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**COMPARATIVE STUDY REGARDING MIND MAPPING TECHNIQUES
VERSUS TRADITIONAL METHOD OF TEACHING MATHEMATICS
AT THE PRIMARY SCHOOL LEVEL**

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ABSTRACT

Purpose: The main purpose of the study was to compare the effectiveness of teaching through mind mapping techniques with traditional methods of teaching Mathematics at the primary school level.

Methodology: The study design was experimental to find out the significant difference between the two groups. Twenty students were randomly selected twenty out of thirty-nine students from primary school. The respondents were equally distributed into two groups (experimental and control groups) and were equally treated for the whole month the experimental group via mind mapping techniques and the control group through the traditional method of teaching Mathematics at the Primary School level in the district Lakki Marwat. Both groups (Experimental and Control groups) were administered post-test after successful completion to both groups to highlight the significant difference between these two teaching methods in the teaching of Mathematics at the primary school level in district Lakki Marwat. Valuable suggestions were suggested regarding mind mapping techniques and traditional methods of teaching Mathematics at the Primary School level.

Main Findings: The collected data was measured and the significant difference between the Mean scores of the Experimental group and Control group was probed. The results of the current study showed that the learning achievement of the experimental group was better than the control group after successful statistical analysis using Mean, Standard Deviation, T-test, Coefficient of variance, and correlation.

Implications of the Study: According to the findings of the study, the learning achievements of the experimental group were found better than the control group. In the light of findings, mind mapping techniques were perceived as highly significant in the teaching-learning process of Mathematics at the Primary school level in district Lakki Marwat. The study will be quite vital for the teachers and students at the Primary school level to adopt mind mapping techniques for the teaching-learning process to easily present the complex ideas, points, and views images before the Primary school students to ensure quality education.

Novelty: The findings of the study will play an important role in the promotion of students' learning through mind mapping techniques at the Primary school level by clarifying the basic ideas of primary school students through new ways and brainstorming approaches using images, pictures, diagrams, and graphs, etc.

INTRODUCTION

Mind mapping facilitates learners while teaching complex ideas to small children in practical life. Mind mapping is an easy way of connecting and linking concepts because mind mapping mostly uses images, lines, and links. Mind mapping is a representation of ideas in a very attractive way and plays a vital role in the learning process (Biktimirov and Nilson, 2006). Mind mapping uses the concept of "radiant thinking" – that is, thoughts radiate out from a single idea, often expressed as an image. A suitable example of mind mapping is brainstorming exercises, and in brainstorming the most important point is that even complex ideas become easy for learners. In this method, we make or surrounded main points or central topic with a bubble and then we expand ideas by adding additional bubbles and connect it with the help of lines with each other for the understanding and facilitation of readers to make sense from it easily. (Minolin, 2015) described the role of mind mapping because he has compared mind mapping techniques with traditional methods of teaching while teaching theories of growth and development.

(Abi-El-Mona & Abd-El-Khalick, 2008) described the importance of mind mapping at the school level especially Mathematics and Science subjects. (Ammar, 2005) investigated the role of mind mapping at a higher secondary level in the study of "effectiveness of computer-based maps in the learning of Biology. Similarly, mind mapping is also helpful in the teaching-learning process at a primary level like in information communication technologies-based learning in the subject of science at the primary level (Warwick and Kershner, 2006). (Malycha and Maier, 2017) described that mind mapping enhances the conceptual development of learners to foster their creative potentials. Thus all the above previous references of researchers not only primary level is mentioned but the role of mind mapping is mentioned in different fields of the teaching-learning process.

In the above discussion, the researcher has discussed mind mapping techniques and their advantages in the teaching-learning process which is a new and advanced method of teaching. Similarly, on the other side, there are traditional methods of teaching also which are used commonly in our education system for a long time. We may not say that traditional or old methods of teaching are useless or they have no value at all but rather we may say these methods were quite helpful one time. The main difference between the traditional and advanced methods of teaching is that in traditional

methods of teaching teachers direct students to learn through memorization and recitation techniques as (Kinchin, 2014) narrated the main difference that traditional methods there is no time or opportunity to do critical thinking, problem-solving and decision-making skills. On the other side in new advanced methods of teaching, there are several opportunities for learners to do problem-solving exercises, critical thinking, and practical participation in various activities which are quite helpful for learners to improve their hidden potentialities in light of teacher supervision.

(Bystrova and Larionova, 2015) highlighted the use of virtual mind mapping to effectively organize the project activities of students at the university. It shows that mind mapping is not limited to the school level but may be quite helpful in various fields of life. In simple words, one may say that mind mapping is an effective way of understanding complex ideas or topics in a simple way (Buzan, 2000). Mind Mapping Technique prepares the mind in a way that information can be used in a logical and imaginary way to make an image in the brain. (Kinchin, 2014) explained that mind mapping is playing a vital role in concept formation and may not be neglected at any stage. This method is helpful in all subjects at the primary level but as a researcher, I say that this method is helpful in the subject of Mathematics also.

OBJECTIVES OF THE STUDY

The main objectives of the study were

1. To examine the effectiveness of teaching Mathematics through mind mapping techniques at the Primary school level in district Lakki Marwat.
2. To determine the effectiveness of teaching Mathematics through traditional methods at the Primary school level in district Lakki Marwat.
3. To compare the effectiveness of teaching Mathematics through mind mapping techniques with traditional methods of teaching Mathematics at the Primary school level in district Lakki Marwat.
4. To suggest valuable recommendations regarding mind mapping techniques and traditional methods of teaching Mathematics at the Primary school level in district Lakki Marwat.

HYPOTHESIS OF THE STUDY

H₀₁: There was no significant difference between mind mapping techniques and traditional methods of teaching Mathematics at the Primary School level in district Lakki Marwat.

RESEARCH METHODOLOGY

The study design was experimental because the experimental method was a more suitable one to find out the significant difference between the two groups.

Participants: The researcher randomly selected 20 students out of 39 students from Primary schools in district Lakki Marwat. The students were divided into two equal groups according to their age, academic level, and especially the free test score i.e. experimental group and control group. After the division of students into two groups, the researcher treated them as a teacher for complete one month the experimental group through mind mapping techniques and the control group through the traditional method of teaching Mathematics at the primary level. After successful completion to both control and experimental groups, the researcher administered a post-test to

DATA ANALYSIS

Pre-test and Post-testing were used to highlight the significant difference between these two teaching methods in the teaching of Mathematics at the Primary School level.

DELIMITATION OF THE STUDY

As the study was experimental. Therefore, the study was delimited to Primary School in district Lakki Marwat.

PURPOSE OF THE STUDY

The main purpose of mind mapping was to improve the teaching-learning process. Mind mapping techniques were very helpful for the learning process. It facilitated learning, and improved information recording, and showed that how different facts and ideas are related to enhance creativity and solve problems. Furthermore, mind mapping was very helpful in the teaching-learning process at the Primary School level. Mind mapping was also helpful for students because it was a visual representation of information. It facilitated learners in the learning process to get new ideas. It helped in mapping out new ideas, exploring concepts in more detail, and facilitated a better understanding of relationships and connections.

RESULTS

The data which was collected by the researcher through pre-test and post-test (research instruments) was successfully analyzed through descriptive statistics like Mean, Standard Deviation, T-test, Coefficient of variance, and correlation had been used to measure the data properly and systematically and find out the significant difference between the Mean scores of Experimental group and Control group. Then after the successful completion of this process, the results of the study were tabulated in tables to highlight the main difference between the activities-based learning and without classroom activities teaching-learning process at the Primary School level.

Table1: Mean and Standard Deviation of Experimental and Control Groups on Pre-Test

S.No.	Group	Mean	Standard Deviation
1	Experimental	13.04	5.03
2	Control	13.8	5.07

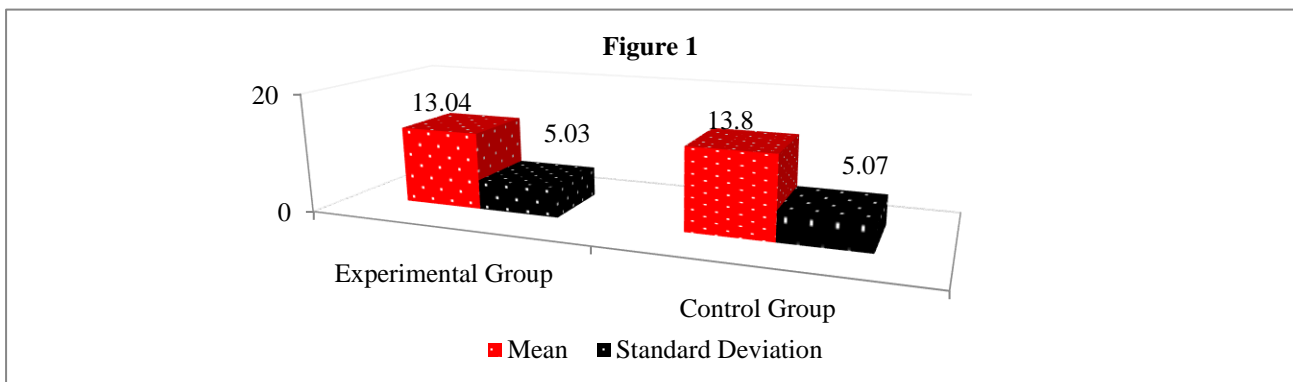


Table 1 along with the figure shows that both the experimental and control group are equal in pre-test scores. The Mean score of the experimental group is 13.04 and the Standard Deviation is 5.03, on the other hand, the Mean score of the Control group is 13.8 and the Standard deviation is 5.07. The above table shows that both of the groups are equal in the light of the pre-test score before the treatment.

Table 2: Mean and Standard Deviation of Both Experimental and Control Groups on Post-test

S. No.	Group	Mean	Standard Deviation
1	Experimental	27.07	3.08
2	Control	19.03	6.03

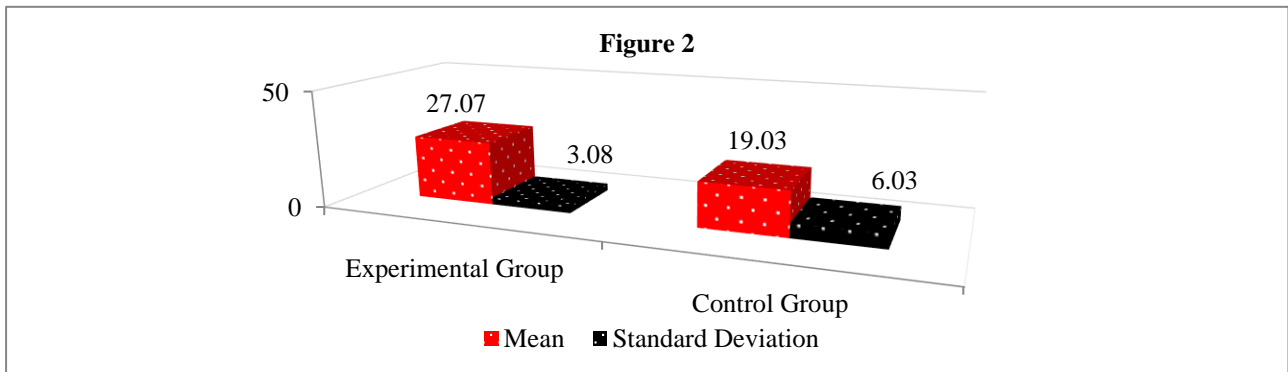
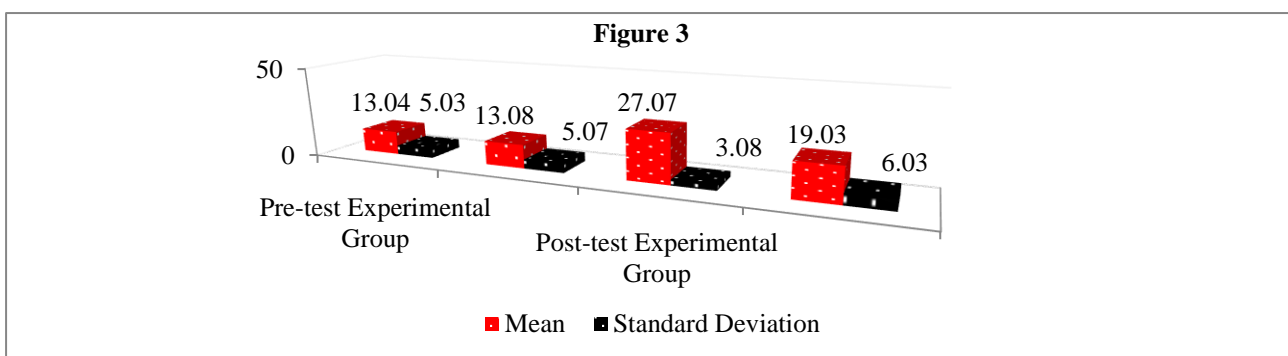


Table 2 along with the figure indicates that the learning achievement of the experimental group is better than the control group. Thus the Mean score of the experimental group is 27.07 and the Standard deviation is 3.08 and on the other side the Mean Score of the control group is 19.03 and the Standard Deviation is 6.03. This table shows the clear difference between the learning process of the experimental group and the control group in a proper manner. The result of the post-test highlights that classroom activities increases facilitate the teaching-learning process may help the learners in the learning process.

Table 3: Pre-Test and Post-Test Results of Both Experimental Group and Control Group

Pre-Test Result			Post-Test Result		
Group	Mean	Standard Deviation	Group	Mean	Standard Deviation
Experimental Group	13.04	5.03	Experimental Group	27.07	3.08
Control Group	13.8	5.07	Control Group	19.03	6.03

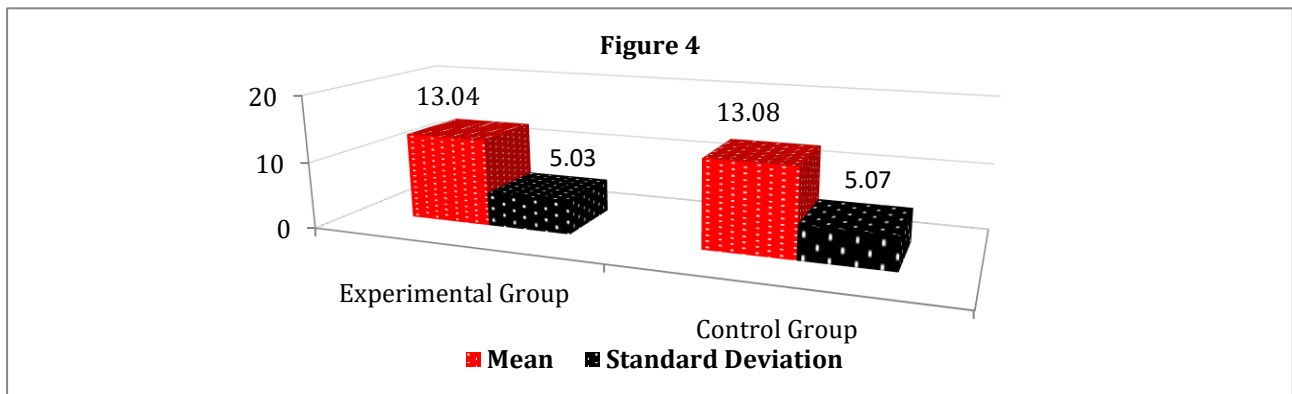


The data of table 3 is already presented in Tables 1 and 2 but here the researcher has presented the data in one signal table to highlight the difference between the two mentioned groups (Experimental, control clearly and systematically. The above table indicates the significance between the experimental and control group in the post-test result. It means that classroom activities are very important for students at primary level because it motivates them towards the learning

process and engages the learners in various activities which are beneficial for them regarding teaching-learning process.

Table 4: Mean Standard Deviation and T-Value of Experimental and Control Groups on Pre-Test

S.No.	Group	Mean	Standard Deviation	t-Value Calculated	Probability
1	Experimental	13.04	5.03	0.041	0.05
2	Control	13.08	5.07		



In table 4, t-calculated value and level of significance 0.05 are presented along with Mean scores and Standard Deviation of pre-test scores of both experimental group and control group in a very systematic manner to highlight the t-calculated value of the experimental group and control group. Here in the light of the t-calculated value of both the experimental and control group scores clearly show that there is no significant difference between the experimental group and control group in pre-test scores but equal. The Mean scores of the Experimental group are 13.04, the standard deviation is 5.03, and the control group's mean scores are 13.08 and the standard deviation is 5.07. Similarly, the t-calculated values of both of the groups are 0.041, which is smaller than ± 2.0303 at 0.05 level of significance; and at $df = -18$.

Table 5: Mean Standard Deviation and T-Value of Experimental and Control Groups on Post-Test

S. No.	Group	Mean	Standard Deviation	t-value calculated	Probability
1	Experimental	31.8	4.03	5.09	0.05
2	Control	23	7.04		

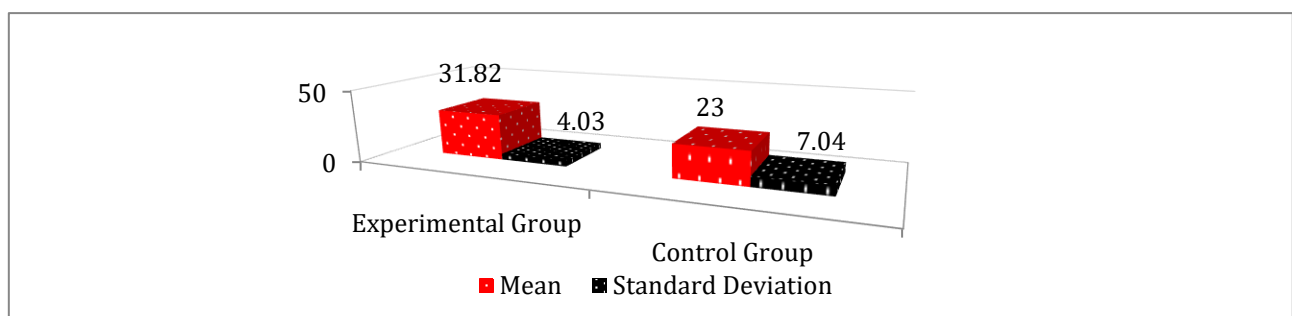


Table 5 along with the figure indicates the Mean scores of control and experimental groups in post-test are 31.8 and 23. Thus Standard Deviation of experimental and control groups are 4.03 and 7.04. Similarly, the t-value between both of the groups experimental and control groups is 5.09. Which is greater than ± 2.0303 at 0.05 level of significance? and at $df = -18$ Thus in the light. The table shows that the learning achievement of the experimental group is better than the control group.

Table 6: The Co-Efficient of Variance (C.V) Classroom Activities in Pre-Test Result

C.V of Experimental Group	C.V of Control Group
29.7	29.11

The above table shows the co. efficient of variance of pre-test scores obtained by the respondents in this experimental study. The coefficient of variance between the experimental group and control group is 29.7 and 29.11. The co-efficient of the experimental group and control clearly describes that there is no significant difference between the experimental group and control group in pre-test score.

Table 7: The Co-Efficient Of Variance (C.V) Classroom Activities in Post-Test Result

C.V of Experimental Group	C.V of Control Group
15.07	47.51

Table 7 highlights that the Experimental Group is stable than the Control Group in light of the post-test scores obtained by the respondents. The co-efficient variance between the Experimental Group and Control Group is 15.7 and 47.51 which is not a slight difference but it is a great difference between these two groups and the result of the post-test score showed that the role of classroom activities are very important in the teaching-learning process at primary level.

DISCUSSION

The result of the current study showed that mind mapping techniques play a great role in the teaching-learning process at the secondary level and may not be neglected its status in the teaching-learning process at the primary level. The study revealed that it makes the teaching-learning process effective. The study showed that super learning techniques create self-confidence among the learners at primary. The study further highlighted that it makes the secondary level learners present their views in front of other class fellows and teacher as well which encourage the learners. The result of the study also showed that super learning techniques engage the learners during the teaching-learning process.

CONCLUSIONS

The researcher concluded that mind mapping techniques play a vital role in the teaching-learning process at the primary level and especially in the subject of mathematics. The researcher concluded that Mind mapping techniques are helpful for learners because in this method of teaching complex ideas may be presented easily in images. It's an easy way of learning Mathematics at the primary level. The researcher further concluded that students are not mature enough at the Primary school level to gain complex ideas or a topic that is why mind mapping techniques are easy for them to learn.

LIMITATIONS

The researcher selected Khyber Pakhtunkhwa province for the study. There are so many districts in Khyber Pakhtunkhwa but the researcher gave priority to district Lakki Marwat to attain the desired objectives of the study.

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AUTHORS' CONTRIBUTION

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Authors' Contribution: 1-Data Collection, 2- Statistical Analysis, 3-Study Design, 4-Literature Review, 5- Manuscript preparation, & 6- Financial Management.

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