



IMPACT OF MIND MAPPING LEARNING STRATEGY ON STUDENTS' THINKING DEVELOPMENT AT UPPER PRIMARY LEVEL

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Abstract:

The present investigation explored the impact of mind mapping learning strategy on students' thinking development in geography at upper primary level. 'Pre-test Post-Test Non-Equivalent Group Design' was used in this study. This investigation was conducted on total 74 students grouped as experimental group (38), and control group (36). The investigator did this experiment over 15 weeks with conventional and mind mapping learning strategy. The self-prepared performance test on class VIII textbook (Geography) of the West Bengal State Board, India was used as an instrument. The study revealed that the learners instructed through mind mapping learning strategy significantly got superior results than those instructed through the conventional teaching technique in geography. The investigation uncovered that mind mapping learning strategy tends to promote equality in geography learning performance and thinking development between girls and boys. The mind mapping learning strategy is fit for improving students' mastery of content. The study suggested that mind mapping learning strategy ought to be utilized in geography teaching and learning for the improvement of students' thinking development.

Keywords: Geography, Mind Mapping Learning Strategy, Thinking Development, Upper Primary Level.

Introduction:

There are numerous strategies for teaching, yet by and large, the instructor chooses a specific technique dependent on the pre-requisites of the substance, showing offices accessible, the capacity of learners and the way of thinking of the educator. On the off chance that the instructing is to be prevalent, the instructor must get aware of the current conditions and improvement in all perspectives. Ausubel (1978, 1968, & 1963) likewise firmly prove false the explanation that learning through categorization, observation or understanding is fundamentally latent or insignificant. He contends that the rearing of such inactively and non-seriousness is the consequence of the inadequate available resources embraced by the instructor for the introduction of the learning aids. He contends that each student at any precise stage and time of his/her learning, each student has his/her own subjective formation for the learning or picking up a bit of information. Innovative thoughts can be well-read or preserved only to the certain level by which they can be connected to already existing in cognitive formation in the form of knowledge of ideas and concepts. It presents a desirable connection in terms of ideational instructors. This duty may take place properly when an instructor tries to sequence the matters to be learned and represents it in such a way that ideational instructors can perform their roles. Appropriate previous association of learning matters and exhibiting it in an appropriately composed manner, it causes the learner to improve and reinforce his/her psychological structure by getting and holding the new information. Consequently, the instructor should attempt to show the learning matters so ably before the learners as the student feels no trouble in snaring the new information with his/her current psychological structure.

Mind mapping has been utilized in different of circumstances and has created as an instrument utilized to symbolize an individual's or group's information and thoughts about particular subject. Mind maps have an orderly formation and multiple connections (Brinkmann 2003; Novak, 1990; Buzan, 1993; Novak & Govin, 1984). Mind mapping engages in representing the ideas in the middle of the screen. Main ideas are designed to connect with other ideas in the topic. The main thoughts are highlighted directly into the connections. Sub-layers for secondary thoughts are highlighted from the main layers. The standard is that thoughts should move from the dynamic to the solid. At the top of the priority list mapping, each significant layer develops a unit with its sub-layers. For straightforwardness, associations between the sub-parts of various main branches are not highlighted (Brinkman, 2003). Most maps include the utilization of hues, pictures, portrayals, and images. Lines are attracted from higher ideas to bring down ideas to which they are connected and between ideas on a similar level.

Rationale of the Study:

In geography, the mind mapping learning technique has been extensively suggested and utilized in different ways. Mind maps are multi-tactile apparatuses that utilize visuospatial direction to combine information, and continuously, assist learners to categorize and preserve data (McDermott & Clarke, 1998). Mind maps are multi-tangible instruments that may enable students to arrange, integrate, and store information (D'Antoni, 2009).

Many research studies point out that mind mapping is an useful instrument in learning procedure on scholastic accomplishment at elementary level in ‘Science’ (Kalyanasundaram et. al., 2017; Adodo, 2013; Parimalafathima, Sasikumar & Panimalarroja, 2012; Issam & Fouad, 2008; Cunningham, 2005), in mathematics (Poorana & Mohanasundaram, 2013) and in language (Bahareh & Abbas, 2015; Egitim, 2012; Riswanto, Pebriprandika & Putra, 2012; Suyanto, 2010; Toi, 2009) subjects.

We know that place, language, socio-political environment and cultural background effects on investigation. Most of the studies were conducted in other countries, very few studies were conducted in upper primary level and some researchers viewed that mind mapping learning strategy has favourable impact on students’ learning achievement in economics & social science subjects (Parikh, 2016; Madu & Metu, 2012), but some investigators also mentioned that mind mapping strategy doesn’t have any positive effect on students’ achievement in geography subject (Ying, Guoqing, Guozhen & Yuwei, 2014). These contradictions had inspired the researcher to investigate his research work in India and also motivated to see the impact of mind mapping learning strategy on students’ thinking development in geography at upper primary level.

Statement of the Problem:

The present study was an effort to investigate “Impact of Mind Mapping Learning Strategy on Students’ Thinking Development at Upper Primary Level”.

Operational Definition of Key Terms Used in th Study:

Mind Mapping Learning Strategy: In the present investigation, mind mapping alludes to an incredible graphical system used to represent words, thoughts, tasks connected by lines or bends to its main thoughts or realities and make web connections and comprise of pictures, images, and hues. In the present investigation, mind mapping is a concrete graphic illustration that elaborates on how a single idea is related to another idea in the same categories.

Thinking Development: In the present study, thinking development alludes to the pedagogic performance of students in geography as per written test employed.

Upper Primary Level: Upper primary level covers the education of students from class V to VIII in the West Bengal State Board. However, in the present investigation, upper primary level alludes to class VIII only.

Objectives of the Study:

1. To explore the impact of mind mapping learning strategy over conventional teaching-learning method on students’ thinking development in geography among class VIII students.
2. To study the comparative impact of mind mapping learning strategy over conventional teaching-learning method on students’ thinking development in geography among class VIII students in relation to the gender.

Hypotheses of the Study:

H0₁: There is no significant difference in the students' thinking development in geography of the group instructed through mind mapping learning strategy and conventional learning strategy.

H0₂: There is no significant difference in performance test scores in geography between girls and boys instructed through mind mapping learning strategy over conventional strategy of learning.

Methodology:

Research Design: The present investigation was adopted quasi-experimental research design. 'Mind Mapping Learning Strategy' was the independent variable and 'Thinking Development' was the dependent variable, and 'Gender' was moderator variable, in this investigation. 'Pre-test Post-Test Non-Equivalent Group Design' was used in this study. The researcher had taken two groups purposively for the treatment in this study. Before treatment two groups were given the same pre-test, and then the instruction to the experimental group by mind mapping learning strategy and control group to conventional learning strategy were given. After that, two groups were given post-test. The decorative presentation of the research design is exposed in the following table-1.

Table-1: Research Design of the Study

Groups	Pre-Test	Treatment	Post-Test
Control Group	T ₁	X ₁ (Conventional Learning Strategy)	T ₂
Experimental Group	T ₃	X ₂ (Mind Mapping Learning Strategy)	T ₄

Sample and Sampling Procedure: The present investigation was done at Ajodhya Belpukur High School (H.S.), Howrah of the West Bengal, India. The present study was concerned with the class VIII students of elementary level in Bengali medium school under the West Bengal State Board. The researcher had used purposive sampling method in this study. The investigator did this experiment on 74 students of class VIII including both the gender, i.e., girls and boys. There were total 3 sections in the class VIII, i.e. VIII-A, VIII-B and VIII-C in the school. All the students were already randomly assigned in the different class sections by the school norms on the basis of their class result. That means, roll no. 1 was assigned in VIII-A, roll no. 2 was assigned in VIII-B and roll no. 3 was assigned in VIII-C, roll no. 4 was assigned in VIII-A and so on. The researcher had taken two sections from Class VIII, i.e., control group (36 students of VIII-A section) and experimental group (38 students of VIII-B section) purposively. The control group (VIII-A) was instructed through conventional teaching method and experimental group (VIII-B) was instructed through mind mapping learning strategy. The decorative presentation of the sample is shown in the following table-2.

Table-2: Sample Design of the Study

Groups	Class	Number of Students	Instruction
Control Group	VIII-A	36 (15 Boys, 21 Girls)	Conventional Learning Strategy
Experimental Group	VIII-B	38 (18 Boys, 20 Girls)	Mind Mapping Learning Strategy

Tools:**Intervention Tools:**

Mind Mapping Lesson Plan: The investigator had developed some mind maps on the selected topics of geography and used them during curriculum transaction. At first, researcher had selected the first chapter of geography of class-VIII book containing Surface of the Earth, Seismic Waves, and Layers in the Earth's Interior, Earthquake and Volcanism units. Researcher had identified ideas, thoughts and concepts from the selected topics and developed mind maps against every topics. Researcher had developed lesson plans for every class based on mind mapping. All lesson plans consist with major five points. Learning objectives, Pre-Existing Knowledge, Learning Resources were fixed for each lesson. Here introduction, presentation and summarization are the main three phases of teaching and learning. After the completion of instruction, researcher had evaluated the class lesson through mind map. Home assignments were given by the researcher for the measuring students' understanding of mind map. During curriculum transaction investigator had explained every topic, mind maps were also developed and discussed in the classes. They were also permitted to discuss with classmates and the investigator also assisted them to simplify their worries. After discussion, researcher had summarized the day's lesson through mind map with the help of learners' view.

Lesson Plan in Conventional Method: The researcher had prepared lesson plans for every geography class based on conventional method. The researcher had taught same topics from the same chapter which were used in experimental group. 'Chalk and Talk Method' was used as learning method in the control group class.

Measuring Tool:

Performance Test: The researcher had developed performance test in selected one chapter in geography of class VIII to evaluate pre & post performance of the students. The units were Surface of the Earth, Seismic Waves, and Layers in the Earth's Interior, Earthquake and Volcanism in the syllabus of class VIII. The researcher had distributed 30 marks among the units followed by the competencies like Analyzing, Evaluating and Creating Thinking Skills by taking view of the geography experts. The test contained multiple choice items having equal marks i.e. 1 marks for each question.

Procedure: After getting permission from the head teacher of the selected school, the researcher had selected two sections of class VIII purposively. As students were already randomly assigned in different sections of the class by school norms, the researcher had selected VIII-A as the control group and VIII-B as the experimental group. 'Researcher-made-performance-test' was used during pre-test in two groups. The experimental group was instructed through mind mapping learning strategy. Mind maps were developed by the researcher in all the selected units of 'Interior of the Earth' section (Surface of the Earth, Seismic Waves, and Layers in the Earth's Interior, Earthquake and Volcanism). Mind maps were additionally developed and discussed in classroom. Understanding related problems of the learners were solved. They were permitted to discuss with their friends and with researcher to simplify their doubts. Conventional method was used as teaching and learning strategy for the control group. On account of the conventional

method, the researcher had taught the control group through the chalk and talk method. All topics were instructed in a same sequence in both groups. Both experimental and control group members didn't know that they were being engaged with an investigation. The experiment was ongoing for 15 weeks. At last, a similar test was conducted in both the groups.

Data Analysis: The acquired data were analyzed by using \bar{X} , SD and t-test. Before utilizing the t-tests normality distribution of the data were measured. The samples t-test (independent) was utilized to contrast the geography performance scores between girls and boys on the pre-test & post-test (on both the control & experimental groups). Box-Plot Graphical Portrayal was utilized to compare geography performance scores between girls and boys and it was also used to compare geography performance scores between the control group & experimental group on the post-test. A paired sample t-test was used to contrast pre-test & post-test performance scores on both the control group & the experimental group. The significance level of 0.01 was utilized. Every quantitative data were analyzed by using Microsoft Office Excel and IBM SPSS Statistics 20.

Results:

Interpretation of Pre-Test Scores: The students utilized for this investigation in both experimental & control groups were subjected to a pre-test which was marked and recorded. The scores obtained were compared utilizing the samples t-test (independent) and are exhibited in Table-3. From Table-3, it is clear that there is no significant difference between the experimental & control group in their pre-test mean scores. This implies the students of the both groups were equivalent regarding their prior knowledge on the selected topics at the beginning of the investigation.

Table-3: Comparison of the Mean of Performance Scores in Pre-Test between Experimental Group (Mind Mapping Learning Strategy) and Control Group (Conventional Method)

Groups	N	Mean	SD	SEM	df	t-value	p-value
Experimental Group	38	8.87	1.298	0.211	72	0.914	0.364
Control Group	36	9.14	1.246	0.208			

Hypotheses Testing:

Null Hypothesis-1: H₀₁: There is no significant difference in the students' thinking development in geography of the group instructed through mind mapping learning strategy and conventional learning strategy.

To test this hypothesis, the post-test mean scores in performance test of both the experimental and control groups were compared by using the independent samples t-test. Before using independent samples t-test, normality distribution was checked (Figure-1). The consequence of the t-test is as appeared in Table-4. The outcome obtained shows that there is a significant difference between the two groups in terms of their mean thinking development scores in the post-test. This implies the experimental group (mind mapping)

has higher score than the control group (conventional method) which is appeared in the box plot diagram (Figure-2); the null hypothesis is therefore rejected.

Figure-1: Normality Distribution of Post-Test Performance Scores for Experimental Group (Mind Mapping Learning Strategy) and Control Group (Conventional Method)

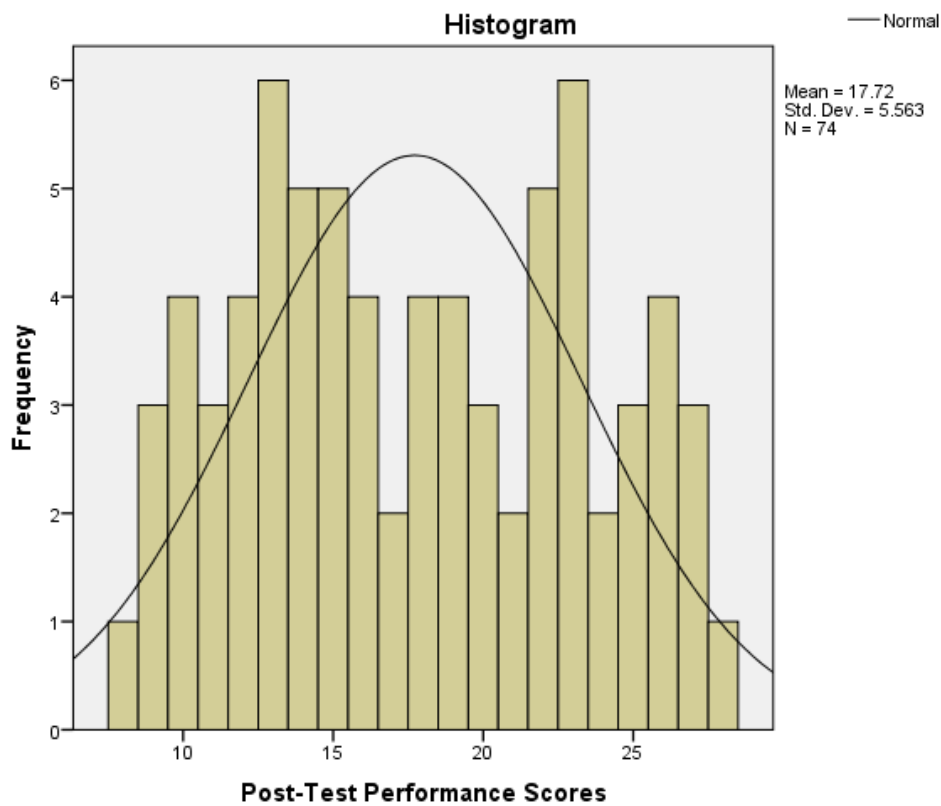
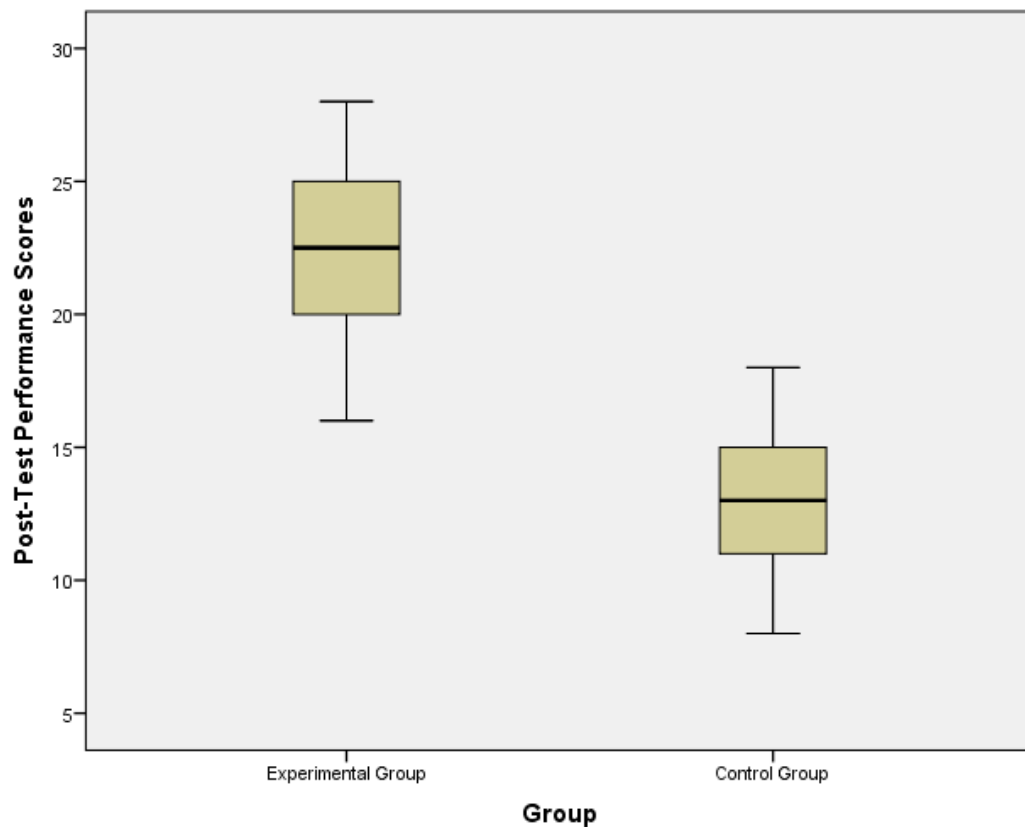


Table-4: Comparison of the Mean of Performance Scores in Post-Test between Experimental Group (Mind Mapping Learning Strategy) and Control Group (Conventional Method)

Groups	N	Mean	SD	SEM	df	t-value	p-value
Experimental Group	38	22.34	3.165	0.513	72	14.312	0.000
Control Group	36	12.83	2.490	0.415			

Figure-2: Box Plot Diagram to Show the Comparison of Performance Scores in Post-Test between Experimental Group (Mind Mapping Learning Strategy) and Control Group (Conventional Method)



Null Hypothesis-2: H_{02} : There is no significant difference in performance test scores in geography between girls and boys instructed through mind mapping learning strategy over conventional strategy of learning.

To determine whether the performance of girls and boys differed following the respective treatments, the post-test mean performance scores in geography were subjected to independent samples t-test. The outcome has been appeared in Table-5 and Table-6. From the outcomes, it tends to be seen that there is no significant difference in the post-test mean performance scores between girls and boys trained to utilize mind mapping learning technique (Table-5) Because of this outcome, the null hypothesis is accepted. It can also be seen that there is no significant difference in the post-test mean performance scores between girls and boys taught utilizing conventional strategy of learning (Table-6). Because of this outcome, the null hypothesis is accepted. The ramifications of this result revealed that mind mapping learning strategy and conventional method tend to promote homogeneity of performance between the girls and boys which is appeared in box-plot diagrams (Figure-3 and Figure-4). At last it can be said that both mind mapping learning strategy and conventional method are gender friendly.

Table-5: Comparison of Performance Scores between Boys and Girls in Post-Test for Experimental Group (Mind Mapping Learning Strategy)

Group	Gender	N	Mean	SD	SEM	df	t-value	p-value
Experimental Group	Boys	18	23.00	3.106	0.732	36	1.224	0.229
	Girls	20	21.75	3.177	0.710			

Figure-3: Box Plot Diagram to Show the Comparison of Performance Scores between Boys and Girls in Post-Test for Experimental Group (Mind Mapping Learning Strategy)

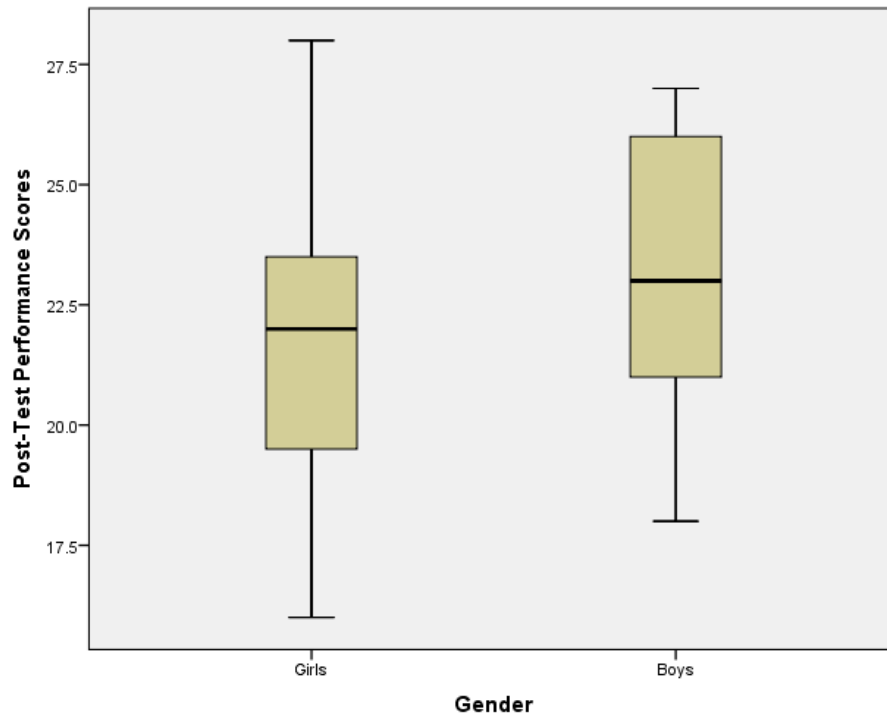
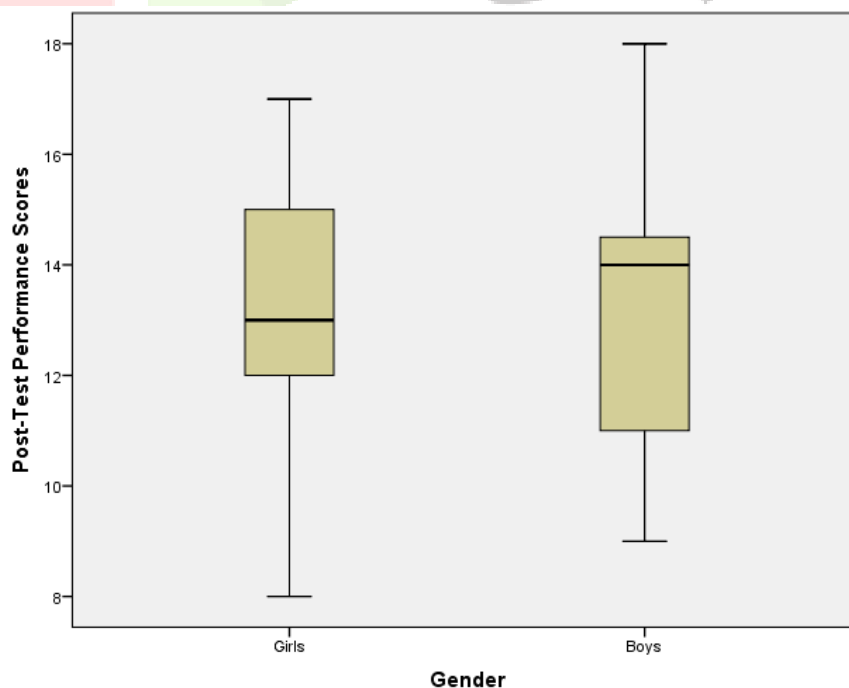


Table-6: Comparison of Performance Scores between Boys and Girls in Post-Test for Control Group (Conventional Method)

Group	Gender	N	Mean	SD	SEM	df	t-value	p-value
Control Group	Boys	15	12.93	2.576	0.665	34	0.201	0.842
	Girls	21	12.76	2.488	0.543			

Figure-4: Box Plot Diagram to Show the Comparison of Performance Scores between Boys and Girls in Post-Test for Control Group (Conventional Method)



Discussion:

The aftereffects of the investigation indicates that post-test mean scores of learners in the experimental group (Mind Mapping Learning Strategy) was found to be significantly superior from that of their counterparts in the control group (Conventional Method) in geography learning accomplishment. Albeit a few analysts (Ying, Guoqing, Guozhen, and Yuwei, 2014) found that mind mapping technique doesn't have any constructive outcome on students' accomplishment in geography; however, the consequences of the present investigation demonstrated that mind mapping learning strategy has beneficial outcome on students' thinking development in geography (Parikh, 2016; Madu and Metu, 2012). Albeit a few specialists (Parimalafathima, Sasikumar, and Panimalarroja, 2012) found that mind mapping learning strategy has beneficial outcome on girls' thinking development than boys; however, the present investigation uncovered that mind mapping learning technique tends to promote equality in geography learning performance and thinking development between girls and boys. In this way, mind mapping is an amazing realistic procedure that plans to utilize the cerebrum with full limit (Buzan and Buzan, 1996) and it is an organized conceptualizing strategy (Michelco, 1998) which can improve learners' learning accomplishment as well as thinking development in geography at upper primary level.

Educational Implications:

The present investigation was experimented on Bengali medium learners to discover the impact of mind mapping learning strategy on students' thinking development in geography at upper primary level. The aftereffect of the study found that mind mapping learning technique upgrading the student's thinking development in geography. So it is helpful for guardians, instructors, educational program organizers, learners, teacher trainers, textbook writers, commercial, and government association and so on. Educators can utilize the mind map as a device for instructing and learning in geography adequately for students' learning achievement and thinking development. Mind mapping learning procedure can be utilized as a compelling apparatus to contemplate the geography at upper primary level and students can build their insight without much of a stretch in a particular topic. The instructive head can think for preparing instructors by utilizing mind mapping learning strategy in their group as it improves learners' thinking development and learning performance. The investigation will also be supportive for instructors for making mind maps for teaching geography. Curriculum planners may consolidate this procedure in educational program rules for the accomplishment of proposed learning results and content development for meaningful learning. Textbook writers may exhibit and categorize the content innovatively with the assistance of mind maps.

Conclusion:

The present investigation uncovers that the mind mapping learning strategy has essentially better effect on learners' thinking development and learning performance in geography. Embracing mind mapping necessitates that geography teachers need decent knowledge on constructivist learning and the manners by which mind mapping learning strategy can be utilized to encourage learners' thinking. Consequently, it is

recommended that instructors should utilize the learning strategy of mind mapping during their curriculum transaction. Also the instructors ought to be ready to create and utilize such mind maps. This investigation can be imitated with larger sample size and other disciplines. This would decide the most proficient methods for utilizing mind mapping for learners' benefit.

References:

- Adodo, S. O. (2013). Effect of Mind Mapping a Self-Regulated Learning Strategy on Students' Achievement in Basic Science and Technology. *Mediterranean Journal of Social Sciences*, 4 (6), 163-172.
- Ausubel, D. P. (1963). *The Psychology of Meaningful Verbal Learning*. New York: Grune and Stratton.
- Ausubel, D. P. (1968). *Educational Psychology: A Cognitive View*. New York: Holt, Rinehart and Winston.
- Ausubel, D. P., Novak, J. D., & Hanesian, H. (1978). *Educational Psychology: A Cognitive View* (2nd ed.). New York: Holt, Rinehart and Winston.
- Bahareh, M. & Abbas, B. (2015). Effect of Mind Mapping Strategy on Comprehending Implicit Information in EFL Reading Texts. *International Journal of Educational Investigations*, 2 (3), 81-90.
- Brinkmann, A. (2003). 'Graphical Knowledge Display – Mind-mapping and Concept-mapping as Efficient Tools in Mathematics Education', in: P. Perks and S. Pre stage (eds.), *Mathematics Education Review, the Journal of Association of Mathematics Education Teachers*, 16, 39-48.
- Buzan, T. (1993). *The Mind Map Book*. London, BBC Books.
- Buzan, T., & Buzan, B. (1996). *The mind map book: how to use radiant thinking to maximize your brain's untapped potential*. New York: Plume Books.
- Cunningham, G. E. (2005). Mind Mapping: It's Effect on Student Achievement in High School Biology. Ph. D. Thesis, Graduate School of the University of Texas at Austin.
- D'Antoni, A. V. (2009) Relationship between the Mind Map Learning Strategy and Critical Thinking In Medical Students. Ph.D. Thesis in Health Science. Seton Hall University.
- Egitim, B. (2012). Effects of Mind Mapping on Academic Achievement, Retention, Views and Attitudes towards Course. *Journal of Social Sciences*, Retrieved from <http://www.esosder.org/eng>.
- Issam, A, E, M. & Fouad, A, E, K. (2008). The Influence of Mind Mapping on Eight Graders' Science Achievement. *Social Science and Mathematics*, 108 (7), 298-312.
- Kalyanasundaram et. al., (2017). Effectiveness of Mind Mapping Technique in Information Retrieval among Medical College Students in Puducherry-A Pilot Study. *Indian Journal of Community Medicine*, 42(1), 19-23.
- Madu, B. C. & Metu, I. C. (2012). Effect of Mind Map as a Note Taking Approach on Students Achievement in Economics. *Journal of Emerging Trends in Economics and Management Sciences*, 3 (3), 247-251.
- McDermott, P., & Clarke, D. N. (1998). *Mind maps in medicine*. Edinburgh: Churchill Livingstone.
- Michelco, M. (1998). *Cracking creativity: The secrets of creative genius*. California: Ten Speed Printing.

- Novak, J. (1990). 'Concept-mapping: A Useful Tool for Science Education', *Journal of Research in Science Teaching*, 27, 937-949.
- Novak, J.D. and Govin, D.B. (1984). *Learning how to learn*, Cambridge University Press.
- Parikh, N. D. (2016). Effectiveness of Teaching through Mind Mapping Technique. *International Journal of Indian Psychology*, 3 (3), 148-156.
- Parimalafathima, M., Sasikumar, N. & Panimalarroja, M. (2012). *Effectiveness of Mind Mapping Strategies to Promote Achievement in Science among Upper Primary Level*. Re-Thinking the Teacher Education, Sree Vaishnav Publications, Chennai, Tamilnadu.
- Poorana, S. P. & Mohanasundaram, K. (2013). Impact of Mind Map Teaching Strategy on Achievement in Mathematics. Ph.D. Thesis, Manonmaniam Sundaranar University, Tirunelveli.
- Riswanto, Pebriprandika & Putra (2012). The Use Mind Mapping Strategy in the Teaching of Writing. *International Journal of Humanities and Social Sciences*, 2 (21), 60-68.
- Suyanto, A. (2010). Effectiveness of Mind Mapping to Teach Writing Skill. English Education Department, Graduate School Report, Sebelas Market University, Surakarta.
- Toi, H. (2009). *Research on how mind map improves memory*. Paper presented at the International Conference on Thinking, Kuala Lumpur, Malaysia. Retrieved from http://www.informationtamers.com/WikIT/index.php?title=Backing_mind_mapping.
- Ying, Guoqing, Guozhen & Yuwei (2014). The Effect of Mind Mapping on Teaching and Learning: A Meta-Analysis. *Standard Journal of Education and Essay*, 2 (1), 17-31.

