Mathematics Manipulatives for the Development on the Numeracy Skills of Kindergarten Pupils

GILDA FE GUANZON-PISARAS
https://orcid.org/0000-0002-3211-8826
comely.ping@gmail.com
Odiongan Central School
Department of Education – Division of Gingoog City

ABSTRACT

Math manipulatives are fun! Children who are known to be fun-loving individuals enjoy using these concrete tools to make sense of the problems they are given. This study aimed to determine the use of Mathematics Manipulatives for the development of numeracy skills of kindergarten pupils. It utilized the experimental research design with pre-test and post-test. It was conducted in Odiongan Central School (OCS), Division of Gingoog City, Misamis Oriental. The subjects of this study were the two (2) sections of Kinder-Daffodil as the experimental and control groups. The research instrument used in this study was the 20-item teacher-made pre-test and post-test questionnaire. The frequency and mean were used to determine the pre-test and post-test scores of the experimental and control groups. The result revealed that the pupils in the experimental group have developed more mastery level on their numeracy skills than the control group. There was a significant difference between the pre-test and post-test scores of the experimental and control groups. Thus, the null hypothesis (Ho) was rejected. Based on the findings of the study, a training program was proposed for consideration and approval.
KEYWORDS

Mathematics Manipulatives, Development, Numeracy Skills, Kindergarten, Experimental Design, Philippines

INTRODUCTION

Math manipulatives are fun! Children who are known to be fun-loving individuals enjoy using these concrete tools to make sense of the problems they are given. These materials help our younger learners to learn new math concepts more easily. Through the use of math manipulatives, it enables to build a relationship when shown visually how to solve problems and given opportunities to explore some things. As cited in Math Manipulatives (2017) that math fluency develops with repeated practice and play with manipulatives.

Manipulatives, as described by Van de Walle, Karp & Bay-Williams (2013), posited that students and teachers could use. In like manner, manipulatives in the teaching and learning process. It is a mathematical tool that can be used in Mathematics instruction which is following the mathematics standards such as the Mathematics Process Standards included in Principles and Standards for School Mathematics (NCTM, 2000) and the Common Core State Standards for Mathematics (National Governor's Association, 2010).

The child’s everyday experiences are full of learning opportunities that lay the foundations for numeracy. Numeracy is the ability to apply math’s concepts in all areas of life. Its skills involve understanding numbers, counting, solving number problems, measuring, sorting, noticing patterns, adding and subtracting numbers and so on. Basic number concepts and skills in numeracy emerge before school entry. It is essential to promote the development of these competencies in young children and to know the best learning methods, as these skills are often predictive of children’s future school achievement.

Moreover, according to Reid (2016) children who enter school have already possessed early numeracy skills. They only vary significantly in how they acquire, and how quickly they receive it. Children who come to school already purchased early numeracy which later on provides a foundation for their mathematics achievement and competence (Geary, 2015).

There were several studies investigated the mathematical development of the children from preschool to primary school; they found out that children’s counting skills and understanding of quantities and their relationships in the preschool predict their Mathematics achievement in the primary school (Aunio & Niemivirta, 2010). Aubrey, Godfrey, & Dahl (2006) said that other studies have demonstrated on entry to school, number sense and numeracy knowledge predict math’s achievement in later school years.
Consequently, the researcher herself as a Kindergarten teacher at Odiongan Central School is experiencing a problem on how to improve the numeracy skills of the Kindergarten pupils. In the Mean Percentage Score (MPS) of their First Grading Periodical Test, Numeracy got 65% among the four subjects in Kindergarten. This seems to be a big problem on the part of the researcher as their Kindergarten teacher because it is the first time that the MPS for Numeracy dropped to a meager score. In the past four years of the researcher in handling Kindergarten, she makes use of different pictures as a strategy in teaching Numeracy to the pupils. She finds it very useful because the pupils are motivated to engage in the learning process which resulted in the high scores of MPS in the past years.

Based on the preceding discussions, the researcher feels the need to envision other approaches/strategy such as the use of Mathematics manipulatives and find its influence on the numeracy skills of Kindergarten pupils.

**FRAMEWORK**

This study is anchored on the Constructivists theories of Piaget (1952); Bruner (1966) and to theories of Friedrich Froebel and Maria Montessori.

From Piaget, educators have adopted the notion that elementary school children’s thinking is concrete. It has been assumed that children of this age learn best through concrete objects. Concrete operational children have difficulty performing mental operations on abstract symbols. By this view, making problems tangible also makes them tractable for young children.

Bruner (1966) believed that elementary-school children’s thinking focused on particular properties that could be actively manipulated. Bruner explicitly called for the use of concrete objects in instruction, suggesting that using many different real objects could help to move children beyond their focus on the perceptual properties of the individual objects. In Bruner’s (1966) words, this approach could “empty the concept of specific visual features and allow the student to grasp its intellectual properties.

Friedrich Frobel (1904) had recognized the need that teachers must follow a specific order of events for the children to grasp and retain concepts. He first realized this need for the law on his series of Gifts and Occupations which he designed as part of a systematic method for children to learn through play. He had observed children who were using concrete manipulatives and realized that there is a process by which they develop their knowledge of mathematical concepts.

Maria Montessori (1917) continued to work with manipulatives and constructed manipulatives which targeted fundamental elementary math concepts. The Montessori Method is based on the idea that children learn best when the environment supports their natural desire to acquire skills and knowledge. Dr. Montessori concluded that between the ages of 0-6 years of age, a child possesses a fantastic ability to absorb knowledge more quickly and effortlessly than later in life - the absorbent mind. Critical
to understanding the learning capacity of a child is to understand the significance of sensitive periods for early learning. At crucial points in a young child’s life, he or she is intensely fascinated by or capable of learning specific skills more than at any other time in their life. Once these periods of learning pass, they may never return. This finding makes it necessary to expose children to learning as early as possible introducing them to new concepts and in the development of a curriculum suited to their interest, stage of development, physical, emotional and intellectual needs - the needs of the whole child.

In 2013, the National Council of Supervisors of Mathematics (NCSM) issued a position statement on the use of manipulatives in classroom instruction to improve student achievement. To develop every student’s mathematical proficiency, leaders and teachers must systematically integrate the use of concrete and virtual manipulatives into classroom instruction at all grade level (NCSM, 2013).

Today, manipulatives are still widely used in math classrooms across the country and educators highly advocate their use. In fact, the National Council of Teachers of Mathematics (NCTM) has recommended the use of manipulatives in teaching mathematical concepts at all grade levels. The five objectives that correspond to the NCTM standards are problem-solving, communicating, reasoning, connections, and estimation. When using manipulatives, the goal is to foster children's concepts of numbers and operations, patterns, geometry, measurement, data analysis, problem-solving, reasoning, connections and representations (Boggan, Harper, & Whitmire, 2012).

Research from both learning theory and classroom studies show that using manipulatives to help teach math can positively affect student learning. This is true for students at all levels and of all abilities. Incorporating manipulatives into mathematics lessons in meaningful ways helps students grasp concepts with greater ease, making teaching most effective.

Heddens & Picciotto (1998); Sebesta & Martin (2004) as cited on as cited on the Research on the Benefits of Manipulatives (2016) found that with long-term use of manipulatives in mathematics, educators have found that students make gains in the following general areas: (1) verbalizing mathematical thinking, (2) discussing mathematical ideas and concepts, (3) relating real-world situations to mathematical symbolism, (4) working collaboratively, (5) thinking divergently to find a variety of ways to solve problems, (6) expressing issues and solutions using a variety of mathematical symbols, (7) making presentations, (8) taking ownership of their learning experiences, (9) gaining confidence in their abilities to find solutions, (10) to mathematical problems using methods that they come up with themselves without relying on directions from the teacher.

To implement formative assessment well, William (2011) shares five key strategies. Three are particularly well-supported by manipulative-based instruction: classroom activities and learning tasks which elicit evidence of learning, activating learners as instructional resources for one another, and activating learners as owners of their
education. In all three cases, by actively engaging students in the doing of mathematics, manipulatives provide a foundation which encourages discussion and student ownership of their work. This provides teachers with a vivid current picture of student understanding and guides teachers in determining appropriate next steps.

In like manner, this study will make use of the Pre-test and Post-test to determine the development of the numeracy skills among the Kindergarten pupils. According to Kelly, (2017) pretests help measure student learning over a period. The protest marks a student’s level of understanding before instruction while a final assessment or posttest measures student learning. A comparison of pre- and post-tests can provide a teacher an opportunity to track student growth in one class or over several years.

**OBJECTIVE OF THE STUDY**

This study determined the influence of Math Manipulatives to the Numeracy Skills of Kindergarten Pupils.

**METHODOLOGY**

**Research Design**

This study used the experimental design using the pre-test and post-test where an independent variable was manipulated while all other variables except for the dependent variable were held constant. The effect of the manipulation of the independent variable to the dependent variable was measured through pre-test and post-test. The pre-test and post-test had used the same teacher-made questionnaire which is composed of 20-items. Two sections of Kindergarten pupils were chosen to be the participants of the study, one for the control group and the other for the experimental group. Both parts were named as section Daffodil. The experimental group was composed of 17 pupils who were in the afternoon session. The control group was formed of 23 pupils who belong in the morning session.

The pre-test was administered before the intervention and post-test were conducted after the invasion.

**Research Locale**

This study was conducted in Odiongan Central School which was located at Barangay Odiongan, Gingoog City. It was 12 kilometers away from the city proper going to Butuan City. Its estimated population was two thousand eight hundred (2,800) individuals. Their traditional livelihoods were: fishing and farming.

Odiongan Central School was the central school among the nine elementary schools in North 1 District in the Division of Gingoog City. The school was led by a school principal. The school had 21 teachers. It has a total enrolment of 636 pupils of which 331 were males, and 305 were females.
Research Participants
Two sections of Kindergarten pupils were chosen to be the participants of the study, one for the control group and the other for the experimental group. Both sections were named as section Daffodil. One section is in the morning session and another one on the afternoon session. The control group who were in the morning session was composed of 11 males and 12 females, with a total number of 23 pupils. The experimental group who were in the afternoon session was composed of 8 males and nine females, with a total number of 17 pupils. The two groups had a different number of pupils as per enrolment record for the School Year 2017 – 2018. This study had a total of 40 participants.

Research Instrument
The research instrument used in this study was a researcher – made a questionnaire. The pre-test and post-test questionnaire had questions about the early numeracy skills need to be assessed for the kindergarten. It was submitted to three experts namely: school principal, district supervisor, and schools division superintendent for validation. Thorough checking and editing of the test questions were done for the appropriateness of numeracy skills to be assessed. After the validation, the test questionnaire was finalized, and pilot tested to 25 pupils from Kindergarten section Carnation. The validity of the test items was determined using item analysis. Item analysis was made to identify the issues which were included in the Pre-test and Post-test. The result of the item analysis determined the items to be included in the test. From the 50 item-test, there are 30 items which are discarded because these items are identified as poor items and considered to be very difficult and very easy based on the results of the item analysis. The questionnaire was composed of 20 pieces. The questions were written based on the numeracy skills which needed to be assessed in a Kindergarten learner. A reliability test was also made on the test which had a result of Rho KR20 – 0.68. This means that the test was good for a teacher-made classroom test.

Ethical Consideration
The respondents of this study will be assured that ethical guidelines will be followed such that names of the pupils will not appear in any of the pages of the study unless written permission is obtained. The dignity and well-being of the pupils shall likewise be protected at all times. The researcher will also make sure that data will be gathered throughout the study will remain confidential. Personal information of the respondents will be treated with privacy thus shall be stored safely.

Data Gathering Procedure
The data was gathered first by asking permission from the Schools Division Superintendent of the Division of Gingoog City. When the permission was granted, a copy of the approved letter was furnished to the District Supervisor of North I District and the school principal. After this, the researcher asked permission to the parents of the
respondents and gave them an orientation about the study. When the parents had given their consent, the researcher conducted the study.

This study started last November 2017. The pre-test was given to the control group and experimental group to measure their prior knowledge. The test was administered by the researcher. During the trial, the researcher had read aloud the directions and the questions of the test. The subjects of the study were given thirty (30) minutes to answer the entire questionnaire. The questionnaire had 20 items. The result of the pre-test was analyzed using MPS and t-test. The level of performance of the pupils was measured using the MPS scale adopted from National Education Testing and Research Center (NETRC).

After this, the use of Math Manipulatives was implemented with the experimental group within forty-five (45) days. The experimental group was exposed to different types of manipulatives. There were five types of math manipulatives which were used with the experimental group, and they were categorized as for counting, sorting, patterning, time and measurement. Each of this type of manipulatives was used with the experimental group during their work period two within the forty-five days period of the study. The researcher introduced the different kinds of manipulatives and had taught the subjects of the study how to use the manipulatives being presented to them. The experimental group had experienced manipulating the mathematics manipulatives exposed to them. Sample pictures of the manipulatives used with the experimental group were found in the appendices of this study. On the other hand, the controlled group was not exposed to the different types of manipulatives within the forty-five days period. They were just exposed to different visual aids used by the researcher during their work period 2.

When the forty-five days period of the study was over, the post-test was conducted. Last January 2018 the post-test was given to the subjects of the study to measure the effect of the intervention after it has been implemented. The two groups of the study had used the same questionnaire. The same with the procedure during the pre-test, the researcher conducted the post-test with the experimental and controlled group. The survey given in the post-test was the same with the study provided in the pre-test. The result of the post-test was then analyzed and interpreted to determine the effect of mathematics manipulatives to the numeracy skills of the Kindergarten pupils.

The following figures presented the actual use of mathematics manipulatives in the experimental group. These manipulatives were used to improve the numeracy skills among the pupils of Kinder-Daffodil based on the Standards and Competencies for Five-Year-Old Filipino Children as of May 2016. Along with the figures are its short description about its learning competencies, learning codes, topic, materials and its procedures when using it.
RESULTS AND DISCUSSION

Table 2. Pre-test Scores of the Pupils in the Control and Experimental Groups

<table>
<thead>
<tr>
<th>Range</th>
<th>Control Group</th>
<th>Experimental Group</th>
<th>Level of Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>0</td>
<td>Mastered</td>
</tr>
<tr>
<td>18 – 19</td>
<td>4</td>
<td>0</td>
<td>Closely Approximating Mastery</td>
</tr>
<tr>
<td>14 – 17</td>
<td>5</td>
<td>0</td>
<td>Moving Towards Mastery</td>
</tr>
<tr>
<td>7 – 13</td>
<td>6</td>
<td>5</td>
<td>Average Mastery</td>
</tr>
<tr>
<td>3 – 6</td>
<td>5</td>
<td>9</td>
<td>Low Mastery</td>
</tr>
<tr>
<td>1 – 2</td>
<td>2</td>
<td>3</td>
<td>Very Low Mastery</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>No Mastery</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

MPS 55.20 Average Mastery 25.60 Low Mastery

In the control group, 2 or 9% got scores from 1 to 2 and interpreted as having shallow mastery level; 5 or 22% had counts from 3 to 6 and explained as having low mastery; 6 or 26% got scores from 7 to 13 and understood as having average skill; 5 or 22% got scores from 14 to 17 and interpreted as having to move towards mastery level; 4 or 17% got scores from 18 to 19 and understood as having closely approximating mastery; and 1 or 4% had a score of 20 and interpreted as on the mastered level.

The MPS of the control group in the pre-test was 55.20. Thus, the performance level of the pupils in the control group in the pre-test was on the average mastery level. The average mastery level of the controlled group showed that they had acquired necessary numeracy skills for Kindergarten learners.

Consequently, the performance of the control group in the pre-test was supported by the study of Varol & Farran (2006) who stated that: a meaningful task encourages reflection and communication to build mathematical understanding by enabling children to use skills and knowledge they already possess.

Moreover, in the experimental group, 3 or 18% had scores from 1 to 2 and interpreted as having shallow mastery level; 9 or 53% got scores from 3 to 6 which was having an interpretation of low mastery level; 5 or 29% had counts from 7 to 13 and interpreted as having average mastery level; and none of the pupils in the experimental group had reached the levels of moving towards mastery and mastered.

Furthermore, the MPS of the experimental group was 25.60. The level of performance of the pupils in the experimental group in the pre-test was on the low mastery level.

Based on the results of the pre-test, it was manifested that the pupils on the experimental group needed a reinforcement to develop their knowledge on numeracy as stated by Aubrey, Dahl, & Godfrey (2006) as cited by Mononen, Aunio, Koponen & Aro (2014) that without extra support, intervention, children are likely to remain low-performers throughout their primary school years.
Thus, the researcher had thought of using mathematics manipulatives to cope with the need of the experimental group based on their pre-test MPS result.

Table 3. Post-test Scores of the Pupils in the Control and Experimental Groups

<table>
<thead>
<tr>
<th>Range</th>
<th>Control Group %</th>
<th>Experimental Group %</th>
<th>Level of Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>5</td>
<td>6</td>
<td>Mastered</td>
</tr>
<tr>
<td>18 – 19</td>
<td>6</td>
<td>5</td>
<td>Closely Approximating Mastery</td>
</tr>
<tr>
<td>14 – 17</td>
<td>6</td>
<td>3</td>
<td>Moving Towards Mastery</td>
</tr>
<tr>
<td>7 – 13</td>
<td>4</td>
<td>3</td>
<td>Average Mastery</td>
</tr>
<tr>
<td>3 – 6</td>
<td>2</td>
<td>0</td>
<td>Low Mastery</td>
</tr>
<tr>
<td>1 – 2</td>
<td>0</td>
<td>0</td>
<td>Very Low Mastery</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>No Mastery</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>

MPS  | 78.70 Moving Towards Mastery | 86.20 Closely Approximating Mastery

In the control group, 2 or 9% got scores from 1 to 2 and interpreted as having low mastery level; 4 or 18% had counts from 7 to 13 and understood as having average mastery; 6 or 26% got scores from 14 to 17 and interpreted as having to move towards mastery level; 6 or 26% got scores from 18 to 19 and understood as having closely approximating mastery; and 5 or 22% had a score of 20 and interpreted as on the mastered level.

The MPS of the control group in the post-test was 78.70. Thus, the performance level of the pupils in the control group during the post-test was on the level of moving towards mastery.

In like manner, in the experimental group, 3 or 18% had scores from 7 to 13 and interpreted as having average mastery level; 3 or 18% who had scored from 14 to 17 and interpreted as having the level of moving towards mastery; 5 or 29% got the scores of 18 to 19 and understood as having closely approximating mastery level; 6 out of 17 pupils or 35% were explained as on the mastered level.

The MPS of the experimental group was 86.20. Consequently, the level of performance of the pupils in the experimental group during the post-test had increased to closely approximating mastery.

The mastery level of the pupils in the experimental group which was closely approximating mastery level was due to the implementation of mathematics manipulatives.

The results of the MPS manifested that the numeracy skills have been developed. These results were related to the results of the study conducted by Sowel (1989) who stated that Mathematics achievement is increased through the long-term use of concrete
instructional materials and that students’ attitudes toward mathematics are improved when they have instruction with real materials provided by teachers knowledgeable about their use.

Moreover, exposure to early numerical activities at home, in preschool, or in daycare plays a vital role in the establishment of new mathematical competencies for kindergarten students (Jung, 2011). The more exposure to new numerical competencies students receive through games, stories, or play before formal schooling begins, the more they understand the building blocks of mathematics (Ramani & Siegler, 2008).

Based on the results of the post-test, it was indicated that mathematics manipulatives had developed the numeracy skills of the Kindergarten pupils. Casebeer (2012) stated that longitudinal studies have shown that early numeracy skills are accurate predictors of later mathematics achievement.

Table 4. T-test Result for Pre-test and Post-test Scores of the Control Group

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Variance</td>
<td>36.3636</td>
<td>36.3633</td>
</tr>
<tr>
<td>Number of Subjects</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Degree of Freedom</td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>t-computed</td>
<td>-3.0846</td>
<td></td>
</tr>
<tr>
<td>t-table (0.05, 39)</td>
<td></td>
<td>2.0227</td>
</tr>
<tr>
<td>Interpretation</td>
<td></td>
<td>Significantly different at 5% level of significance</td>
</tr>
<tr>
<td>Decision</td>
<td></td>
<td>Reject H0</td>
</tr>
</tbody>
</table>

Table 4 revealed that the control group had tabulated t-value of 2.0227 while its computed t-value was -3.0846 with 39 degrees of freedom for both pre-test and post-tests conducted to them. There were 23 subjects/participants of this group. The variance for pre-test was 36.3636, and the difference for post-test was 36.3633. Both tests had 11 as its mean.

Consequently, these results of the control group for its pre-test and post-test were interpreted as significantly different with 0.05 significant level. This leads to making the null hypothesis to be rejected.

Furthermore, there is a significant difference between the pre-test and post-test scores of the control group. This is supported by the study of Crowley (2015) as he stated that the students’ performance increases regardless of treatment condition.
Table 5. T-test Result for Pre-test and Post-test Scores of Experimental Group

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>5.1176</td>
<td>17.2353</td>
</tr>
<tr>
<td>Variance</td>
<td>6.9854</td>
<td>10.5662</td>
</tr>
<tr>
<td>Number of Subjects</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Degree of Freedom</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>t-value (computed)</td>
<td>-11.9258</td>
<td></td>
</tr>
<tr>
<td>t-value (table;0.05, 31)</td>
<td>2.0395</td>
<td></td>
</tr>
<tr>
<td>Interpretation</td>
<td></td>
<td>Significantly different at 5% level of significance</td>
</tr>
<tr>
<td>Decision</td>
<td></td>
<td>Reject H0</td>
</tr>
</tbody>
</table>

Table 5 revealed that the experimental group had tabulated t-value of 2.0395 while its computed t-value was -11.9258 with 31 degrees of freedom for both pre-test and post-tests conducted to them. There were 17 subjects/participants in this group. The variance for pre-test was 6.9854, and the difference for post-test was 10.5662. Both tests had 11 as its mean.

Consequently, these results of the control group for its pre-test and post-test were interpreted as significantly different with 0.05 significant level. This leads to making the null hypothesis as rejected.

Based on the results, there is a significant difference between the pre-test and post-test scores of the experimental group. The numeracy skills of the pupils in the experimental group had developed because of the use of mathematics manipulatives. This result is supported by Shoval (2011) who stated that Manipulatives in the Math Classroom manipulatives or movement had the most significant effect on lower achievers than other students. In like manner, Uttal (2009) as cited by Johnson (2015) stated that it is easier for children to understand a mathematics concept with the support of concrete materials than when something is presented without it.

**CONCLUSIONS**

Based on the findings of the study, the following conclusions are drawn as follows:

1. The pupils in the control groups had enough knowledge and understanding of the competencies included in the survey while the pupils in the experimental group had inadequate knowledge and skills of a kindergarten. The pupils in the control and experimental groups were of the different level of performance at the beginning of the study.

2. The pupils in the experimental group gained more knowledge and skills during the implementation of mathematics manipulatives than the pupils in the control group.
3. There is a significant difference of the pre-test and post-test scores of both groups.
4. That the use of mathematics manipulatives has been proposed as an intervention program to improve the Numeracy skills of the Kindergarten pupils.

**RECOMMENDATION**

After thorough analyses of the results, the following recommendations are stated as follows:

1. That the Education Program Specialist in Kindergarten should implement a program which will lead to the use of Mathematics Manipulatives in the classroom. They should encourage Kindergarten teachers to apply the method of Mathematics Manipulatives. They should provide technical support to the teachers who will implement Mathematics manipulatives in their teaching through training and seminar-workshops during INSET and LAC Sessions.
2. That the school heads should monitor the implementation of Mathematics manipulatives in the classroom and provide financial support to those teachers, who will implement the program.
3. That Kindergarten teacher should consider the use of Mathematics manipulatives in their teaching since its effectiveness in increasing pupils’ performance has been established.
4. That the pupils should use Mathematics manipulatives as their learning style to enhance their numeracy skills. It will also help them to be to improve more complex skills in Mathematics.
5. That further research and study should be conducted in the use of Mathematics Manipulatives and also include other variables such as motivation, perception, and attitude of the Kindergarten pupils.

**LITERATURE CITED**


