PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

Early Childhood Stimulation (ECS) through Play-based teaching to improve the Math skills of Children Aged 5 in Muday Charity Association kindergarten in Addis Ababa.

Abera Assefa

Assistant Professor Kotobe Education University and Ph.D candidate at Haromaya University

Abstract

The current study sought to investigate the effect of early childhood stimulation (ECS) through play-based teaching to improve the math skills of children aged 5 at the Muday Charity Association kindergarten in Addis Ababa, Ethiopia. The research was conducted between randomly selected experimental groups (n = 11, 5 years) and control groups (n = 11, 5 years), using two groups of design before and after the test. The results of the study depicted that there was a significant rank difference between the two groups after the intervention was carried out. Moreover, the Mann-Whiny U test result revealed that there were significant differences in post-test results between the Experimental and Control groups on Math skill results, (U=27.50, P=.028). Hence, teachers who are working with early childhood in general and math teachers, in particular, should be aware of the significance of play-based math teaching and should work on adopting different games and materials that align with specific math concepts.

Received in Sep. 2023 Revised from Nov. 2023 Accepted: Nov, 2023 Ethiopian Journal of Sport Science (EJSS), Volume IV, and Issue IV, Published by Ethiopian Sport Academy 2023.

"**Keywords**: "early childhood stimulation, play base teaching, Math skills of Children aged 5

1. INTRODUCTION

Ethiopian government schools are free; however, food, uniforms, and school supplies are not provided. Above all, food is a critical issue, as children from low-income families are unable to attend school (Mudy, 2021). Similarly, all of the students at Mudai Charity's Green Academy kindergarten come from impoverished families, and all but a few have only one parent — their mother. These families live in unimaginable conditions, without no running water, plumbing, or electricity. Coupled with, up to ten people are frequently housed in single-room shacks with dirt floors.

For all of its students and their mothers, the Muday Association has become a surrogate "extended family." The school

provides the children with three nutritious meals per day as well as education. Furthermore, Muday sponsors a Mother's Cooperative in which student mothers make scarves, jewelry, baskets, shoes, and ceramic goods in the compound's vicinity. As a result, the organization provides free educational services to the children and having provided a working environment for their mother, allowing them to earn money. In fact, this allows the mothers to earn a living and keeps them from resuming their prostitution lives. Muday Association also provides classes in hygiene, nutrition, and other life skills, as well as feeding the moms on the days that the cooperative meets. In addition, the Muday Association has also taken on the task of providing food, housing and education for children whose parents have either passed away or are no longer able to care for them.

In particular, when it comes to early childhood education, According to Rusdawati (2020), early childhood education is the provision of an effort to stimulate; guiding, nurturing, and providing learning activities that will result in the ability and skills of the child. Scalise, Daubert et al. (2018) found that preschoolers from low-income households lag behind preschoolers from middle-income households in numerical skills that underpin later mathematics achievement. This is clearly indicated at the very outset of this page that the kindergarten students in this specified school are from single-parent or impoverished families, and all but a few have only one parent—their mother, who is not able to care for the children.

In like manner, Clements and Sarama, (2007) traces that prekindergarten and kindergarten (aged 4–6 years) are widely acknowledged to be an especially important time for preparing pupils for success in math. These early education years represent an opportunity to narrow the gaps in attainment between children entering with varied number knowledge (Ginsburg et al., 2008; Scalise et al., 2017). Indeed, children who leave kindergarten with weak number skills may never catch up to those who enter first grade with good number competencies, whereas early interventions can place at-risk children onto an appropriate learning trajectory (Jordan et al., 2010).

Numerous research studies documented, in this regard, very young children's potential to engage with mathematical skills and understandings. These include enumeration, simple arithmetic, representation, problem solving,

measurement and spatial skills, geometric knowledge and logic in a range of circumstances (Diezmann & Yelland, 2000; Ginsburg & Golbeck, 2004; Hughes, 1986; Kilpatrick et al., 2001; Mulligan et al., 2006; Peters, 1992; Perry & Dockett, 2002; Sophian, 2004; Zur & Gelman, 2004).

Accordingly, it becomes clear that recent early mathematics interventions have incorporated playful activities to facilitate learning activities (Scalise et al., 2017). Playful learning activities and games broadly represent a developmentally appropriate mechanism for teaching young children in an engaging and supportive way (Hassinger-Das et al., 2017). These activities can also give children opportunities to practice their early numeracy skills (Ramani & Eason, 2015). When offered an engaging learning context and the opportunity for active participation, children tend to benefit more than those who are directly taught or allowed to freely explore without guidance (Hassinger-Das et al., 2017).

For example, Siegler and Ramani (2009) randomly assigned preschoolers to play a linear numerical board game, a circular numerical board game, or a set of non-playful, typical numerical activities (counting aloud, counting objects, identifying numerals) for four 15-20 minibus sessions over a 3-week period. The authors then found that children playing numerical board games surpassed children on the other two conditions by measuring their numerical size knowledge. Similarly, Ferrara and colleagues (2011) found that parent-child dyads who engaged in a playful, interactive block-building activity to assemble a target structure used significantly more spatial language than dyads that were given pre-assembled block structures to interact with for the same amount of time. These patterns of findings underscore that playful learning activities may lead to greater learning than engaging in non-playful activities, particularly for preschool-aged children.

Early childhood educators and psychologists, including Jean Piaget, Maria Montessori, Lev Vygotsky, Jerome Bruner and Eric Erikson, acknowledged the value of learning through play for cognitive and emotional development (e.g. Lauritzen, 1992; Fleet, 1990; Colliver & Veraksa, 2021; Donahoo, 2016). According to these authors, play is an activity, and games are tools for learning.

In this regard, the work of two psychologists, Piaget and Vygotsky, seems to

have an impact primarily on the current discussion. Piaget's theory suggests that most preschool-aged children (between two to seven years old) are at their preoperational level, where they learn to understand concepts through playing with objects (Piaget, 1962). Furthermore, Piaget explains that children develop their understanding of abstract concepts through concrete learning experiences, so that they can build their own ideas and principles without feeling pressured.

It makes more sense to consider Lev Vygotsky, the Russian psychologist, and his cultural-historical theory as a component of the broader idea of early childhood development and stimulation. According to Vygotsky's theory, children should be educated in the Zone of Proximal Development (ZPD), which is the stage at which they are nearly able to complete a task (Crain, 2005). Equally important, scaffolding—the short-term assistance parents or teachers provide for a child to complete a task—is equally significant, as Vygotsky.

Despite being aware, many Kindergarten teachers and family members lack a clear understanding of how to stimulate young children's mathematical learning. In this respect, Gifford (2004) pointed out in an early-year review of mathematics education that we simply "do not know much about the systematic help children learn". It is widely accepted that good mathematics teaching can positively impact learners in the school sector.

To this effect, preschools play a big part in getting children ready for primary school. Nonetheless, the children enrolling in Muday Charity Kindergarten are from low-income, illiterate single-parent households. This would not give children the readily available platform of support from others that they need. As a result, the current study sought to determine whether early childhood stimulation (ECS) through play based teaching can improve the math skills of children aged 5 at Muday Charity Association kindergarten in Addis Ababa.

2. OBJECTIVE

The current study sought to investigate the effect of early childhood stimulation (ECS) through play-based teaching to improve the math skills of 5-year-old children at the Muday Charity Association kindergarten in Addis Ababa, Ethiopia.

This Experiential study particularly focuses on:

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

- ✓ To compare the pre-test math skill results between the two groups of 5-year-old children at the Muday Charity Association kindergarten in Addis Ababa, Ethiopia
- ✓ To determine the post-test math skill result between experimental & Control groups of 5-year-old children at the Muday Charity Association kindergarten in Addis Ababa, Ethiopia

3. APPROACHES

This experiential study was conducted to look at whether a play-based teaching at kindergarten was significant between Experimental (n = 11, aged 5) and Control (n = 11, aged 5) groups, which were randomly selected. The research design employed in this study was a pretest-posttest design. Initially, a pre-test exam was taken by all participating children (N = 22) who were enrolled in two classrooms sharing the same grade level. The exam was prepared based on the grade level texts, in consultation with the grade level main teachers, and after reviewing a substantial amount of literature on early childhood math skills. The test was held at the end of the first semester of the year to incorporate what the students learned into the test.

The exam is dived into five major sections: 1) Number concepts and relations, 2) Number operations, 3) Geometry & Spatial sense, 4) Measurement & Comparison, & 5) Patterns (Siegler & Ramani, 2009). The pre-test was administered to the target groups after seeking the input of experts in the field of early childhood education and developmental psychology. Once the feedback was obtained, the questions were revised accordingly. The examination, comprising a total of twenty questions, was conducted over a span of two days, specifically one session in the morning and another in the afternoon, with five questions allocated to each session, thereby allowing for the comprehensive completion of the entire questionnaire within the specified timeframe.

During the test conducted in both pre- and post-tests, the instructions were read and explained to the children. The post-test was carried out in the same way as the pre-test despite the fact that the experimental group had taken 15 play-based intervention sessions. The duration of the intervention has been determined by reviewing multiple literature sources. One such example is the study conducted by Siegler and Ramani in 2009. It involved assigning children

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

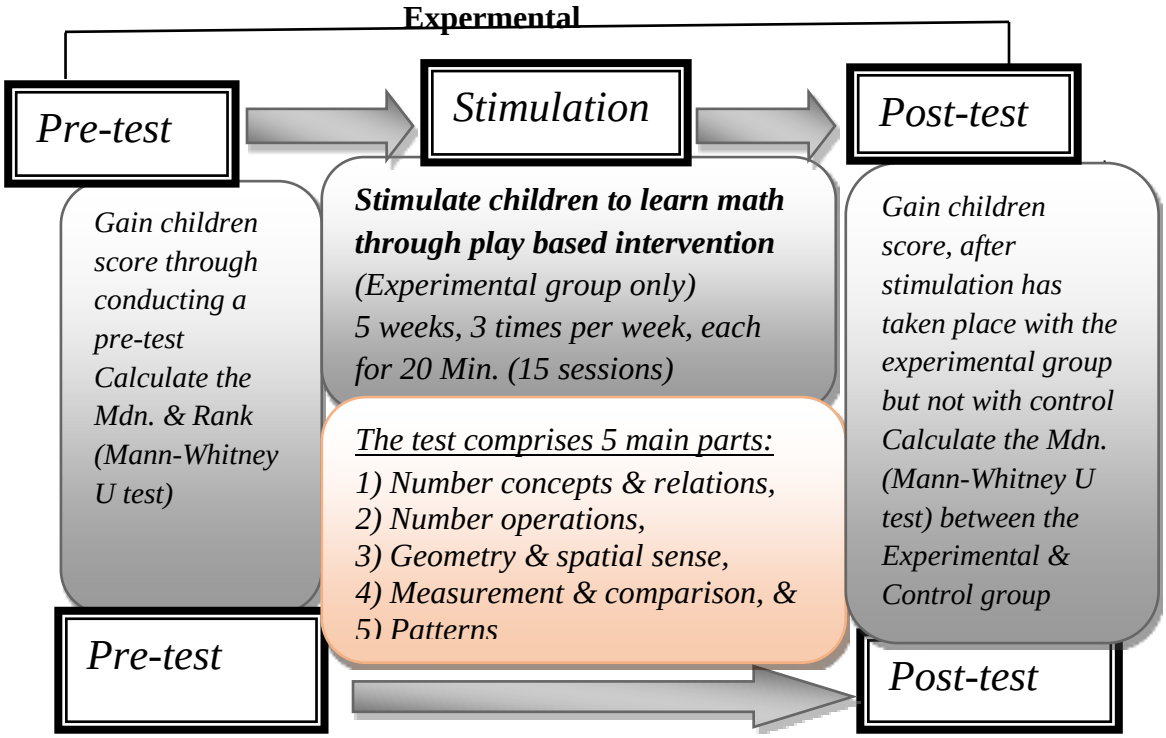
randomly to play a linear numerical board game, a circular numerical board game, or a set of non-playful, typical numerical activities (counting aloud, counting objects, identifying numerals) for four 15-20 min sessions over a 3-week period. Additionally, it is important to note that the play was organized in a structured manner, with the topics covered being relevant to the children's learning. The project is planned using a play-based learning model, which suggests that math skills can be developed through play and activities. It is believed that children's lives revolve around their play and activities. Some learn through actions while others learn through observation.

4. VARIABLES

In this study there are two variables, namely the independent variable (Experimental and Control groups) and the dependent variable (Math Skill test result). The entire study design and the methods used are summarized in Figure 1.

Figure 1

The research variables with the procedures



Pre-Intervention Reports

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

For about three weeks prior to the pre-test, the researcher helped the main teacher in the classroom. Assuming that this would give him the opportunity to familiarize himself and build a rapport. First, all participants, divided into two groups (N = 22), completed a pre-test examination. The examination was constructed based on texts of the given level, in coordination with the teachers of the given level, and after consulting a significant body of research on mathematics skills in early childhood. The examination is divided into five main sections: 1) Number concepts and relationships; 2) Number operations; 3) Geometry and Spatial Sense; 4) Measurement and Comparison; and 5) Patterns.

Before the pre-test was administered to target groups, the instrument was validated with the comments of experts for feedback. On the basis of the feedback received, the questions were amended. The examination, consisting of 20 questions, was completed in two days, one morning and one afternoon, with 5 questions in each session, in order to complete the whole set of questions in two days between breaks. During the examination, the teacher read and explained the instruction to the children individually and in groups by the main teacher. The test was conducted during their breaks and when they are free of other regular tests. The pre-test results of both groups are depicted in the table below 1.

Table-1.

Pre-test Math Skill Result of the Two Independent Groups, n=22

No	*Group -1 (n=11)*	*Pre-test result, (5 parts * each 4Quest.)=20points Group-1 Result*	No	*Group -2 (n=11)*	*Pre-test result , (5 parts * each 4 Questions)=20points*
1.	Berket Gashu	13	1.	Mikdas Tesfay	12
2.	Basufikad Desalege	16	2.	Tigist Habitamu	15
3.	Mihirate Fantahun	14	3.	Bastslot Ashanafi	15
4.	Simon Yohans	14	4.	Fisum Mulugata	12
5.	Zikaryas Getachew	12	5.	Helen Sisay	15
6.	Ananyas Salamon	17	6.	Eba Alemu	14
7.	Mikedas Tatak	12	7.	Galeni Kitaba	12
8.	Elias Webushet	12	8.	Nigusu Salamon	13
9.	Kidest Tesfaye	14	9.	Hirut Tarkagne	14
10.	Elias Webeshet	12	10.	Mignot Bihonge	12
11.	Edena Alex	16	11.	Kidus Yoseph	13

**In order to maintain anonymity for ethical consideration, the names of the children are changed*

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

5. INTERVENTION PLAN

a. Math: Age 4–5

By focusing on games, mathematics is integrated in a natural way, rather than being taught in isolation. And it is done through familiar objects that children are already interested in. As practical play advances children's learning, they engage in problem solving, argumentation and memory. During intentional play, opportunities for mathematical thinking and understanding are thought to appear naturally. In general, this intervention guideline is intended to address the development of children's mathematics, age-by-age and includes 5 main parts:

1) Number concepts & relations,
2) Number operations,
3) Geometry & spatial sense,
4) Measurement & comparison, &
5) Patterns

b. What the child will learn

The child will learn to:

- Count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.
- Use quantities and objects to add and subtract 2 single-digit numbers and count on or back to find the answer.
- Use everyday language to talk about size, weight, capacity, position, distance, time, and money to compare quantities and objects and to solve problems.
- Recognize, create, and describe patterns.
- Explore characteristics of everyday objects and shapes and use mathematical language to describe them.
- Figure 2: Research participants at intervention sessions

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

PLAY BASED INTERVENTION PLAN

Weeks	Time	Topic		Content	Instructional Materials
1st Jn. 3-7	1hrs. (3 sessions, 20min.each)	**1.**	**Number Concepts & Relations**	They will play games with all number formats (concrete sets, digits and number words), Practice counting with numbers 0–20 , Count backward from 6 to 1	Images, cards, concrete models, number cards, Blocks, charts, figures, corks, ping pong balls, figures, pictures.. etc
1st Jan. 3 - 7	1hrs. (3 sessions, 20min.each)	**2.**	**Number operations**	Do additions and subtractions in the range 1–6. Determine without counting the largest of three numbers in the range 0-10	
2nd Jan,10-14	1hrs. (3 sessions, 20min.each)	**3.**	**Geometry & spatial sense**	Name basic shapes, recognize familiar shapes and understand the shape is still the same shape if you make it larger or turn it to the side/ or down wards	Plastic sheets made of circles, triangles, rectangle shapes
2nd Jan,10-14	1hrs. (3 sessions,20min.each)	**4.**	**Measurement & comparison**	Make informal comparisons and estimates lay objects end to end to accurately measure the length of an object, use measurement words such as small, long, thick, tall etc	
3rd Jan,17-21	1 hrs. (3 sessions, 20min.each)	**5.**	**Patterns**	Patterns are things—numbers, shapes, images—that repeat in a logical way. Patterns help children learn to make predictions, to understand what comes next, to make logical connections, and to use reasoning skills. Hence, fix more complex repeating patterns, such as ABB or ABC pattern. Or pictures /images	Objects such as pencils , Colored cards , pictures, balls …etc Alphabet models..etc

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

6. ACTIVITIES PERFORMED TO IMPLEMENT THE 7. INTERVENTION

While preparing play-based math activities, the grade level math teaching text, teacher's feedback and different literatures were utilized. Particularly the play was organized considering the following five basic main themes: 1) Number concepts & relations, 2) Number operations, 3) Geometry & spatial sense, 4) Measurement & comparison, & 5) Patterns. Besides, ages, developmental needs, and interests of children were taken into consideration. On this base, 10 play-based math activities were prepared in line with the five basic themes.

To understand that the prepared activities were correctly selected, first, expert opinions were obtained from two main teachers & one academic working in the field of pre-school education. After receiving feedback from the teachers of the grade level and from the respective expertise, as well as including their feedback, the implementation of the activities was set as 15 play-based intervention sessions with only the experimental group, three sessions for each part with 20 minutes for each.

The intervention was also carried out after the children had had tea breaks. Above all, the instruments that are considered to be fundamental during the intervention sessions were prepared before the start of the program taking into account the five basic themes mentioned above. Of the two different classes at the same level, the experimental group was randomly identified.

Post- Intervention Report

The post-test was conducted in the same manner as the pre-test, following the completion of 15 play-based intervention sessions with only the experimental group, three sessions for each part, with the assistance of the main teachers. The following table 2 vividly depicts the post-test results:

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

Figure 4: *Play based math related activities*

	Group -1 *(n=11) Experimental Group*	*Post-test result , (5 parts * each 4 Questions)=20points* *Group-1 Result*		*Group -2* *(n=11)* *Control Group*	*Post-test result , (5 parts * each 4 Questions)=20points* *Group-2 Result*
No			No		
1.	Berket Gashu	14	1.	Mikdas Tesfay	13
2.	Basufikad Desalege	13	2.	Tigist Habitamu	14
3.	Mihirate Fantahun	17	3.	Bastslot Ashanafi	14
4.	Simon Yohans	13	4.	Fisum Mulugata	13
5.	Zikaryas Getachew	17	5.	Helen Sisay	15
6.	Ananyas Salamon	16	6.	Eba Alemu	14
7.	Mikedas Tatak	16	7.	Galeni Kitaba	13
8.	Elias Webushet	18	8.	Nigusu Salamon	14
9.	Kidest Tesfaye	15	9.	Hirut Tarkagne	15
10.	Elias Webeshet	16	10.	Mignot Bihonge	14
11.	Edena Alex	15	11.	Kidus Yoseph	15

Source: ***https://doodlelearning.com/maths/maths-activities/eyfs-maths-activities***

Table-2.

Post-test Math Skill Result of the Two Independent Groups, n=22

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

8. FINDINGS

Pre-Test Result

As indicated at the very outset of the objective section that the first intent of this Experiential study was to compare the pre-test math skill scores between Experimental -1 *(n=11, age=5)* and Control *(n=11, age=5),* Which are assigned by the Muday Charity Association kindergarten as two different classes of the same levels. Accordingly, A Mann-Whitney U test was conducted to compare whether there was a median difference in the pre-test Math results of the two groups α = 0.05 level of significance and the results are described here under:

Table -3

Descriptive statics of the pre-test result between the Experimental & Control group, n=22

		Statistics
Pre-Test Result		**Result of pre -Test**
Experimental	N	11
	Median	14.000
	Skewness	.563
	Std. Error of Skewness	.661
	Kurtosis	-1.056
	Std. Error of Kurtosis	1.279
Control	N	11
	Median	13.000
	Skewness	.196
	Std. Error of Skewness	.661
	Kurtosis	-1.776
	Std. Error of Kurtosis	1.279

Table-4

The Mann-Whitney U test Statistics pre-test result between the Experimental and Control Groups, n=22

pre-test Result	**Test Statistics**
	Result of pre -Test
Mann-Whitney U	54.000
Wilcoxon W	120.000
Z	-.441
Asymp. Sig. (2-tailed)	.659
Exact Sig. [2*(1-tailed Sig.)]	.699[b]
a. Grouping Variable: groups	
b. Not corrected for ties.	

Descriptive statistics of the pre-test result in Table-3 above indicated that the Experimental group (*Mdn*= 14.00) was greater than the Control group (*Mdn*= 13.00).

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

However, A Mann-Whitney U test statistics result in the above table 4 showed that the there was no significance Math Skill result difference (*U=54.00, p=.659* α = 0.05 level of significance) between the two independent groups.

Post-Test Result

After 15 play-based intervention sessions with only the experimental group, three seasons for each part that has 20Min were held and completed. For each period, the results of the experimental groups were compared to those of the control group and the following results were secured.

Table 5

The Mann-Whitney U test post- Statistics result between the Experimental and Control Groups, n=2

Statistics

Post-Test Result			Result of post -Test
Experimental	N	Valid	11
	Median		16.0000
	Skewness		-.237
	Std. Error of Skewness		.661
	Kurtosis		-.809
	Std. Error of Kurtosis		1.279
Control	N	Valid	11
	Median		14.0000
	Skewness		.000
	Std. Error of Skewness		.661
	Kurtosis		-1.111
	Std. Error of Kurtosis		1.279

Table-6

The Mann-Whitney U test Statistics post-test result between the Experimental and Control Groups, n=22

Test Statistics

post-test Result	Result of post -Test
Mann-Whitney U	27.500
Wilcoxon W	93.500
Z	-2.218
Asymp. Sig. (2-tailed)	.027
Exact Sig. [2*(1-tailed Sig.)]	.028b
a. Grouping Variable: groups	
b. Not corrected for ties.	

The Median Math test result in table -5 depicted that the group which has taken the intervention was (*Mdn*= 16.00) compared to control group (*Mdn*= 14.00) for those not receiving the 15 play-based Math skill intervention sessions that runs each 20 Min. A Mann-Whiny U test result in table- 6 showed that there was a significant difference

in post test result between the Experimental and Control groups on Math skill result,(*U=27.50, P= .028).*

From this, it is possible to conclude that the intervention was effective. Furthermore, the effect size was calculated to determine the impact of the results of the intervention and was found to be 0.473 Moderate, as Cohen (1988) classification of the effect sizes that are 0.1 (Small Effect, 0.3 (Moderate Effect), and 0.5 and above (Great Effect).

DISCUSSION OF THE FINDINGS

This project was undertaken to investigate early childhood stimulation (ECS) through play-based teaching to improve the math skills of 5-year-old children at the Muday Charity Association kindergarten in Addis Ababa, Ethiopia. In particular, it tried to look at whether play-based teaching at kindergarten was significant between experimental (n = 11, aged 5) and control (n = 11, aged 5) groups, employing a two-group pretest-posttest design. The results of the study depicted that there was a significant rank difference between the two groups after the intervention was carried out. Moreover, Mann-Whiny U test result revealed that there was a significant difference in post test result between the Experimental and Control groups on Math skill result, (*U=27.50, P= .028).* This finding is consistent with Ferrara and colleagues (2011) that playful learning activities may lead to greater learning than engaging in non-playful activities, particularly for preschool-aged children.

In this regard, it is crucial to focus on the fundamental developmental phases that enable children to comprehend abstract ideas through tangible learning experiences without feeling pressured. On the one hand, this would help to raise the relevance of play-based education for the development of mathematical abilities in early childhood, and on the other hand, as most of the children in this organization come from poor families and have a single illiterate parent, helping with such an appropriate approach at this age, would give them the opportunity to take lessons without much pressure and to understand easily In general, the better the lessons, the more enjoyable, developmentally appropriate and stress-free it will be.

To this end, this study would have been better if it had been conducted in larger settings, with a larger sample size, and

included other related factors thought to influence mathematics performance.

9. CONCLUSIONS AND RECOMMENDATION

9.1.Conclusions

Through the play, children can acquire affective features such as self-confidence and they can better express themselves, realize their talents, and develop social-cognitive skills. It is accepted largely that a child, whose needs for play is met, is healthy in terms of physical and mental aspects. It is also known that the characters of children who can cooperate with their friends and comply with the rules of the games develop positively during the play (Saracho, 2001). Most of all, this method is more effective especially in terms of acquiring and consolidating mathematical concepts. From this assertion, one can be safe to say that it is necessary and encouraging to enhance math skills at an early age through play play-based approach. As far as the Early Childhood Stimulation (ECS) through play-based teaching to improve the Math skills of Children is concerned, while children are studying on math activities through play based approaches, tended to improve other developmental areas in addition to cognitive development. The age level in which these children existing in also encourages to present the actual lessons in accordance with the real-life situation through making the lesson a play based rather than abstractions and stressful.

From this, it is possible to understand children learn and discover the world best through plays; it enables children to actively participate in the activities and learn by enjoying. Of course, it is not easy task to select the appropriate activities that well fits with the given contents, as it requires a lot of effort and creativity of the teacher throughout every lesson. Besides, the materials may not be accessible that would assist the teacher to address the given content easily. Selecting plays, which are age appropriate that addresses the very intents of the topic in line with the materials, is highly demanding task. In fact, play based approaches do have indispensable role in math skill development of early childhood.

9.2. Recommendation

This study is planned according to the play-based learning model. According to the play-based learning model, the activities are thought to contribute to the development

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

of math skills. However, selecting appropriate play activities that particularly address the intended objectives should be organized and integrated with math. In fact, this requires looking for the materials and activities that go hand in hand with math skills. Hence, teachers who are working with early childhood in general and math teachers in particular should be aware of the significance of play-based math teaching and should work on adopting different games and materials for this purpose.

In general, teachers should be encouraged to include play-based approaches to teaching, and they should be supported to create a conducive pedagogical environment for the child. Therefore, kindergarten teachers should be familiarized with the play-based teaching approach; teachers working in this charity organization should have short-term training on early childhood education on a regular basis in order to assist the lesson with the play-based teaching. It is worth noting that play-based assisting material should exist before the actual lesson commences. Consequently, educators ought to record various local plays or games and incorporate those that align with a specific subject matter considering age levels holds great importance.

PRINT ISSN (2960-1657)
ONLINE ISSN (2958-793X)
Volume IV, Issue I (2023)
Ethiopian Journal of Sport Science (EJSS)
https://ejss-esa.edu.et/index.php/ejss

EFERENCES

Advances in Social Science, Education and Humanities Research, Volume 554

Aubrey, C., Bottle, G. & Godfrey, R. (2003). Early Mathematics in the Home and Out-of-Home Contexts. *International Journal of Early Years Education*, 11(2), 91-103. *http://dx.doi.org/10.1080/09669760304708*

Bibok, M.B., Carpendale, J.I.M., & Muller, U. (2009). Parental scaffolding and the development of executive function. *New Directions for Child and Adolescent Development*, 123, 17-

Colliver, Y., & Veraksa, N. (2021). Vygotsky's contributions to understandings of emotional development through early childhood play. *Early Child Development and Care*, 191, 1026 - 1040. https://doi.org/10.1080/03004430.2021.1887166.

Crain, W. (2005). *Theories of development concepts and applications* (5th ed.), Pearson.

Diezmann, C. & Yelland, N. (2000). *Developing Mathematical Literacy in the Early Childhood Years Promoting Meaningful Learning: innovations in educating early childhood professionals*, 47-58. National Association for the Education of Young Children.

Donahoo, D. (2016). Playing games teaching human rights. *Ethos*, 24, 22.

Fleer, M. (1990). Scaffolding conceptual change in early childhood. *Research in Science Education*, 20, 114-123. https://doi.org/10.1007/BF02620486.

Güneş, F. (2015). Game-based learning approach. Turkish Studies, 10(11), 773–786. http://doi.org/10.7827/TurkishStudies.8499 Google Scholar

https://courses.lumenlearning.com/lifespandevelopment2/chapter/cognitive-development-2/

Hughes, M. (1986). *Children and Number: difficulties in learning mathematics*. Oxford.

Lauritzen, P. (1992). Facilitating Integrated Teaching and Learning in the Preschool Setting: A Process Approach. *Early Childhood Research Quarterly*, 7, 531-550. https://doi.org/10.1016/0885-2006 (92)90073-8.

Mbadakar, C., Jthakkar, P., Mhugar, S., Kukreja, P., Gassudani, H., Gokhale, N. (2017). Evaluation of the Relevance of Piaget's Cognitive Principles among Parented and Orphan Children in Belagavi City, Karnataka, India: A Comparative Study. *Int. J. Clinical Pediatric Dent.*; 10(4): 346-350. doi: 10.5005/jp-journals-10005-1463

Module 5: Early Childhood (2021, Nov23).

Paul, H. (2021). Brookes Publishing Co., Inc. https://brookespublishing.com/newsletters/early-childhood-newsletter/teach-young-children-math/

Perry, B. & Dockett, S. (2004). Mathematics in Early Childhood Education. *Research in Mathematics Education in Australasia*, 103-125.

Peters, S. (1992). Spatial Ability: an investigation into the spatial ability and play preferences of four-year-old children. *SAME papers*, 117-129.

Ramani, G. B., Scalise, N. R. (2018). It's more than just fun and games: Play-based mathematics activities for Head Start families. *Early Childhood Research Quarterly*, 50, 78–89. https://doi.org/10.1016/j.ecresq.2018.07.011

Rusdawati.(2020). The Early Childhood Mathematics Learning. Advances in Social Science, Education and Humanities Research, Volume 449. Proceedings of the International Conference of Early Childhood Education (ICECE 2019)

Saracho, O. N. (2001). Exploring your children's literacy development through play. *Early Child Development and Care*, 167, 103–114.

Sophian, C. (2004). Mathematics for the Future: developing a Head Start curriculum to support mathematics learning. Early Childhood Research Quarterly, 19(1), 59-81. http://dx.doi.org/10.1016/j.ecresq.2004.01.015

Thomas, R. M. (1979). *Comparing theories of child development*. Santa Barbara

Vogt, F., Hauser, B., Stebler, R., Rechsteiner, K., Urech, C. (2018). Learning through play—pedagogy and learning outcomes in early childhood mathematics. *European Early Childhood Education Research Journal*, 26(4), 589–603

Wortham, C. S. (2006). *Early childhood curriculum, developmental bases for learning and teaching* (4th ed.). Pearson.

Yıldız, V. (1999). The effect of cooperative learning and traditional teaching on the development of basic mathematical skills in pre-school children. *Education and Science Journal*, 23(111), 42–50.

Yu-Chia, H. (2021). Comparison and Contrast of Piaget and Vygotsky's Theories.

Zur, O. & Gelman, R. (2004). Young Children Can Add and Subtract by Predicting and Checking. *Early Childhood Research Quarterly*. 19(1), 121-137. http://dx.doi.org/10.1016/j.ecresq.2004.01.003