LEARNING METHOD IN TEACHING MATHEMATICS AND LEARNERS' COGNITIVE ABILITY

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ABSTRACT

In today's modern world, educational trends also became varied depending on the school setting and learner's situation due to the changing of learning modalities applied in each school. Learning is now focused not merely in a traditional spoon feeding of information to the students but rather give emphasis on the learner's capabilities by gaining their own knowledge through their own experiences.

The primary aim of the study was to determine Learning Method in Teaching Mathematics in enhancing the Learners' Cognitive Ability.

The primary respondents of this study were the Junior High School students of San Pedro Relocation Center National High School. One hundred ten (110) out of the total number of students in Grade 8 were used as respondents for this study. The respondents of the study were chosen using the simple random sampling. The descriptive method was used to determine Learning Method in teaching Mathematics in enhancing the Learners' cognitive ability.

The instrument used in the study was a survey questionnaire-checklist The questionnaire is a research-made instrument devised validated by the experts. Moreover, the statistical treatment used to compute and analyze the data were percentage, mean, standard deviation, Paired t-test and Pearson r correlation.

The study shows that there is a significant difference in the cognitive ability of the students using learning method in teaching mathematics. Thus, the researcher, therefore, concludes that the research hypothesis stating there is no significant difference in the cognitive ability in mathematics before and after using Learning Method in Teaching Mathematics is rejected.

And also, study shows the null hypothesis "There is no significant effect of Learning Method in Teaching Mathematics to the Cognitive Ability of the Leaners" is partially rejected.

The study suggests and recommends that teachers may continue this method of teaching so that students will be motivated and increase their academic performance they will know the effects of the learning method in teaching Mathematics on the student's cognitive ability. It also suggests that schools may develop curricula that will fit the student's abilities and interests. They may also provide programs that will focus on self-gaining knowledge, self-evaluation, and self-discovery learning of the student.

Keywords:
Learning Method in Teaching Mathematics, Leaners' Cognitive Ability.

INTRODUCTION

For more than two thousand years, Mathematics has been a part of the human search for understanding. Every individual often, accept the fact that Mathematics is not an interesting subject, which results to students' inattentiveness and poor performance in the subject. Learners get bored with the traditional teaching-learning process; presenting something interesting to students that can motivate them to learn more about Mathematics.

In today's modern world, educational trends also became varied depending on the school setting and learner's situation due to the changing of learning modalities applied in each school. Learning is now focused not merely in a traditional spoon feeding of information to the students but rather give emphasis on the learner's capabilities by gaining their own knowledge through their own experiences.

Mathematics is a crucial subject that provides a foundation for various fields, such as science, technology, engineering, and finance. Effective teaching methods in mathematics can improve learners' understanding and performance in the subject. In recent years, there has been growing interest in using innovative teaching methods in mathematics education to enhance learners' cognitive abilities and promote meaningful learning. One of the challenges that the teachers may encounter nowadays is how they will improve the cognitive abilities of the learners. Cognitive ability is an essential factor that affects learners' academic achievement and overall success in life. Cognitive ability refers to the mental skills and processes that are involved in thinking, learning, and problem-solving. These skills include attention, memory, reasoning, perception, and language. The ability to process and analyze information, make decisions, and solve problems is crucial for success in academic and professional settings.

Moreover, learners from the present generation are identified to have multiple intelligences, wherein they have different potentials, skills, talents, and abilities that not only centered academically. To provide a suitable learning method for students the learning program must be given programmatically, simply, systematic, and specific, the program also needs to be given continuously so that students can acquire new skills and abilities that can be implemented in daily activities.

This study aims to determine the Learning Method in Teaching Mathematics in enhancing their Cognitive Ability.

Specifically, it seeks answers to the following questions:

1. What is the learners' profile of the respondents with regards to:
   1.1 Age;
   1.2 Sex?
2. What is the level of learning method in teaching Mathematics in terms of;
   2.1 Collaborative;
   2.2 Movement aids learning;
   2.3 Experiential;
   2.4 Independent; and
   2.5 Self-directed activities?
3. What is the level of learners' cognitive ability in Mathematics relative to;
   3.1 Logical reasoning;
   3.2 Abstract Thinking
   3.3 Pattern Recognition;
   3.4 Information Processing; and
   3.5 Problem Solving?
4. Is there a significant difference in the cognitive ability in mathematics before and after using Learning Method in Teaching Mathematics?
5. Is there a significant effect of learning method in teaching mathematics to the cognitive ability of learners?

REVIEW OF RELATED LITERATURE

Mathematics is one of the concepts that can be taught to early childhood in stimulating children's mathematical-logical intelligence. Mathematical logic intelligence requires children to think logically and process numbers. The ability to think logically and process these numbers can be seen through children's play activities. In fact, there are still some people who think that playing is only important to fill the child's free time. This view is of course not true. This is because for children playing is a way for them to recognize themselves and the surrounding world through exploration and researching what they see, hear, and feel, (Nirmala R. et al 2019).

There is emerging interdisciplinary thought on the embodied mind has provided a new framework for understanding Maria Montessori's contributions to education. Montessori philosophy, also, there is an alternative approach that might be called embodied education: education in tune with the intimate connection of the body and the mind. Such coordination of body and mind is important for education

because it facilitates student experiences of deep engagement and interest that have been referred to as flow, Rathunde, K. (2019).

Zuckerman, O., et al. (2016), develops digital flow and system learning blocks, and as a researcher of tangible interfaces for learning and play, is inspired by Montessori traditional wooden objects created for 'Casa dei bambini', "Children's House". Montessori's manipulatives concentrate on Cultural area, Language, Mathematics, and Sensorial. The concepts like texture, area, number, shape, color which are given by traditional manipulatives are enhanced by digital manipulatives to concepts such as the behavior of systems, feedback and control emergence, acceleration, social networks, communication, differential geometry.

To fully develop the unseen potential of the learners, teachers must give them freedom of choice to explore the environment. Instructors should develop the concept of self-respect for their learners as well as train them to respect others. The Montessori Method of teaching concentrates on quality rather than quantity. Teachers assist learners with the sensory-based teaching methodology advocated by Maria Montessori, (Huxel, A.C. 2013).

These characteristics of materials make up the basis of concentration training. According to Ozdogan (2014), the basis of concentration education is to enable child to find and correct his own mistake. The child's interests, learning environment and physical stimulus play a significant role in gathering attention and focusing.

According to the American Montessori Society (2015), choosing a Montessori environment for a child has many benefits. It is known for individually paced learning and fostering independence, the Montessori Method also encourages empathy, a passion for social justice, and a joy in lifelong learning. Given the freedom and support to question, to probe deeply, and to make connections, Montessori students become confident, enthusiastic, self-directed learners. They are able to think critically, work collaboratively, and act boldly—a skill set for the 21st century.

The Montessori classroom structure allows movement freedom of movement within established rules, spaces are bright and spacious and are designed to stimulate awareness and independence for children. The prepared environment allows to bring reality to the child so the children find a meaning in their world and adapt successfully. This environment suggests a respect for the materials, the work of other colleagues, and the adult, and makes the children unfold with order and freedom, (Bechara A, & Damasio H, 2013).

Children learn more effectively when they discover knowledge themselves, through self-exploratory learning and experiential approach to knowledge. At the same time, the materials used are in line with the real world, as the new knowledge offered is related to the existing reality and it is grasped in an experiential and differentiated way (Papanastasiou et al., 2017).

Traditional schools are beginning to catch onto the idea of building key concepts from different subjects into the core curriculum. By showing students the connections that exist between different curricula, giving the opportunity to apply skills they have learned, and offering opportunities to learn real-world skills, Montessori style teach students to be independent thinkers with strong self-confidence, (Nervena, P. 2014).

Anjujar, I. (2016), states that in Montessori environment is an attractive and organized environment for work and the working materials are distributed in areas. It is a space to promote freedom and autonomy for children so they can work at their own pace and depending on their needs. The adult is responsible of preparing this environment. The materials are handled and real and children can work with them whenever they want and they are never interrupted by the guide and they have their own error control.

METHODOLOGY

The descriptive method was used to determine the Learning Method in Teaching Mathematics in enhancing their Cognitive Ability.

One hundred ten (110) were randomly selected students from Grade 8 that were assessed and used as respondents of this research. Simple random sampling is applied from a population of Grade 8 students in San Pedro Relocation Center National High School.

The instrument used in the study was a survey questionnaire-checklist. The questionnaire is a research-made instrument devised to determine the Learning Method in teaching Mathematics in enhancing learners' cognitive ability. The said questionnaires were validated by the experts.

In order to analyze and interpret the data gathered, a weighted mean and standard deviation was used. Paired t-test was used to determine if there was a significant difference in cognitive ability in mathematics before and after using Learning Method in Teaching Mathematics. Pearson r correlation was used to find a significant effect between the Learning Method in Teaching Mathematics and the learners' cognitive ability.

RESULT AND DISCUSSION

The following tabular presentations and discussions will further characterize the Learning Method in Teaching Mathematics and the Learners' Cognitive Ability.

Figure 1 shows the Learners' profile of the respondents with regards to Age.

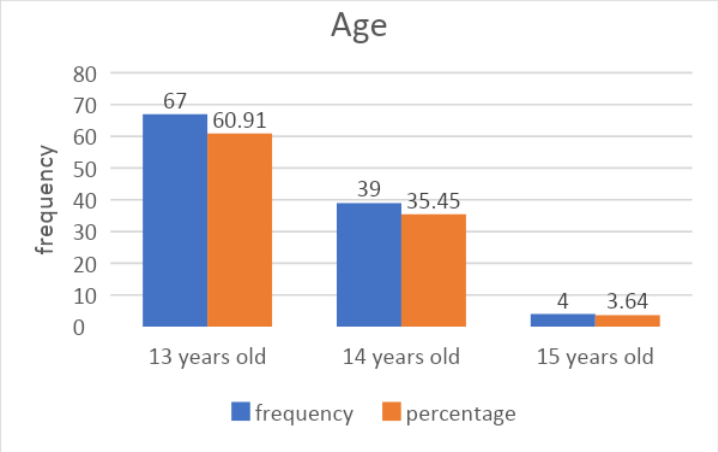

Figure 1. Learners' profile of the respondents with regards to Age

Out of 110 respondents, the age "13 years old" received the highest frequency of sixty-seven (67) or 60.91% of the total sample population. Followed by the age "14 years old" with frequency of thirty-nine (39) or 35.45% of the total sample population. While the age "15 years old" received the lowest frequency of four (4) or 3.64% of the total sample population.

This means that the Learners' profile of the respondents with regards to Age were majority 13 years old during the time of the study. Children of early childhood age have an individual way of perceiving, processing, and recalling information. These are not the skill differences through which children's performance capacities are measured but the differences related to thinking style. In other words, cognitive style is children's individual way of approach to a mental task.

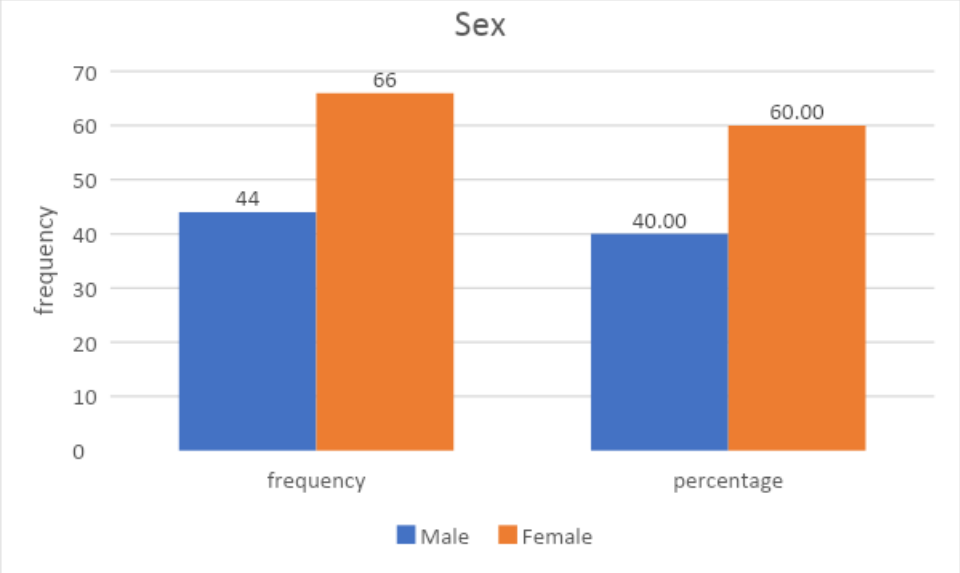

Figure 2. Learners' profile of the respondents with regards to Sex

Out of 110 respondents, the sex "Female" received the highest frequency of sixty-six (66) or 60.00% of the total sample population. While the sex "Maler" received the lowest frequency of forty-four (44) or 40.00% of the total sample population.

This means that the Learners' profile of the respondents with regards to sex were majority female during the time of the study.

Learning Method

In this study learning method includes collaborative, movement aids learning, experiential learning, independent and self-directed activities.

Table 1. Level of learning method in teaching Mathematics in terms of Collaborative

STATEMENTS	MEAN	SD	REMARKS
Create learning activities that are complex which will allow students to collaborate with each other.	4.38	0.59	Strongly Agree
Minimize opportunities for free riding.	3.86	0.83	Agree
Build in many opportunities for discussion and consensus.	4.15	0.61	Agree
Focus on strengthening and stretching expertise.	4.29	0.65	Strongly Agree
Prepare every learner to be part of a team.	4.56	0.63	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.25 0.32 Very High		

Table 1 illustrates the level of learning method in teaching Mathematics in terms of Collaborative. The students strongly agree that collaborative let them create learning activities which will allow them to collaborate with each other (M= 4.38, SD= 0.59), prepare every learner to be part of the team (M= 4.56, SD= 0.63). On the other hand, students agree that it minimize opportunities for free riding (M= 3.86, SD= 0.83).

The weighted mean of 4.25 indicates that the level of learning method in teaching mathematics in terms of collaborative is very high. This means that collaborative help provides students with the

opportunity to discuss and have a higher understanding of the material it can also help them to develop their critical thinking.

Table 2. Level of learning method in teaching Mathematics in terms of Movement aids learning

STATEMENTS	MEAN	SD	REMARKS
Allow students to do physical movements and other activities while they are learning.	4.25	0.71	Strongly Agree
Create activities that can improve student's focus and retention.	4.54	0.63	Strongly Agree
Accommodate all learning styles and allows the learners to interact with each other to gain more knowledge.	4.46	0.73	Strongly Agree
Engage students in other physical activities which are connected to their lesson.	4.37	0.66	Strongly Agree
Prepare an environment for safe learning and education.	4.54	0.70	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.43 0.37 Very High		

Table 2 illustrates the level of learning method in teaching Mathematics in terms of Movement aids learning. The students strongly agree that movement aids learning creates activities that can improve student's focus and retention (M= 4.54, SD= 0.63), prepare an environment for safe learning and education (M= 4.54, SD= 0.70) and it allows them to do physical movements and other activities while they are learning (M= 4.25, SD= 0.71).

The weighted mean of 4.43 indicates that the level of learning method in teaching mathematics in terms of movement aids learning is very high. This means that the teachers need to incorporate movement into lessons for the student to explore different ideas. Overall, incorporating movement into learning can be beneficial way to aid learning.

Table 3. Level of learning method in teaching Mathematics in terms of Experiential

STATEMENTS	MEAN	SD	REMARKS
Use real-life examples that are related to the topic.	4.34	0.69	Strongly Agree
Build experiences from in-house situations.	4.01	0.74	Agree
Use team challenges and allow students to solve real-life problems.	4.23	0.71	Strongly Agree
Provide real-world and role-specific simulations.	4.09	0.75	Agree
Incorporate experiential activities and connect it to a bigger picture.	4.25	0.78	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.18 0.37 High		

Table 3 illustrates the level of learning method in teaching Mathematics in terms of Experiential. The students strongly agree that experiential allow them to use real-life examples that are related to the topic (M= 4.34, SD= 0.69), incorporate experiential activities and connect it to a bigger picture (M= 4.25,

SD= 0.78). Likewise, the students agree that it allows them to build experiences from in-house situations (M=4.01, SD =0.74).

The weighted mean of 4.18 indicates that the level of learning method in teaching mathematics in terms of experiential is high. This means that experiential help the students to engage emotions as well as enhance their knowledge and skills, leading to greater gratification in learning, it is also an effective way to prepare students for their chosen careers and help them develop the skills they need to succeed in the real world.

Table 4. Level of learning method in teaching Mathematics in terms of Independent

STATEMENTS	MEAN	SD	REMARKS
Give the learners the ability to make their own choices.	4.34	0.71	Strongly Agree
Provide gentle guidance and allowing them to learn through play at their own pace	4.35	0.76	Strongly Agree
Provide a flexible and empowering learning environment.	4.31	0.69	Strongly Agree
Engage students spontaneously with the environment and learner-led activities flourish.	4.16	0.72	Agree
Provide a variety of learning materials that will allow students to choose what is suitable for them.	4.51	0.70	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.33 0.37 Very High		

Table 4 illustrates the level of learning method in teaching Mathematics in terms of Independent. The students strongly agree that independent provide a variety of learning materials that will allow students to choose what is suitable for them (M= 4.51, SD= 0.70), provide gentle guidance and allowing them to learn through play at their own pace (M= 4.35, SD= 0.76). Furthermore, the students agree that it engage them spontaneously with the environment and learner-led activities flourish (M=4.16, SD=0.72).

The weighted mean of 4.33 indicates that the level of learning method in teaching mathematics in terms of independent is high. This means that independent help the students promotes creativity, intellectual curiosity, and a better understanding of one's own strengths and weaknesses, it can also lead them to improve their motivation, confidence, and performance.

Table 5 illustrates the level of learning method in teaching Mathematics in terms of Self-Directed Activities. The students strongly agree that self-directed activities assess their readiness to learn and provide activities that are appropriate to them and provide hands-on learning activities that allow them to work together and learn on their own (M= 4.37, SD= 0.60), allow students to evaluate their own progress based on how they do their performance tasks (M= 4.34, SD= 0.75). On the other hand, the students agree that it cultivate extrinsic motivation for students to cope up with their learning activities (M= 4.10, SD= 0.78).

The weighted mean of 4.28 indicates that the level of learning method in teaching mathematics in terms of self-directed activities is very high. This means that self-directed activities support continuous growth and provides motivation and new experiences, is the natural way of learning and helps individuals learn through their interests and personal learning style.

Table 5. Level of learning method in teaching Mathematics in terms of Self-Directed Activities

STATEMENTS	MEAN	SD	REMARKS
Assess students' readiness to learn and provide activities that are appropriate to them.	4.37	0.60	Strongly Agree
Cultivate extrinsic motivation for students to cope up with their learning activities.	4.10	0.78	Agree
Engage the learners with their own learning process.	4.23	0.71	Strongly Agree
Provide hands-on learning activities that allow learners to work together and learn on their own.	4.37	0.70	Strongly Agree
Allow students to evaluate their own progress based on how they do their performance tasks.	4.34	0.75	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.28 0.37 Very High		

Learners' Cognitive Ability

In this study cognitive ability includes logical reasoning, abstract thinking, pattern recognition, information processing and problem solving.

Table 6. Level of learners' cognitive ability in Mathematics relative to Logical reasoning

STATEMENTS	MEAN	SD	REMARKS
Differentiate things between observation and inferences.	4.14	0.71	Agree
Easily wrestle with the math concepts and figure out answers.	4.29	0.73	Strongly Agree
Formulate ideas regarding math problems and wider perspective to logical statements.	4.25	0.73	Strongly Agree
Use my fundamental knowledge to think and reason out from a logical approach.	4.21	0.74	Strongly Agree
Formulate ideas regarding math problems and wider perspective to logical statements.	4.36	0.73	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.25 0.42 Very High		

Table 6 illustrates the level of learners' cognitive ability in Mathematics relative to Logical reasoning. The students strongly agree that they formulate ideas regarding math problems and wider perspective to logical statements (M= 4.36, SD= 0.73), they easily wrestle with the math concepts and figure out answers (M= 4.29, SD= 0.73). Likewise, students agree that they differentiate things between observation and inferences (M= 4.14, SD= 0.71).

The weighted mean of 4.25 indicates level of learners' cognitive ability in Mathematics relative to logical reasoning is very high. This means that the learning method in teaching mathematics is relevant to needs of the students in way that it enables them to analyze complex problems and arrive at well-supported conclusions based on evidence and reasoning.

Table 7. Level of learners' cognitive ability in Mathematics relative to Abstract Thinking

STATEMENTS	MEAN	SD	REMARKS
Think about wider concepts and perspectives.	4.23	0.88	Strongly Agree
Utilize knowledge for real-life application.	4.35	0.64	Strongly Agree
Absorb information and make connections to a wider world.	4.29	0.71	Strongly Agree
Understand complex concepts and learn with concrete experiences.	4.30	0.64	Strongly Agree
Continue learning new things through real-world activities and experiences.	4.42	0.68	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.32 0.37 Very High		

Table 7 illustrates the level of learners' cognitive ability in Mathematics relative to Abstract Thinking. The students strongly agree that they continue learning new things through real-world activities and experiences (M= 4.42, SD= 0.68), they utilize knowledge for real-life application (M= 4.35, SD= 0.64) and students think about wider concepts and perspectives (M=, 4.23, SD= 0.88).

The weighted mean of 4.32 indicates level of learners' cognitive ability in Mathematics relative to abstract thinking is very high. This means that in order to improve the abstract thinking of the students, they can engage in creative activities, read widely, learn about different disciplines, seek out diverse perspective and develop strong critical thinking skills. Classrooms use special materials that are beautiful, hands-on, and designed to help children develop concentration and work through the process of learning.

Table 8. Level of learners' cognitive ability in Mathematics relative to Pattern Recognition

STATEMENTS	MEAN	SD	REMARKS
Match information received from the information already learned.	4.39	0.65	Strongly Agree
Imagine new possibilities and visualize data.	4.23	0.69	Strongly Agree
Decode the meaning of each pattern.	4.30	0.74	Strongly Agree
Differentiate various materials from each other.	4.36	0.63	Strongly Agree
Determine the significant meaning of each pattern and data.	4.32	0.68	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.32 0.38 Very High		

Table 8 illustrates the level of learners' cognitive ability in Mathematics relative to Pattern Recognition. The students strongly agree that they match information received from the information already learned (M= 4.39, SD= 0.65), they differentiate various materials from each other (M= 4.36, SD= 0.63 and the students imagine new possibilities and visualize data (M= 4.23, SD= 0.69).

The weighted mean of 4.32 indicates level of learners' cognitive ability in Mathematics relative to pattern recognition is very high. This means that learning method in teaching mathematics is relevant to the needs of the students in a way that it led them to practical applications such as improving image recognition and helped them to develop a better understanding of complex information.

Table 9. Level of learners' cognitive ability in Mathematics relative to Information Processing

STATEMENTS	MEAN	SD	REMARKS
Interpret and understand visual and other learning materials.	4.47	0.59	Strongly Agree
Appropriately identify information from charts, graphs and maps.	4.34	0.68	Strongly Agree
Find meaning behind the pictures, infographics and data from different resources.	4.39	0.69	Strongly Agree
Translate information from different aspects in the learning materials up to more precise verbal explanation.	4.30	0.68	Strongly Agree
Recognize the importance of data gathering and information processing in the teaching and learning process.	4.44	0.66	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.39 0.38 Very High		

Table 9 illustrates the level of learners' cognitive ability in Mathematics relative to Information processing. The students strongly agree that they interpret and understand visual and other learning materials (M= 4.47, SD= 0.59), they recognize the importance of data gathering and information processing in the teaching and learning process (M= 4.44, SD= 0.66) and students translate information from different aspects in the learning materials up to more precise verbal explanation (M= 4.30, SD= 0.68).

The weighted mean of 4.39 indicates level of learners' cognitive ability in Mathematics relative to information processing is very high. This means that learning method in teaching mathematics is relevant to the needs of the students in a way that it enables them to improve memory and recall, optimizing decision-making processes, and developing innovative solutions to complex problems.

Table 10. Level of learners' cognitive ability in Mathematics relative to Problem Solving

STATEMENTS	MEAN	SD	REMARKS
Find answers on the given problem without stressing out.	4.25	0.72	Strongly Agree
Simplify things to get solutions for solving math problems.	4.16	0.78	Agree
Identify what is being asked in the problem and solve the equation using mathematical techniques.	4.13	0.88	Agree
Check my answers right away and recognize if there are any mistakes on it.	4.39	0.73	Strongly Agree
Revisit past problems and connect them to the new problems so that I can easily get an answer.	4.27	0.75	Strongly Agree
Weighted Mean **SD** ***Verbal Interpretation***	4.24 0.43 Very High		

Table 10 illustrates the level of learners' cognitive ability in Mathematics relative to Problem Solving. The student strongly agree that they check their answers right away and recognize if there are any mistakes on it (M= 4.39, SD= 0.73), they revisit past problems and connect them to the new problems so that they can easily get an answer (M= 4.27, SD= 0.75), On the other hand, the students agree that they

identify what is being asked in the problem and solve the equation using mathematical techniques (M= 4.14, SD= 0.88).

The weighted mean of 4.24 indicates level of learners' cognitive ability in Mathematics relative to problem solving is very high. This means that learning method in teaching mathematics is relevant to the needs of the students in a way that it led them use critical thinking and creative thinking skills. It also enables them to recognized and defined the problem, developed alternative solutions and evaluate the best solution.

Table 11. Significant Difference in the Cognitive Ability in Mathematics before and after using Learning Method in Teaching Mathematics

Cognitive Ability	Test	t-stat	p-value	Analysis
Logical reasoning	*Before* *After*	23.954	.000	*Significant*
Abstract Thinking	*Before* *After*	18.779	.000	*Significant*
Pattern Recognition	*Before* *After*	20.577	.000	*Significant*
Information Processing	*Before* *After*	21.759	.000	*Significant*
Problem Solving	Before After	19.068	.000	*Significant*

Table 11 presents the significant difference in the cognitive ability in mathematics before and after using Learning Method in Teaching Mathematics.

The Logical reasoning, Abstract Thinking, Pattern recognition, Information processing and Problem Solving of the Cognitive Ability was observed to have a significant difference to the before and after of the tests. This is based on the computed t values obtained from the tests which were greater than the critical t value. Furthermore, the p-values obtained were less than the significance alpha 0.05, hence there is a presence of significance.

Cognitive styles are among the most important determinants of individual success. Cognitive styles affect considerably the individual point of view and have a strength in explaining the general skills in children rather than their academic success.

Table 12 presents the significant effect of Learning Method in Teaching Mathematics to the Cognitive ability of Learners.

The Movement aids learning, Experiential, Independent and Self-directed activities of the Learning Method in Teaching Mathematics was observed to have any significant effect to the Learners' Cognitive Ability except for the Collaborative. This is based on the computed t values obtained from the tests which were greater than the critical t value.

Open and multi age classrooms may offer an environment with rich, collaborative, and varied social interactions that may foster early socioemotional skills. Thus, there are reasons to believe that Montessori preschool education may lead to greater academic, cognitive, and social outcomes than conventional education in young children.

Table 12. Significant Effect of Learning Method in Teaching Mathematics to the Cognitive Ability of the Learners

Learning Method	Cognitive Ability	r-value	Degree of Correlation	Analysis
Collaborative	Logical reasoning	0.252	Weak Relationship	Significant
	Abstract Thinking	0.183	Very Weak Relationship	Not Significant
	Pattern recognition	0.134	Very Weak Relationship	Not Significant
	Information Processing	0.213	Weak Relationship	Significant
	Problem Solving	0.060	Very Weak Relationship	Not Significant
Movement aids learning	Logical reasoning	0.232	Weak Relationship	Significant
	Abstract Thinking	0.240	Weak Relationship	Significant
	Pattern recognition	0.297	Weak Relationship	Significant
	Information Processing	0.406	Moderate Relationship	Significant
	Problem Solving	0.266	Weak Relationship	Significant
Experiential	Logical reasoning	0.301	Weak Relationship	Significant
	Abstract Thinking	0.219	Weak Relationship	Significant
	Pattern recognition	0.253	Weak Relationship	Significant
	Information Processing	0.168	Very Weak Relationship	Not Significant
	Problem Solving	0.216	Weak Relationship	Significant
Independent	Logical reasoning	0.216	Weak Relationship	Significant
	Abstract Thinking	0.239	Weak Relationship	Significant
	Pattern recognition	0.188	Very Weak Relationship	Not Significant
	Information Processing	0.224	Weak Relationship	Significant
	Problem Solving	0.297	Weak Relationship	Significant
Self-directed activities	Logical reasoning	0.354	Weak Relationship	Significant
	Abstract Thinking	0.261	Weak Relationship	Significant
	Pattern recognition	0.383	Weak Relationship	Significant
	Information Processing	0.411	Moderate Relationship	Significant
	Problem Solving	0.376	Weak Relationship	Significant

Scale	Strength
±0.80 – ±1.00	Very Strong
±0.60 – ±0.79	Strong
±0.40 – ±0.59	Moderate
±0.20 – ±0.39	Weak
±0.00 – ±0.19	Very Weak

CONCLUSION

On the basis of the foregoing findings, the following conclusion was drawn.

The study shows the difference in the cognitive ability in mathematics before and after using learning method in teaching mathematics has significant Thus, the researcher, therefore, concludes that the research hypothesis stating there is no significant difference in the cognitive ability in mathematics before and after using Learning Method in Teaching Mathematics is rejected.

And also, study shows the null hypothesis "There is no significant effect of Learning Method in Teaching Mathematics to the Cognitive Ability of the Leaners" is partially rejected.

RECOMMENDATIONS

1. It suggests that teachers may continue this method of teaching so that students will be motivated and increase their academic performance they will know the effects of the learning method in teaching Mathematics on the student's cognitive ability.
2. It recommends schools may develop curricula that will fit the student's abilities and interests. They may also provide programs that will focus on self-gaining knowledge, self-evaluation, and self-discovery learning of the student.
3. Lastly, it recommends for future researchers that this study also motivates them to be patient in doing research and inspired them to be good and better researchers for the next generation.

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