



HAND EXERCISE ON HANDWRITING LEGIBILITY OF PUPILS WITH DYSGRAPHIA IN IKERE EKITI LOCAL GOVERNMENT AREA, EKITI STATE

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Abstract: *This study examines the effect of hand exercise on the handwriting legibility of pupils with dysgraphia in Ikere Ekiti Local Government Area, Ekiti State, considering two moderating variables: gender and self-esteem. The study adopted a pretest-posttest control group quasi-experimental research design. The multistage sampling procedure was used to select participants. The instruments used include the Dysgraphia Screening Test & NST, Writing Assessment, Self-esteem Scale, and Wesch Intelligence Scale for pupils. Treatment lasted six weeks, and data were analyzed using Analysis of Covariance (ANCOVA) at a 0.05 significance level. The findings revealed a significant main effect of treatment on handwriting legibility ($F(1,59) = 149.663, p < 0.05$), but no significant effects of gender ($F(1,59) = 0.186, p > 0.05$) or self-esteem ($F(1,59) = 0.094, p > 0.05$). Additionally, there were no significant interaction effects between treatment and gender, treatment and self-esteem, gender and self-esteem, or treatment, gender, and self-esteem on handwriting legibility. Based on the findings, it is recommended that hand exercises be adopted in managing handwriting legibility.*

Keywords: dysgraphia, hand exercise, handwriting, handwriting legibility, play therapy.

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Introduction

Handwriting is a critical skill in academic settings, playing a significant role in communication, recording, and idea transmission throughout students' education (Dennis and Swinth, as cited in Feisefu, 2021). It involves perceptuo-motor skills, cognitive and linguistic processes, and is linked to numerous school activities, with 30-60% involving motor tasks such as handwriting (Chang and Yu, 2014). Effective handwriting requires fine motor control, visual-motor integration, and sustained attention, with impairments in these areas affecting writing development (Martins et al., 2013; Okuda et al., 2011). Clear handwriting is crucial for conveying knowledge, and poor handwriting can lead to lower academic marks and reduced self-esteem (Collette et al., 2017; Feder and Majnemer, 2007).

Dysgraphia is a condition characterized by significant challenges in composing written text, marked by illegible handwriting, distorted letter shapes, difficulty writing fluently, spelling errors, and trouble expressing ideas in writing (Feisefu, 2021). According to the DSM-5, dysgraphia is classified as a "specific learning disorder with impairment in written expression" (APA, 2013). It requires persistent difficulties with writing for at least six months, despite intervention efforts. These difficulties can impair academic performance, work, and daily activities, and must be confirmed through a thorough clinical evaluation and standardized performance measures.

Hand exercises involve guiding pupils to learn through hands-on experiences, allowing them to manipulate study objects like plants, insects, scientific instruments, and mathematical tools. This

approach engages pupils in a comprehensive learning experience that enhances critical thinking (Haury and Rillero, 2015). Hands-on learning significantly improves retention rates, as noted by Obanya (2012), who stated that practice-based learning has a retention rate of about 75%, compared to 5% for lectures. Despite some teachers finding it time-consuming (Ekwueme and Meremikwu, 2010), the method is effective for increasing academic achievement. Additionally, play therapy is beneficial for young pupils' social, emotional, and intellectual growth, helping them express feelings and develop problem-solving skills (Landreth, 2012; Landreth, Ray, and Bratton, 2009).

This study aims to investigate the effect of hand exercise on the handwriting legibility of pupils with dysgraphia in Ikere Ekiti Local Government Area of Ekiti State, guided by the following null hypotheses:

H₀₁. There is no significant main effect of treatment on handwriting legibility of pupils with dysgraphia in Ikere Ekiti.

H₀₂. There is no significant main effect of gender on handwriting legibility of pupils with dysgraphia in Ikere Ekiti.

H₀₃. There is no significant main effect of self-esteem on handwriting legibility pupils with dysgraphia in Ikere Ekiti.

Literature Review

Concept of Dysgraphia

Dysgraphia is a specific learning disability that affects writing skills, manifesting in difficulties with spelling, handwriting, and articulating thoughts on paper (National Center for Learning Disabilities, 2009). The International Dyslexia Association (2009) describes it as a learning disability impacting students' ability to

learn and utilize written language to convey their ideas. Students with dysgraphia often encounter challenges with legibility, automaticity, and writing speed (Berninger & Wolf, 2009). Dysgraphia can occur independently or alongside other learning disabilities such as dyslexia, influencing handwriting quality, letter spacing, and production speed (Nicolson & Fawcett, 2008). Symptoms of dysgraphia include irregular letter sizes, improper use of lines and margins, variable writing speed, and heavy reliance on visual monitoring (Richards, 1999).

Concept of Handwriting Legibility

Fine motor skills are crucial for writing, enabling individuals to control finger movements to hold a pen or pencil correctly. Comprehensible handwriting is particularly important in academics, as it plays a key role in a child’s educational development. It enables students to transfer knowledge, hone cognitive skills, boost confidence, and anticipate future success. Teachers may need to manipulate variables like print size, material color, or the type of writing used (Mather, Goldstein, & Eklund, 2015).

There are two primary handwriting methodologies: cursive writing and manuscript writing. Cursive writing involves slightly tilted letters that are joined together, allowing the writer to keep their hand on the paper until the word or sentence is finished. Manuscript writing involves separate letters like block letters, making it easier to read. For children with dysgraphia, cursive handwriting is often recommended because the continuous flow of letters without large spaces helps maintain focus and reduces letter reversals compared to manuscript writing.

Concept of Hand Exercises

Handwriting in alphabetic systems is essential for clear written communication, requiring explicit instruction for students to develop legible and fluent writing skills (Santangelo & Graham, 2016). Research highlights the importance of sequential teaching,

including proper letter placement, motor sequencing of letter strokes, memory retrieval practice, and self-evaluation of handwritten letters (Fancher, Priestley-Hopkins, & Jefferies, 2018; Shaw, 2011). Pupils need at least 20 hours of instruction to learn handwriting effectively (Hoy, Egan, & Feder, 2011; McCarroll & Fletcher, 2017).

Hand strengthening exercises can benefit students with weak or immature pencil grips. Extending and spreading the hand can build strength and stamina, potentially improving fine motor control and pencil manipulation. Some effective exercises include:

- Palms together, fingers spread, push elbows out and the heels of hands down.
- Fingers interlaced, stretch arms out in front, pushing palms forward.
- Stand an arm's distance from a wall, hands flat on it, and use fingers to push away from the wall.
- Bunny jumps, crouching down, and kicking feet in the air.
- Modified crab walk and chair dips.

Methodology

The study employed a pretest-posttest, control group experimental design with a 3x2x3 factorial matrix. The population included all male and female students with dysgraphia in selected primary schools in Ikere Ekiti Local Government Area of Ekiti State. The sample comprised 30 students with dysgraphia from three primary schools in the area. A multistage sampling technique was used to select participants. The instruments used include the Wechsler Intelligence Scale for Children, fourth edition (WISC-IV), Dysgraphia Screening Test (Adapted), Writing Assessment Measure (WAM) (Adapted), and Self-esteem Scale (Adopted). Analysis of Covariance (ANCOVA) was employed in this study.

Results

Table 1: Summary of Analysis of Covariance (ANCOVA) of the main effect of treatment (Hand exercise) method on handwriting legibility of pupils with dysgraphia in Ikere Ekiti Local Government area of Ekiti state.

Source	Type III sum of squares	df	Mean square	F	Sig
Corrected Model	644.908a	8	80.613	48.212	.001
Intercept	602.645	1	602.645	360.418	.001
Pretest	0.282	1	0.282	0.169	.683
Treatment	250.247	1	250.247	149.663	.001
Gender	.310	1	.310	.186	.668
self -esteem	.158	1	.158	.094	.760
Treatment * gender	2.271	1	2.271	1.358	.249
treatment*self-esteem	3.936	1	3.936	2.354	.131
gender*Self-esteem	.552	1	0.552	.330	.568
treatment*gender*self esteem	5.899	1	5.899	3.528	0.066
Error	85.276	51	1.672		
Total	8967.00	60			
Corrected Total	730.183	59			

a. R Squared = .883 (Adjusted R Squared = .865)

Ho₁: There is no significant main effect of treatment on handwriting legibility skills of pupils with dysgraphia in Ikere Ekiti Local Government area of Ekiti state.

From table 1 shows the effect of hand exercise on handwriting legibility of pupils with dysgraphia in Ikere Ekiti Local Government area. There was significant main effect of hand exercise on handwriting legibility of pupils with dysgraphia in Ikere Ekiti ($F_{(1,59)} = 149.7663$; $P < 0.05$). Therefore, hypothesis that state that there is no significant main effect of treatment on handwriting legibility of pupils with dysgraphia in Ikere Ekiti Local Government area of Ekiti state was rejected, in light of the result since the significant value is less than 0.05. This implies that there was significant difference in fine motor skills of pupils taught with hand exercise and conventional method.

Ho₂: There is no significant main effect of gender on handwriting legibility of pupils with dysgraphia in Ikere Ekiti Local Government area of Ekiti state.

From table 1 shows the effect of gender on handwriting legibility of pupils with dysgraphia in Ikere Ekiti Local Government area. There was no significant main effect of gender on handwriting legibility of pupils with dysgraphia in Ikere Ekiti ($F_{(1,59)} = 0.186$, $P > 0.05$). Therefore, hypothesis that state that there is no significant main effect of gender on handwriting legibility of pupils with dysgraphia in Ikere Ekiti Local Government area of Ekiti state was not rejected, in light of the result since the significant value is less than 0.05. This implies that gender had no significant effect on handwriting legibility of pupils with dysgraphia in Ikere Ekiti.

Ho₃. There is no significant main effect of self-esteem on handwriting legibility pupils with dysgraphia in Ikere Ekiti Local Government area of Ekiti state.

From table 1 shows the effect of self-esteem on handwriting legibility of pupils with dysgraphia in Ikere Ekiti Local Government area. There was no significant main effect of self-esteem on handwriting legibility of pupils with dysgraphia in Ikere Ekiti ($F_{(1,59)} = 0.094$, $P > 0.05$). Therefore, hypothesis that state that there is no significant main effect of self-esteem on fine motor skills of pupils with dysgraphia in Ikere Ekiti Local Government area of Ekiti state was not rejected, in light of the result since the significant value is less than 0.05. This implies that self-esteem had no significant effect on handwriting legibility of pupils with dysgraphia in Ikere Ekiti.

Discussion of Findings

The first finding of the study revealed that hand exercise had significant main effect on handwriting legibility of pupils with dysgraphia, the reason for this could be that pupils with dysgraphia like play with thing which enhance their hand coordinator. This finding is in line with the finding of Haury and Rillero (2015) who reported that hands-on learning approach involves the child in a total learning experience which enhances the child’s ability to think critically and write legibly. Similarly, the finding is in support of Clark (2007) found pupils can do movement activities through interaction with their environment, such as through the activity of folding paper, drawing, and cutting and these enhance their handwriting legibility. The finding of the study also revealed that there is no significant main effect of gender on handwriting legibility of pupils with dysgraphia, this finding does not collaborate the finding of Uche (2014) who found that significant gender difference exists for dysgraphia. It was also found out that

there is no significant main effect of self-esteem on handwriting legibility of pupils with dysgraphia, this finding is no in line with the finding of Bamidele (2017) who found that self-esteem has negative impact and worthiness of a learner.

Conclusion and Recommendations

Based on the findings of this study, the following recommendations were made to increase handwriting legibility among adolescents:

1. There should be periodic dialogue between pupil body and school management so as to increase handwriting legibility
2. Pupils should be encouraged to seek professional help in a quest to ensure the attainment of their yearnings and aspirations.
3. Pupils should be made to understand the basic rudiments of handwriting Nigeria National Policy on Education should mandate all schools to add to the syllabus on handwriting

Conclusion and Recommendations

Based on the findings of this study, several recommendations have been proposed to enhance handwriting legibility among adolescents.

- There should be regular discussions between students and school administrators to improve handwriting skills.
- Students should be motivated to seek professional assistance to help them achieve their goals and aspirations.
- It is essential to ensure that students grasp the fundamental principles of handwriting.
- Nigerian National Policy on Education should require all schools to include handwriting instruction in their curriculum.

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