Play Based Learning Activities and Development of Fine Motor Skills Among Children with Intellectual Disabilities

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Abstract

This study was conducted with the aim of finding out the "Effect of play based learning activities on the development of fine motor skills among children with Intellectual Disabilities" with the age group 6-12 yrs. A multiple baseline single subject design was used. Sample for this study consists of three children with intellectual disability and attention deficit disorder as associated condition. Intervention was given for 36 sessions, using developed play package consisting of different activities with different materials. Data was collected using the developed tool and analyzed through visual representation. The results obtained from this study are highly striking with approximately 60% improvement from the baseline till end of intervention.

Keywords: *Play, fine motor skills, Moderate Intellectual Disability*.

Introduction

Admission to learning is a vital quality concern for attaining the right to education for each and every child. For children with disabilities, especially children with intellectual disabilities, this access can be provided by bringing about changes in existing curriculum goals, methods, materials and evaluations. All academic and training activities have noteworthy impact in the development of talent and abilities of students. Mathematical concepts are one of the most effective training materials in these courses. The simplest clarification of the reason for learning mathematics is that mathematics is mutual with our lives and usually the world around us. Mathematics is one of the major keys to understanding the world. Galileo believed that "nature speaks with the language of mathematics (Reys, et al., 2002).

Though, the No Child Left Behind Act of (2001) entails that all students, regardless of their disability, should be involved and make satisfactory yearly progress in high-stakes assessments. With the inclusive education initiatives of the Sarva Shiksha Abhiyaan, children with mild, moderate intellectual disabilities are being increasingly included in regular education classes today. While they are physically included in the classes, they are not able to be included in the learning processes. This may be because of various reasons related to their slower pace of intellectual development. However, if they are enabled to develop their fundamental skills at their own rate using different strategies, their inclusion in the learning process in the classroom can also be facilitated. In this context the researcher has taken up a research problem entitled

"Effect of Play Based Learning on Development of Basic Numerical Concepts among Children with Moderate Intellectual Disability".

Researcher has reviewed a number of studies highlighting the standing of instruction on learning mathematical concepts among children with Intellectual disabilities, learning disabilities, Autism, Multiple disabilities etc. Therefore, it is an area in need of examination and better understanding, hence is the focus of this study.

Objectives

I. To develop tools for assessing fine motor skills among children with intellectual disability.

II. To develop play-based activities tool/ package for children with intellectual disability.

III. To find out the effect of play based learning on development of fine motor skills among children with moderate intellectual disability.

Research Hypothesis

On the basis of the objectives the researcher formulated the following hypothesis

- Play based learning can improve development of fine motor skills among children with moderate intellectual disability.

Research Questions

1) What is the progress in development of fine motor skills with provision of manipulative play-based intervention for children with intellectual disabilities?
2) What is the minimum time child with intellectual disability take to start showing progress in fine motor skills?

Methodology

Single subject or single case research design was employed for the present study. The design was used to examine the "Effect of Play Based Learning Activities on Development of Fine Motor skills Among Children with Moderate Intellectual Disability".

Sample for the Study

For the present study the researcher used purposive sampling technique to select the sample. The sample for the present study consisted of three children with moderate intellectual disability from a special school.

Tool and Instructional Material Used

1. Checklist for Assessing Fine Motor Skills, developed for assessing fine motor skills of children with moderate intellectual disability. Before development of tool the researcher has done an extensive review of literature. The Fine motor tool was developed, by referring to items given on the standardized tools like FACP, VAPS, BASIC MR. validity and reliability for the tools were obtained.

2. Development of Play Package This package has been developed using selected play activities, which will enhance the development of fine motor skills of the children with moderate intellectual disability in the age group 6-12 years. This will include activities like;

- Fitting beads into straw with numbers given.

- Nuts and bolts matching/fixing.
- Button sorting.
- Learning basic numerical concepts using mathematical peg board.
- Building blocks.

Collection of Data

Purposive sampling technique was used by the researcher. A total number of three subjects were selected for the study. Checklist for fine motor skills was used to assess baseline scores. After attaining consistency (pretest score) of subject's intervention was given.

Data Analysis: Graphical representation of scores for visualization of data as is applicable for single subject designs (Parson and Baer, 1978) has been used in this research study.

4.3 Analysis and Interpretation for Research Question one.

RQ1: What is the progress in development of fine motor skills with provision of play-based intervention for children with intellectual disabilities?

Subject 1, 2 and 3 were provided play-based intervention for 36, 33 and 30 sessions respectively (see Table 6). Their scores on pre-tests and post tests on the checklist for fine motor skills are separately shown in tables 5a, 5b and 5c respectively. These scores for each subject are shown visually in the corresponding figures 4a, 4b and 4c respectively.

Table 5a Scores of Subject I (S.K) for Fine Motor Skills (Max. Score = 110)

Session	Data collection periods.	Obtained Score	%
1	Baseline 1	34	30.90
2	Baseline 2	34	30.90
3	Baseline 3	34	30.90
4	Baseline 4	34	30.90
5	Posttest 1 (after 3 int. sessions)	38	34.54
6	Posttest 2 (after 6 int. sessions)	43	39.0
7	Posttest 3(after 9 int. sessions)	49	44.55
8	Posttest 4 (after 12 int. sessions)	54	49.0
9	Posttest 5 (after 15 int. sessions)	58	52.01
10	Posttest 6 (after 18 int. sessions)	63	57.01
11	Posttest 7 (after 21 int. sessions)	68	61.81
12	Posttest 8 (after 24 int. sessions)	72	65.45
13	Posttest 9 (after 27 int. sessions)	78	70.09
14	Posttest 10 (after 30 int. sessions)	83	75.45
15	Posttest 11 (after 33 int. sessions)	87	79.09
16	Posttest 12 (after 36 int. sessions)	90	81.81

Fig. 4a Graphical Representation of Fine Motor Skills Score for Subject 1 (SK)

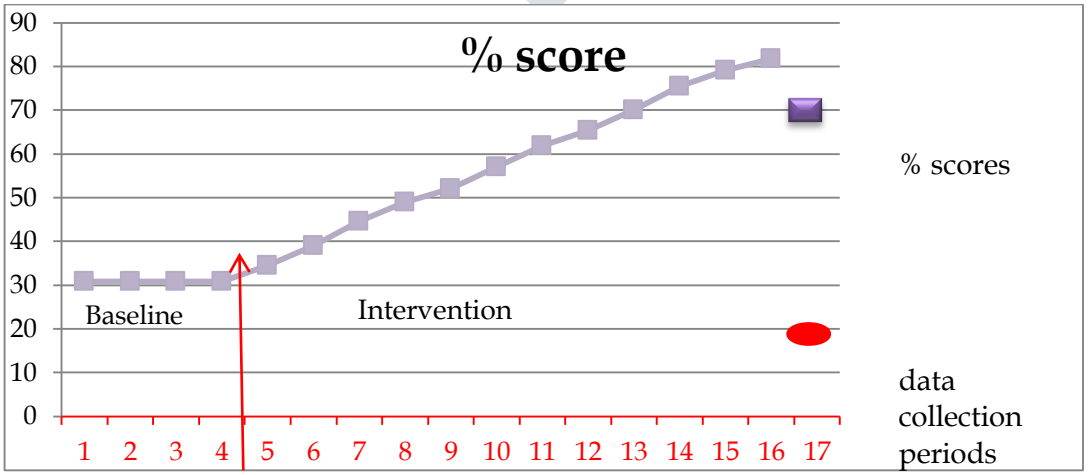


Table 5b Scores of Subject II (SSB) for Fine Motor Skills (Max. Score = 110)

Session	Data collection periods.	Obtained Score	% score
1	Baseline 1	37	33.06
2	Baseline 2	37	33.06
3	Baseline 3	39	35.45
4	Baseline 4	39	35.45
5	Baseline 5	39	35.45
6	Posttest 1 (after 3 int. sessions)	41	37.27
7	Posttest 2 (after 6 int. sessions)	42	38.50
8	Posttest 3(after 9 int. sessions)	45	40.09
9	Posttest 4 (after 12 int. sessions)	50	45.45
10	Posttest 5 (after 15 int. sessions)	55	50.01
11	Posttest 6 (after 18 int. sessions)	58	52.72
12	Posttest 7 (after 21 int. sessions)	66	60.0
13	Posttest 8 (after 24 int. sessions)	69	62.72
14	Posttest 9 (after 27 int. sessions)	77	70.0
15	Posttest 10 (after 30 int. sessions)	81	73.63
16	Posttest 11 (after 33 int. sessions)	86	78.18

Fig. 4b Graphical Representation of Fine Motor Skills Score for Subject 1I (SSB)

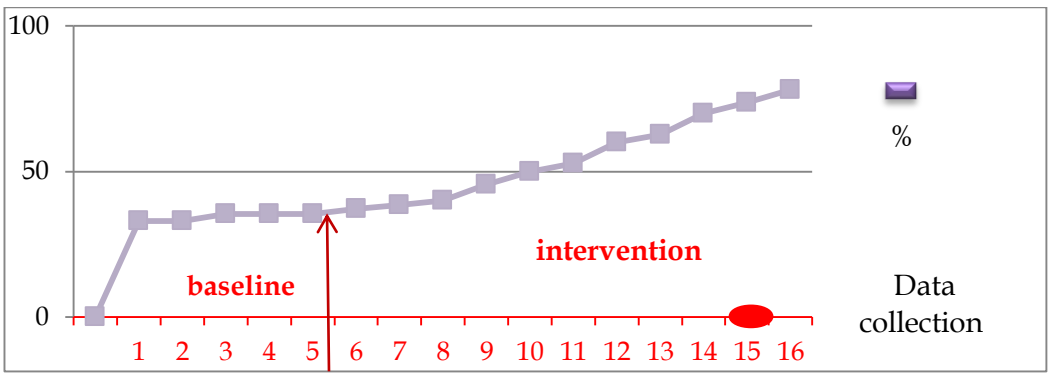
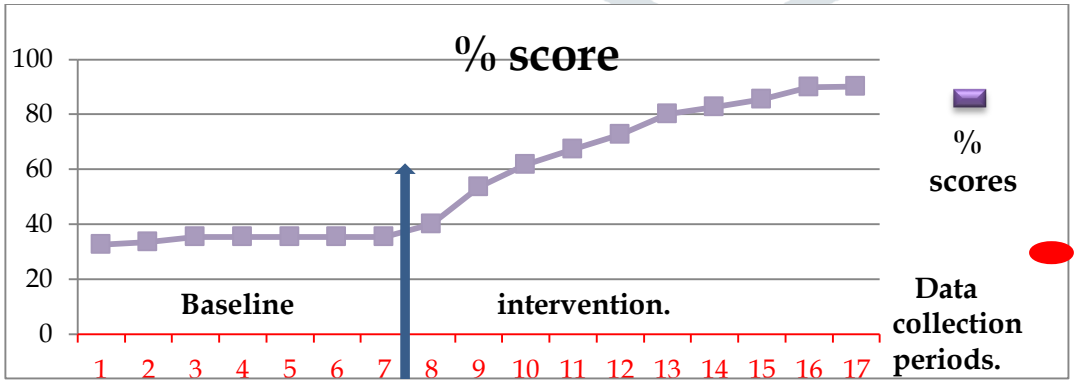


Table 5c Scores of Subject III (N.K) for Fine Motor Skills (Max. Score = 110)

Session	Data collection periods.	Obtained Score	% score
1	Baseline 1	36	32.72
2	Baseline 2	37	33.63
3	Baseline 3	39	35.45
4	Baseline 4	39	35.45
5	Baseline 5	39	35.45
6	Baseline 6	39	35.45
7	Baseline 7	39	35.45
8	Posttest 1 (after 3 int. sessions)	45	40.09
9	Posttest 2 (after 6 int. sessions)	59	53.63
10	Posttest 3(after 9 int. sessions)	68	61.81
11	Posttest 4 (after 12 int. sessions)	74	67.27
12	Posttest 5 (after 15 int. sessions)	80	72.72
13	Posttest 6 (after 18 int. sessions)	88	80.0
14	Posttest 7 (after 21 int. sessions)	91	82.72
15	Posttest 8 (after 24 int. sessions)	94	85.45
16	Posttest 9 (after 27 int. sessions)	98	89.9
17	Posttest 10 (after 30 int. sessions)	100	90.09

Fig. 4c Graphical Representation of Fine Motor Skills Scores for Subject III (N.K)



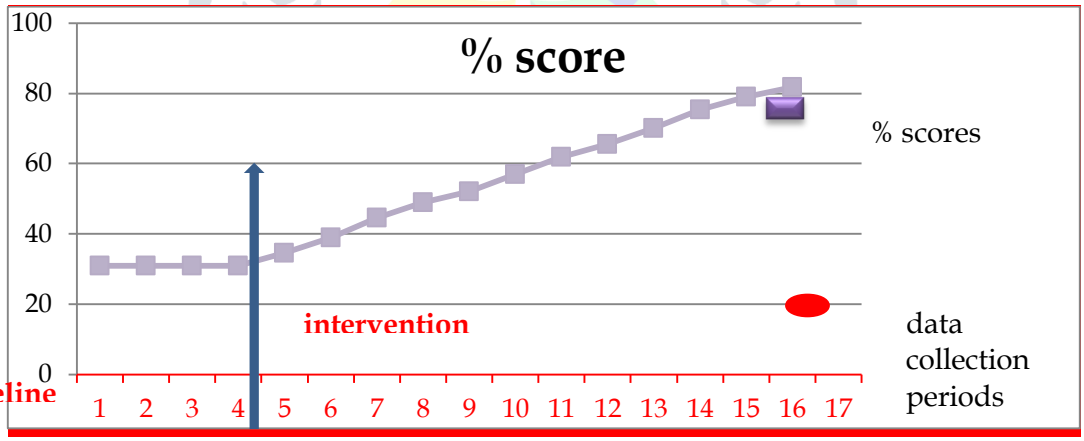
It can be seen from the tables 5a, 5b and 5c as well as the figures 4a, 4b and 4c, that each of the subjects showed that the baseline performance was stable at about 30%, 35% and 35 %. All three subjects showed an improved performance right from the first posttest which was conducted after 3 intervention sessions. Subject 1 showed improvement by 04%, subject 2 improved by 02% while subject 3 improved by 05%. Each of the

subjects showed consistent increase in their scores on fine motor skills as the intervention sessions progressed. Table 6 gives the progress in post-test score from the baseline average for each subject at three time points after 10, 20 and 30 intervention sessions. The effect of intervention in improving the fine motor skills is clearly seen due to the multiple baseline design in this single subject design study and is presented in figure 5. It can be seen from table 6 that each of the subjects was able to make a progress in development of fine motor skills of about 60% (from baseline of around 30% to around 90% after 30 - 36 intervention sessions).

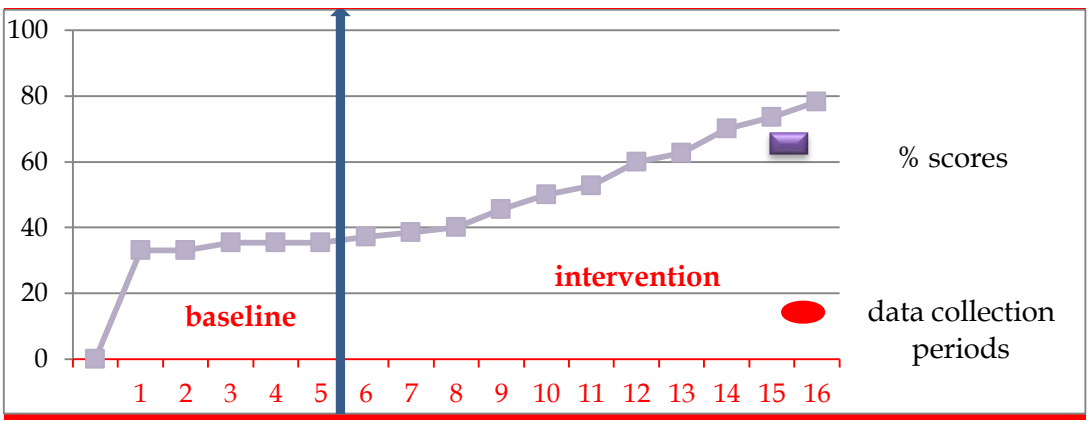
Table 6 Progress of Each Subject in Fine Motor Skills throughout the Intervention Sessions

Time point	**Subject 1**	**Subject 2**	**Subject 3**
Average baseline	30%	35%	35%
First post test	**34.54%**	**37.27%**	**40.09%**
After 10 intervention sessions	44.55	40.09	61.81
After 20 intervention sessions	61.81	60.0	82.72
After 30 intervention sessions	75.85	73.63	90.09
After 33 intervention sessions	79.09	78.18	-
After 36 intervention sessions	81.81	-	-

Fig. 5 Multiple Baseline Design for Three Subjects Showing Effect of Intervention on Improvement in Fine Motor Skills

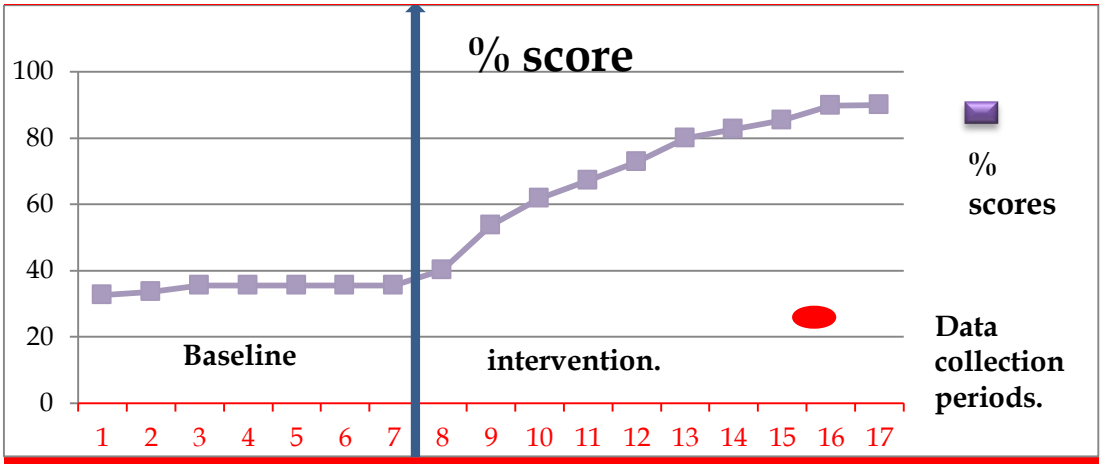


Subject 1 (SK)



Subject 2 (SSB)

Subject 3 (NK)



Analysis and Interpretation for Research Question Four

RQ4. What is the minimum time that a child with intellectual disabilities takes to start showing progress in fine motor skills area?

It can be seen from table 6 that all the three students having intellectual disability started showing improvement from the first posttest itself, which was conducted after the first three intervention sessions. Subject 3, who had moderate intellectual disability but no associated condition showed the highest improvement (around 5%) compared to subjects 1 and 2, who had moderate intellectual disability with associated condition as Down's syndrome. Between subjects 1 and 2, the boy child (subject 1) showed a higher improvement (around 4%) as compared to the girl child (subject 2) showed 2%. Although there were differences in the levels of improvement based on presence of associated condition and gender, the minimum time that a child with intellectual disability can be expected to show an improvement in fine motor skills after manipulative play based training was seen to be three two-hour sessions.

Findings of this Study

Manipulative play-based training improved fine motor skills for all three students with moderate intellectual disability. The use of multiple baseline design in this single subject experimental research study showed clearly that the improvement in skill was due to the intervention because for each subject, improvement in performance on the outcome variables was seen only after commencement of the intervention (Figures 4) This finding is in line with the findings of Funkhouser (1995) taught basic numerical concepts to K–1 student evidencing LD by employing a manipulative device. Students were presented with a vertical display of a rectangle divided into five equal squares, with dots or jellybeans placed within the squares in order to represent the numbers 0 through 5. During the course of instruction, the students constructed identical configurations that represented the numbers 0 through 5, combined configurations to discover sums between 0 and 5, and used the + sign to create sums between 0 and 5. At the end of the four-week intervention period, all

students displayed a 90 percent or greater level of mastery in recognizing and matching the numbers 0 through 5 and adding sums up to 5.

All three students showed approximately 60% improvement from their baseline till the end of the intervention period which gave 30-36 hours of play based training. This finding is important because it shows that about 7 weeks or nearly 2 months of training at elementary age can improve the fine motor skills for students with moderate intellectual disability, irrespective of gender and even in the presence of associated conditions.

➢ Suggestions for Future Research

- The time period for intervention i.e. thirty-six sessions was showing at least 60% improvement. It is possible that increasing the time duration of can further increase the improvement. Future studies with more intervention sessions can find this.
- Future studies using group designs need to be done to generate generalizable evidence.
- This study used a single subject design and found that 30 – 36 sessions was successful in improving the fine motor skills for students with moderate intellectual disabilities even with associated condition. Using this finding as a guide, this study can now be expanded to a group experimental study design with fixed number of interventions to obtain generalizable evidence as is necessary for application of these research findings in real school situation.
- This study can also be repeated using single subject design itself and expanded for the types of associated disability conditions as well as more severe degrees of intellectual impairment.
- Same kind of studies should be conducted to address other skills like social skills, recreation and leisure, domestic, cognitive skills etc.

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