

## Technologically Enhanced Art Therapy: Introducing a New Synergistic Model to Enhance Morphological Awareness in Students with Dysgraphia

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### **Abstract:**

*Writing is an essential task for self-expression. While it is normal for otherwise healthy students to struggle with handwriting, for a small group of students with a transcription learning disability (LD) called dysgraphia, rather than improving the learning process, writing creates a major hurdle that interferes with learning. Because most of their energy is spent on the process of writing, students with dysgraphia risk falling behind at school. More importantly, they are vulnerable to cumulative emotional and behavioral problems which are often left unattended. Art therapy and technology have been incorporated in a variety of ways into treatment of LDs. In the current study, a new hybrid model that builds on earlier empirical research is proposed to provide a compensatory strategy to assist students with dysgraphia. The concurrent treatment approach incorporates drawing activities with the use of mobile devices (specifically the application WhatsApp) to facilitate the self-expression of students with dysgraphia, restore their self-confidence and enhance their skills to a level commensurate with their aptitude while attending to their psychological well-being. Furthermore, the suggested trifold plan is intended to help students with dysgraphia by directly targeting their morphological awareness. The ultimate goal of the interactive strategy is to improve the environment in which students with dysgraphia are learning so that they can focus on their creativity and feel less excluded in normal classrooms. Further empirical research on concurrent dysgraphia treatments is warranted.*

### **Keywords:**

*dysgraphia; disability; drawing; WhatsApp; interactive*

## **I. Introduction**

Despite the rise of technology in today's world, the importance of writing as a medium for self-expression is indisputable (Crouch & Jakubecy, 2007). Writing is a major task that enables students to develop and channel their ideas. Over the years, several researchers have contended that writing is one of the most challenging skills for students to master (Gregg, 1983; Torri, Graham, Leader-Janssen, & Reid, 2006; Papathanasiou, Coppens & Potagas, 2016). In recent years, with neurodevelopmental learning disabilities (LDs) on the rise, there has been a surge of attention to their impact on affected students' academic performance and quality of life (Gregg, Coleman, Davis, & Chalk, 2007; Passolunghi, 2011; Hen-Herbst & Rosenblum, 2019). This paper focuses on dysgraphia, a LD associated with impaired handwriting that greatly interferes with learning. Because of their inefficient pencil grip and visual-motor deficiency, students with dysgraphia spend most of their energy on letter formation, and struggle with processing their thoughts (Crouch & Jakubecy, 2007). More importantly, they are vulnerable to cumulative emotional and behavioral problems (Bryan, Burstein & Ergul, 2004) which are often left unattended (Elksnin & Elksnin, 2004).

The treatment of dysgraphia which often proves to be elusive continues to be a matter of considerable debate. Multiple compensatory strategies have been proposed to assist students with dysgraphia (Gabrieli, 2009; Keifer, 2015). Several researchers have considered the interplay of person and environment when it comes to addressing problems related to LDs (Adelman & Taylor, 1997; Nabhan & El Bitar, 2018). This paper seeks to explore hitherto largely neglected issues related to dysgraphia while proposing a model intended to improve the quality of the environment in which students with dysgraphia learn. The concurrent treatment approach combines art therapy with technology to enhance affected students' skills to a level commensurate with their aptitude while improving their psychological well-being.

### 1.1 Problem Statement

For many students writing reinforces learning. While it is normal for otherwise healthy students to struggle with handwriting, for a small group of students with a transcription LD called dysgraphia, rather than improving the learning process, writing creates a serious obstacle that interferes with learning. Because most of their energy is spent on the process of writing, students with dysgraphia risk falling behind at school. More importantly the lack of efficient learning strategies negatively affects their attitude about themselves and learning.

### 1.2 Hypothesis

Applying a hybrid model that combines the use of application-equipped smart devices with drawing while assisting students with dysgraphia, can enhance their morphological awareness which facilitates their self-expression, restores their self-confidence and ultimately helps them reach their full potential.

### 1.3 Purpose of the Study

Because of the importance of writing and learning in today's world, this article suggests implementing a synergetic model to help students with dysgraphia develop their writing skills and adequately express their ideas. The study also aims at helping them overcome disability barriers by catering to their emotional and behavioral developmental needs.

### 1.4 Research Questions

In the context of dysgraphia as a LD and the use of assistive technology and drawing to treat it, the following questions arise:

1. How effective is drawing in reducing environmental stressors related to dysgraphia?
2. How important is assistive technology, specifically the use of phone applications to increase the morphological awareness of students with dysgraphia and thus improve their writing skills?
3. Does increased attentiveness to the correlation between lack of self-expression and emotional instability control behavioral problems related to dysgraphia?

### 1.5 Definition of Terms

For a better understanding of this study, the following terms are defined:

Learning disability (LD) is "an organically based disorder within a small percentage of children that interferes with their ability to learn to read and write normally" (Sleeter, 2010, p.212). Dysgraphia is "a disorder of "written expression" as "writing skills that... are substantially below those expected given the person's...age, measured intelligence, and age-appropriate education" (Van Hoorn, Maathuis & Hadders-Algra, 2013, p.65). Morphological awareness refers to the ability to recognize and use word parts that carry meaning (Carlisle, 1995).

## II. Review of Literatures

The literature review deals with writing as a learning process and its problems, mainly in relation to dysgraphia. Furthermore, it summarizes the use of technology and art in treatment of LDs in the literature.

### 2.1 Writing as a Learning Process

Writing is a complex process that is essential to everyday life and required for several learning processes (Hen-Herbst & Rosenblum, 2019). Not only is it directly related to students' academic performance (Gregg, 1983), but also to their psychological well-being (Van Hoorn, Maathuis & Hadders-Algra, 2013). As a task, writing involves multiple parts of the brain along with visual, motor and kinesthetic skills (Van Hoorn, Maathuis & Hadders-Algra, 2013). Many researchers such as Fogel, Josman & Rosenblum (2019) contended that with all the cognitive and motor skills it requires writing is "highly sensitive to neurological disturbances" (p.13). In recent years, LDs have received considerable attention (Gregg, 1983; Passolunghi, 20011). Several strategies have been proposed to help students overcome LD barriers (see Gabrieli, 2009; Pino & Mortari, 2014; Flaugnacco et al., 2015; Marshall et al., 2018; Nabhan & El Bittar, 2018).

### 2.2 Dysgraphia as a Learning Disability

Dysgraphia is a neurodevelopmental LD that severely affects students' handwriting. Usually, there is a significant discrepancy between the ability and school performance of affected students. Currently, there is no consensus over definition of dysgraphia (Van Hoorn, Maathuis & Hadders-Algra, 2013) and due to the lack of diagnostic criteria there is no worldwide accepted standard for diagnosis (Hen-Herbst & Rosenblum, 2019). Van Hoorn, Maathuis & Hadders-Algra (2013) indicated that "kinematic studies on poor handwriting in school-age children revealed that dysgraphia is associated with a reduced capacity to adapt writing movements to spatial demands and – in general – is associated with slower writing speed." More importantly, illegible handwriting affects higher-order skills including spelling and story composition (p.66).

Hence, with all the pressure and effort required, it is not uncommon for students with dysgraphia to eventually have concomitant emotional and behavioral challenges related to their frustration of struggling to express themselves (Karande, Kirankumar, Kulkarni & Thakker, 2009). However, literature focusing on emotional issues related to dysgraphia is scarce. According to Gubbay and Klerk (1995), when it comes to the treatment of dysgraphia "medical problems must be resolved and psychological, language, cognitive, emotional, environmental and academic factors must be addressed" (p.7). In addition, interaction is vitally required for any real learning process. According to Sulasmi (2021) learning is dynamic and learning outcomes result from interactions involving cognitive processes. As a result of dysgraphia, all this is hindered and the learning process is wasted.

### 2.3 The Use of Technology to Treat LD

The use of technology provides a wide benefit for students to create distant interaction, specially through the use of various platforms that facilitate this type of communication (Harianja, Soraya, & Fibriasari, 2021). Over the years LDs have responded to a range of treatments, many of which have involved the use of technology to help affected students lead productive lives. While several studies have addressed the enormous potential of computer-aided language learning (CALL) in teaching students with LDs (Larabee, Burns & McComas, 2014; Zheng, Yim & Warschauer 2017), many others were skeptical about the use of technology to support struggling writers (Cheung & Slavin, 2013). In fact, incorporating technologies into classrooms requires a lot of investigation (Cheung & Slavin, 2012).

Furthermore, Zheng, Yim & Warschauer (2017) discussed the importance of bridging the gap between students' out-of-school and in-school literacy practices and encouraged the implementation of computer-mediated communication (CMC) in classrooms. Similarly, MacArthur (2009) highlighted the role of proactive and critical evaluation of technological tools and the opportunities that word processing, spelling checkers, word prediction, and speech recognition offer for students struggling with LDs. A recent study by Marshall et al., 2018 relied on analyses of variance (ANOVA) to emphasize the effectiveness of assistive technology in the treatment of dysgraphia.

## **2.4 The Use of Arts to Treat LDs**

Specific environmental situations often add to the severity of LDs, hence the need to ameliorate the environment in which students with LDs learn has been stressed in the literature (Nabhan & El Bittar, 2018). Previous research has affirmed that art therapy and multi-sensory approach may help students with LD. Multi-sensory programs focus on the five human senses (sight, hearing, smelling, tasting and touching) and often prove highly effective (Bremner, Lewkowicz, & Spence, 2012; Haeyen, van Hooren, Dehue & Hutschemaekers, 2018).

A report published by Freilich and Shechtman (2010) investigated the contribution of art therapy to the treatment of children with LDs and assessed multiple interventions and their respective outcomes. In the same vein, a study by Slayton, D'Archer and Kaplan (2010) highlighted the efficacy of art therapy, specifically drawing. According to them, incorporating drawing into remediation programs "brought dyads closer" (p. 110). Most researchers were unequivocal that art therapy helps students with LDs deal with their emotional and behavioral problems by allowing them to express their anger and frustration through their art (Argyle & Bolton, 2004; Gliga, 2011; alavinezhad, Mousavi & Sohrabi, 2014).

## **2.5 Plan**

In the following pages, a plan that builds on earlier empirical research is presented to provide a compensatory strategy for assisting students with dysgraphia. The suggested trifold plan is intended to help students with dysgraphia by increasing their morphological awareness through the use of technology and art. The ultimate goal of the interactive strategy is to improve the environment in which students with dysgraphia are learning so that they can focus on their creativity and feel less excluded in normal classrooms. It is important to mention the fact that this model can be applied in both normal classrooms and specific classrooms for students with LDs as it can be beneficial to all types of students. Interventionists do not need to be specialists as long as they respect the versatility of the synergistic plan (Argyle & Bolton, 2004). The suggested intervention extends over 10 weeks.

Moreover, students could use mobile phones, iPads or any other electronic devices as long as they have the application WhatsApp, which they will be using during the writing intervention. Research (Vázquez-Cano, 2014) has indicated that the proper use of mobile devices in classrooms can lead to positive outcomes, since such devices have proved to be "conductive to educational and personal interaction, fostering relationships between students and their professors" (p.1505). WhatsApp is an application that allows its users to take part in instant messaging with contacts that also have the application at times convenient for them. Thus, it could help create synergy in the classroom by facilitating the sharing of material inside and outside the classroom. To initiate the study the instructor creates a WhatsApp group and adds every student in the class to it. Each session starts with some time allocated for tuning in and explaining the main goals of the activity.

### III. Results and Discussion

The first part of the plan consists of a drawing activity. This part of the treatment targets students' self-awareness and self-expression. As suggested by Haeyen, van Hooren, Dehue, & Hutschemaekers (2018), students could “develop increased emotion regulation by means of an artistic, visual, and communicative expression of emotions and, doing so, [externalizing] these emotions in the artwork” (p.130). Thus, the instructor introduces the activity by explaining how art (specifically drawing), could help them cope with environmental stressors and negative emotions. For the current activity students are asked to draw using any provided materials (e.g. pencil, pastel, clay or paint). The subject of the drawing should be decided by the students since they are encouraged to depict something that interests them. Throughout the activity, students (especially those with dysgraphia if the classroom is mixed) are assisted by the teacher who can intervene to provide assistance whenever needed.

To stimulate their self-expression, students are allowed to use the internet or any other source to potentially reproduce a painting or an image that inspires them. Once the drawing is finished, every student is asked to take a picture of it and send it to the WhatsApp group after having chosen a corresponding title. To conclude the session, students are informed that during the following days they will be assigned to do a task through WhatsApp.

The second part focuses on digital writing performance and morphological awareness. Students are assigned to write a short paragraph (up to 100 words) on their electronic device at home, to explain their choice of subject and the meaning behind their painting. The autocorrect feature should be turned on to help them avoid spelling mistakes. Afterwards, students are supposed to share whatever they wrote on the WhatsApp group, regardless of spelling mistakes. An informal WhatsApp discussion follows.

When students meet again, they are informed about the main goals of the session. Students are supposed to discuss their drawings and are encouraged to express their inner feelings. After doing so, the interventionist reveals that each paragraph sent to the group will be scrutinized with the main focus on morphological awareness. Every paragraph written by the participants will be displayed through LCD. Recent empirical research on the role of morphological awareness in compensation strategies for students with LDs has yielded a wide array of linguistic dimensions to the subject (Law, Wouters, & Ghesquière, 2015). Morphemes are the smallest word parts that carry meaning (Carlisle, 1995). Students will be given explicit morphology instruction to increase their morphological awareness. The instructor will be evaluating spelling mistakes while focusing on the morphemes in each word. Hence this activity is supposed to improve the writing performance of students with dysgraphia though enhancing their morphological awareness.

The last part focuses on handwriting. Each student is provided with a white sheet and multiple pens and pencils to choose from (pencil grips are also an option if they are available). Students are informed about the task which is: “copy the corrected version of your paragraph on the paper provided.” Students are informed that this is not a graded test and are allotted time to finish the task. Once done, each student is provided with a portfolio to compile their assignments for later evaluation.

The same processes will be repeated every two weeks during the 10-month intervention. By the end of the remediation program, the instructor will analyze each student's compiled material in order to evaluate his/her writing progress throughout the intervention. To conclude, each student will be interviewed to assess the effectiveness of the suggested method on his/her handwriting, emotional and behavioral problems.

#### IV. Conclusion

In sum, dysgraphia is a neurodevelopmental LD that interferes with affected students' writing and academic performance. Like several other LDs, dysgraphia is usually accompanied with other concomitant emotional and behavioral problems which are often left unattended (Elksnin & Elksnin, 2004). This study reviewed how technology and art therapy have been used with students with LD. Furthermore, it proposed the implementation of a synergistic model that combines the use of technology (WhatsApp) with art (drawing) to enhance the morphological awareness of students with dysgraphia and improve the quality of their writing while focusing on their learning environment. The interactive strategy also targets emotional and behavioral problems while fostering collaborative work and artistic expression in an attempt to restore affected students' self-confidence and help them reach their full potential. An important limitation of the study is that it did not target the syntactic and phonological awareness of students with dysgraphia. Additional empirical research on concurrent dysgraphia treatments is warranted.

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