



Effect of Cognitive Orientation to Daily Occupational Performance (CO-OP) to improve handwriting in children with learning disability

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Abstract

Learning Disabilities (LD) describe a group of problems that affect a child's ability to master school tasks, process information, and communicate effectively. Handwriting competence is frequently affected, consequently affecting the legibility of written output and thus affecting academic achievement. The purpose of this study is to determine the effect of cognitive orientation to daily occupational performance (co-op) to improve handwriting in children with a learning disability. This study was done with a quasi-experimental design and convenient sampling techniques were adopted to select the LD children with Handwriting difficulty. A total of thirty (30) children were selected according to inclusion and exclusion criteria, they were divided into two groups 15 subjects in the control group who underwent conventional occupational therapy, and 15 subjects in the experimental group who underwent (co-op) based therapy. The pre-test and post-test were evaluated by the Evaluation Tool of Children's Handwriting-Manuscript (ETCH-M) The statistical analysis showed significant improvement in both groups when compared to the post scores of both groups, there was high statistical significance shown in the experimental group. Analysis revealed that the CO-OP approach had a statistically significant effect compared to conventional occupational therapy intervention in children with LD.

Keywords: Cognitive orientation to daily occupational performance (CO-OP), Learning disability Handwriting.

Introduction

Occupational therapy in pediatrics:

Childhood is hopeful, joyful, and ever-new. The spirit, playfulness, and joy of childhood create the context for occupational therapy with children.

(Case-Smith & O'Brien, 2010). Occupational therapists develop interventions based on analysis of the child's behaviors and performance and the context of the occupations in which the child engages (Case-Smith & O'Brien, 2010). We determine how performance is influenced by

impairment and how the environment supports or restricts their performance (Case-Smith & O'Brien, 2010).

Learning disability: Children with a learning disability have average or above-average intelligence and are provided with proper learning opportunities like their peers but still, there are difficulties faced in their academic potential and educational performances (Case-Smith & O'Brien, 2010).

“Stigma, underachievement, and misunderstanding of LD continue to be stubborn barriers for parents and children to overcome. If LD is left unaddressed, millions of individuals risk being left behind, burdened by low self-esteem, subjected to low expectations, and diminished in their ability to pursue their dreams.”

-James H. Wendorf, Executive director, National Center for Learning Disability

Cognitive orientation to daily occupational performance(CO-OP): CO-OP is based on theories of motor learning, cognitive behaviouristic theories, learning, and problem-solving theories

Through the use of a global cognitive strategy, the child strives to solve occupational performance problems:

Goal: What do I want to do?

Plan: How am I going to do it?

Do: Do it!

Check: How well did my plan work? Do I need to revise my plan?

Aim of the study:

To determine the effect of cognitive orientation on daily occupational performance (CO-OP) to improve handwriting in children with a learning disability.

Objectives of the study:

- 1) To identify the children with a learning disability (LD)
- 2) To identify the effect of conventional occupational therapy on handwriting among control group participants using ETCH-M
- 3) To identify the effect of cognitive orientation to daily occupational performance (CO-OP) on handwriting among experimental group participants using ETCH-M
- 4) Comparing the effect of cognitive orientation on daily occupational performance (CO-OP) with conventional occupational therapy on handwriting between the experimental group and control group using ETCH-M.

Research hypothesis:

There will be a statistically significant difference in the effect of (CO-OP) when compared to conventional occupational therapy to improve handwriting in children with a learning disability.

Research design:

Quasi-experimental type with a quantitative method was adopted

Sample technique:

A convenient sampling technique was used.

Sample size:

Totally 30 subjects were taken in this study, the subjects were divided into two groups experimental and control groups.

- The control group consists of 15 subjects.
- The experimental group consists of 15 subjects.

Sample Setting:

Samples are selected from the Pax Child Plus Paediatric Clinic, which is located in Kamakoti Nagar, Pallikaranai, and Saveetha pupil eco-school, Poonamallee.

Variables:

Independent Variables: COOP approach.

Dependent Variables: Handwriting

Selection Criteria:

Inclusion Criteria:

- Age group: 6 to 12 years
- Participants of gender, both male and female
- Children with a Learning disability,
- Difficulty in handwriting.

Exclusion Criteria:

- Children diagnosed with conditions other than Learning disability such as Autism, Intellectual disability, ADHS, etc.
- Children with good handwriting.
- Children with other neurological disorders.

Tools used:

The Evaluation Tool of Children's Handwriting-Manuscript (ETCH-M)

The procedure of the study:

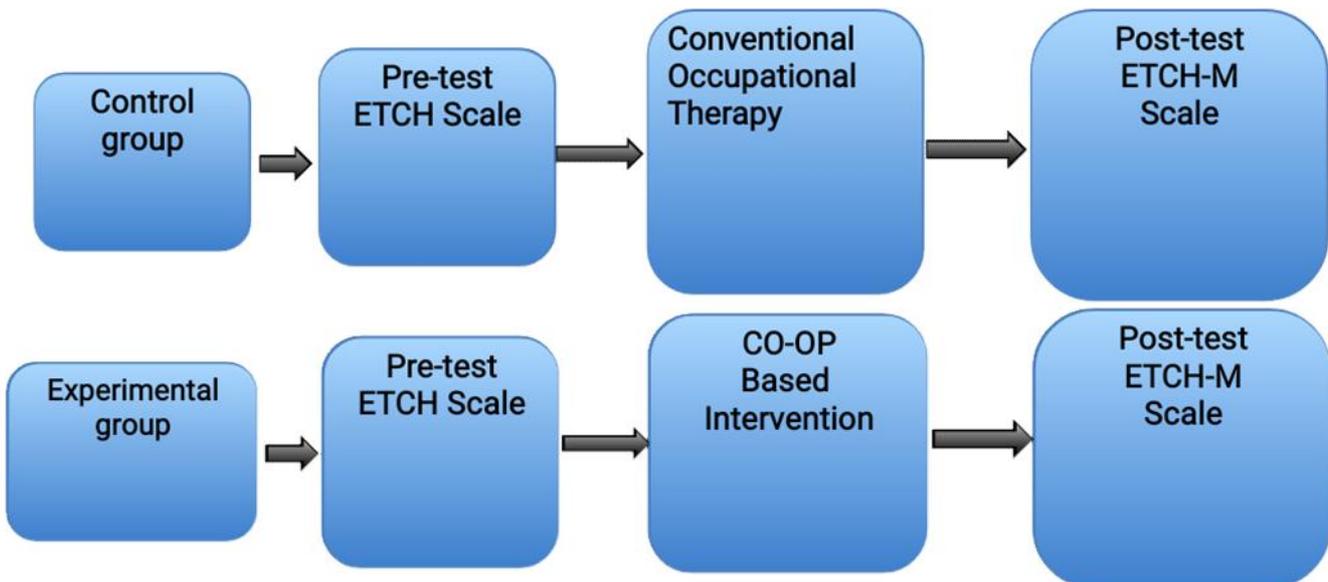
Based on the inclusion and exclusion criteria thirty (30) samples were selected to participate in

the study. Before the intervention process had begun, written consent was obtained from the caregivers of the participants. Based on a convenient sampling technique the participants were divided into two groups (15 members in the experimental and 15 members in the control group). The ETCH scale was used as an administration tool as part of the pre-test in the 1st session. A total of 36 intervention sessions were conducted for each participant where each session was conducted for 45 minutes, three sessions were conducted in a week, over 3 months (36 sessions total). The Final session was used for the administration of the post-test. The pre and post-test values are used to find out the result of the study.

Intervention protocol:

The goal of the study was to improve handwriting in children with learning disability. The experimental group underwent a 45 minutes session that included

- Letter and number formation activities
- Word formation activities
- Letter, Word, and Number Spacing activities
- Near point copying and far point copying activities
- Dictation and Sentence composition activities



Data analysis and Result

Table No: 1 Statistical analysis of pre-test and post-test in the control group

Group		Mean	N	Z value	p-value
Control group	Pre_Word	69.9333	15	-2.000	0.0046*
	Post_Word	70.2	15		
	Pre_Letter	71.6667	15	-2.121	0.034*
	Post_Letter	72.0667	15		
	Pre_Num	69	15	-2.14	0.032*
	Post_Num	70	15		

* Significant at 5% alpha level

Table 1 shows the statistical analysis between the pre-test and post-test of the control group. Since the p-value is lesser than 0.05 in all components (Word, Letter, and Number), an alternate hypothesis is accepted. Hence, there is a

statistically significant difference between pre-test and post-test scores in the Control Group of the ETCH scale. This suggests that the intervention received by the control group had improved.

Graph:1 Comparison of pre-test and post-test scores of the control group

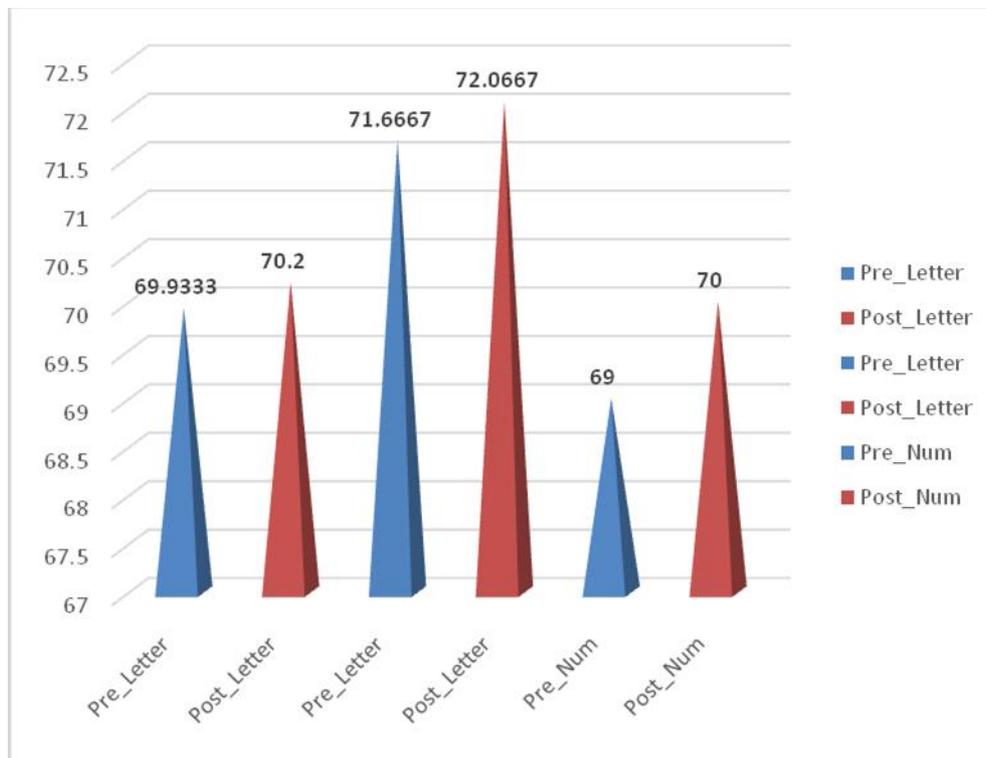


Table: 2 Statistical analysis of pre-test and post-test in the experimental group

Group		Mean	N	Z value	p-value
Experimental group	Pre_Word	70.4667	15	-3.434	0.0001*
	Post_Word	75.9333	15		
	Pre_Letter	72.2	15	-3.508	0.000*
	Post_Letter	77.7333	15		
	Pre_Num	69.7333	15	-3.441	0.001*
	Post_Num	79.2	15		

***Significant at 5% alpha level**

Table 2 shows the statistical analysis of the pre-test and post-test of the experimental group. In the Experimental group, since the p-value is less than 0.05 in all components (Word, Letter, and Number), an alternate hypothesis is accepted. Hence, there is a statistically significant

difference in the Experimental Group between pre-test and post-test scores of ETCH scale. This suggests that the intervention received by the experimental group had a significant improvement

Graph: 2 Comparison of pre-test and post-test scores of the experimental group

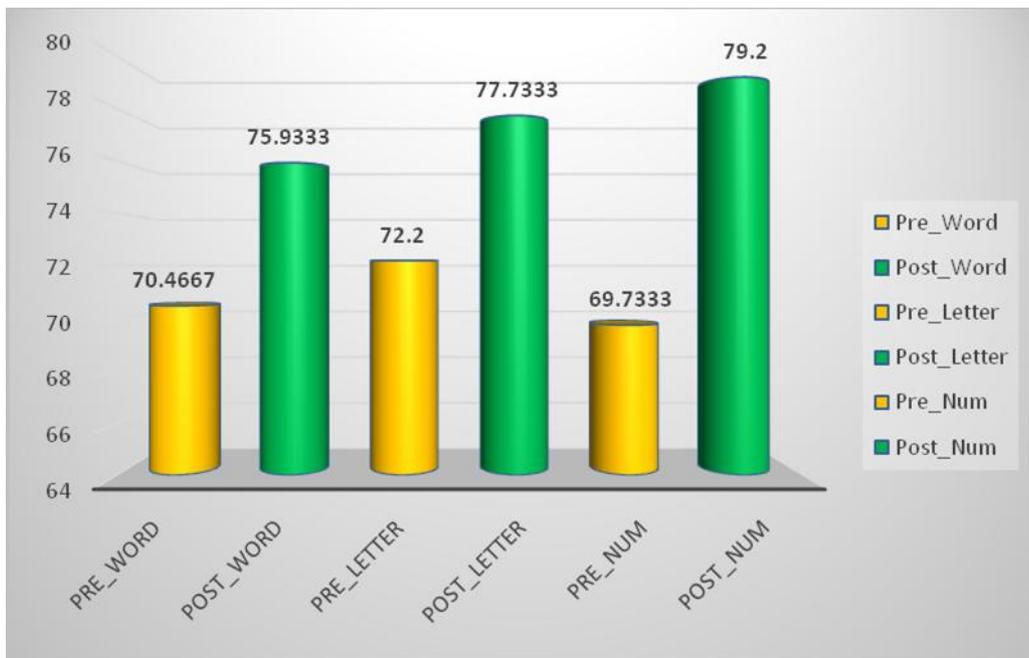


Table: 3 Statistical analysis of the post-test scores of the control and experimental group

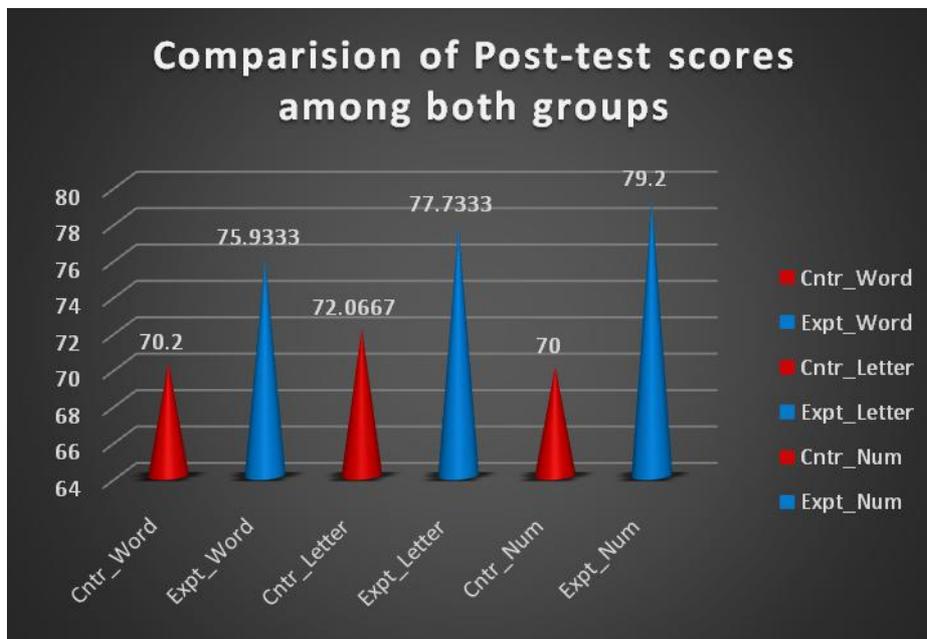
		Mean	N	Z value	p-value
Post-test	Cntr_Word	70.2	15	2.03243	0.04236*
	Expt_Word	75.9333	15		
	Cntr_Letter	72.0667	15	1.99095	0.0466*
	Expt_Letter	77.7333	15		
	Cntr_Num	70	15	2.05316	0.04036*
	Expt_Num	79.2	15		

***Significant at 5% alpha level**

Since the p-value is lesser than 0.05 in all components (Word, Letter, and Number), the alternate hypothesis is accepted. Hence, there is a statistically significant difference in post-test scores between the Experimental and Control

groups of the ETCH scale. This suggests that the intervention received by the experimental group had more improvement when compared to the control group.

Graph: 3 Comparisons of post-test scores between control and experimental group



Discussion

The purpose of this study is to examine the effects of CO-OP intervention in hand-writing among children with a learning disability

Table: 1 and Graph:1 show the statistical analysis between the pre-test and post-test of the control group

- **Mean scores** of Word components 69.9333 and 70.2, Letter components 71.6667 and 72.0667, Numeral components 69 and 70
- **'Z' value** of Word component -2.000, Letter component -2.121, Numeral component -2.14
- **p-value** of Word component 0.0046*, Letter component 0.034*, Numeral component 0.032*

which indicates that there is a statistically significant difference between pre-test and post-test scores in the control group. This indicates that there was a statistical improvement in the control group after conventional occupational therapy. This correlates with the study of **Susan Koziatek** in the year **2003 (R3)**. The title of the study was “**Pencil Grips, Legibility, and Speed of Fourth-Graders' Writing in Cursive**”. The findings of the study showed no statistically significant differences in legibility and speed scores among the four mature pencil grips strengthens and the hand function activities did not have an impact on the handwriting

Table 2 and Graph 2 show the statistical analysis of the pre-test and post-test of the experimental group.

- **Mean scores** of Word components 70.4667 and 75.9333, Letter components 72.2 and 77.7333, Numeral components 69.7333 and 79.2
- **'Z' value** of Word component -3.434, Letter component -3.508, Numeral component 3.441
- **p-value** of Word component 0.0001*, Letter component 0.000*, Numeral component 0.001*

which indicates that there is a significant improvement between the pre-test and post-test in the experimental group. This suggests that the (CO-OP) based intervention received by the experimental group had significant improvement. This correlates with the study of **Rajul Daftary, et. al.**, in the year **2015 (R2)**. This study was conducted to determine the efficacy of cognitive orientation on occupational performance in children with handwriting difficulties. During the intervention session, the CO-OP approach (plan-do-check) method was used to improve handwriting skills in these children. The result shows that all 8 children had significant improvement on ETCH test. This study promotes the use of CO-OP in occupational therapy intervention for the improvement of handwriting performance skills.

Table 3 and Graph 3 show the statistical analysis of the post-test between the control group and the experimental group

- **The mean scores** of the Word component were 70.2 in the control group and 75.9333 in the experimental group, the Letter component was 72.0667 in the control group and 77.7333 in the experimental group, the Numeral component was 70 in the control group and 79.2 in the experimental group.
- **'Z' value** of Word component 2.03243, Letter component 1.99095, Numeral component 2.05316
- **p-value** of Word component 0.04236*, Letter component 0.0466*, Numeral component 0.04036*

Hence, there is a highly statistically significant difference in post-test scores between the Experimental and Control groups. This suggests that the intervention received by the experimental group had more improvement when compared to the control group. The results were similar to the previously conducted study by **Blessy Johnson** in the year **2018 (R1)**. This study was conducted to evaluate the effectiveness of Cognitive Orientation to Occupational Performance (CO-OP) to improve handwriting performance in

children with Developmental Coordination Disorder (DCD). The children in the experimental group were given CO-OP intervention, whereas the control group was given handwriting practice as homework. The duration of the intervention was 45 minutes once a week. The result indicates there is a significant increase in the CO-OP group compared to the control group. There was a significant improvement in word, letter, and numeral legibility post-intervention in comparison to the control group.

Conclusion

The study investigated the impact of the CO-OP approach to improving handwriting use among children with Learning disabilities.

Thirty (30) children with Learning Disability (LD) were included of which 15 children underwent conventional occupational therapy intervention and 15 children were trained for CO-OP-based activities. The results found that a statistically significant difference was present in the scores of pre-tests and post-test for the control and experimental group. It revealed that occupational therapy with CO-OP-based intervention was effective in handwriting legibility in children with LD. Further analysis revealed that the CO-OP approach had a statistically significant effect compared to conventional occupational therapy intervention in children with LD. The findings of this study suggested that the CO-OP approach showed improvement in handwriting skills and can be incorporated with occupational therapy intervention in children with LD.

Limitation:

-) The study had a small sample (30) of children with a learning disability.
-) The study had a lesser number of sessions

Recommendations:

-) The study can be replicated in a large sample size to generalize the results
-) The study can be done for other conditions
-) The study can be increased to many sessions to provide even more therapeutic effects.

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