significant difference between post-test and retention test mean score of Geography achievement of the samples of control group.
5. There is no significant difference between post-test and retention test mean score of Geography achievement of the samples of experimental group.

DISCUSSION OF THE STUDY

The pre-test mean score reveals that the samples in the control and experimental group are equal in the Geography achievement. In the post test, the samples of control and experimental group differ in their Geography achievement based on the post-test mean score. The mean value of the experimental group i.e., (75.22) is better than the control groups whose mean value is (59.33). The mean difference between control and exper4imental group in the post-test is 15. 89.

The retention ability in the Geography achievement of the samples in the experimental group is better than the samples in the control group in which the mean value (75.12) and (54.02) respectively. The retention-test mean difference between control and experimental group is 21.10. It is evidently proved that the implemented mnemonic instructional strategy is unique one the Geography achievement.

In the comparison of post-test and retention test mean score of geography achievement of the samples between control and experimental group, the samples in the experimental are better retention ability than the samples in the control group.

The findings of the present study proved to accept (Cowan 2014; van Kesteren et al. 2018; Weiss 2000). Kerem Colak & Rahman İbrahim Aydın (2022). view that mnemonics as devices that help learners learn faster, recall better. This finding of the study supports the result of the study of (Scruggs & Mastropieri, 1990). that Mnemonic integrated instruction emphasizes on learning for long term retention as it is specifically designed to improve memory. Further, the outcomes of research studies of (Lubin and Polloway 2016). have demonstrated as similar to the findings of the present study that mnemonic strategies are beneficial for students' academic achievement.

EDUCATIONAL IMPLICATION OF THE STUDY

Utilising mnemonic instructional strategies in geography teaching can have several educational implications for enhancing achievement among high school students. Mnemonic strategies, such as acronyms, rhymes, or visualization techniques, can help students remember and recall geographical facts, concepts, and terminology more effectively. This vital for success in geography assessments. Mnemonic instructional strategy often involves creative and collaborative approaches to learning. This can develop student engagement and interest in geography, making the learning process more pleasurable. particularly beneficial during exam preparation. When students are enthusiastically involved in creating and using mnemonic instructional strategy can create their own mnemonics based on their favourites, making the learning process more personalized. This individualization can provide to varied learning desires within the classroom and they may find it easier to apply similar techniques in other academic areas. Students can share their mnemonic creations with peers, fostering a sense of teamwork and community within the geography classroom. Incorporating mnemonic strategies into geography teaching can offer a wide range of benefits, including better retention, increased engagement, and the development of transferable skills that extend beyond the geography classroom.

CONCLUSION

Mnemonic techniques can make learning more engaging and effective by providing students with tools to encode and retrieve information quickly. When teacher implement mnemonic instructional strategy correctly the students can enhance memory retention and facilitate the learning process across various subjects and content areas. Mnemonic strategies offer a structured approach to improving memory and learning by providing students with creative tools to encode and recall information effectively. By incorporating mnemonic techniques into education, teachers can enhance students' ability to retain and apply knowledge across different subjects.

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