



THINKING IN PICTURES: A WAY FORWARD FOR DYSLEXIA, DYSGRAPHIA AND DYSCALCULIA IN GHANA

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Abstract:

Dyslexia a life-long status; however, its impact can change at different stages in a person's life. Many regular and children with special needs exhibit tenets of several learning disabilities at their school going age. Studies have shown how conditions such as Dyslexia and Dysgraphia, Dyscalculia have negatively affected these children's swift development. Suggestions are that, any abnormality in the brain connectivity may affect not only children with special needs, but also regular children in the mainstream. The impact on the affected persons differ from person to person, however, solutions or the way forward depend largely on the approaches of the remediation. Thinking in pictures as a module for Dyslexia, a very common condition in this category and its related associates; dysgraphia and dyscalculia are concisely looked at in this paper.

Keywords: dyslexia, dysgraphia, dyscalculia, thinking in pictures, Ghana

1. Dyslexia

Dyslexia is a language-based learning disability which refers to a cluster of symptoms, resulting in people having difficulties with specific language skills; particularly reading. Most dyslexics may experience difficulties in language skills such as spelling, writing and speaking. It is often referred to as a learning disability because dyslexia can make it very difficult for learners to succeed academically in a classic instructional environment. The myth that dyslexic individuals read backwards is a mystery for many to unravel. Dyslexia is said to be a life-long status and its impact on younger children of school going ages can be devastating, however, the condition can change at different stages in a person's life.

The exact causes of dyslexia are still not completely clear, but people with dyslexia have been found to have problems with discriminating sounds within a word, which is a key factor in their reading difficulties. Brain imaging studies have supplied fresh evidence that the fundamental problem in a dyslexic person lies in the brain's

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ability to process “phonemes”. In speech sounds, phonemes enable us to tell one word from another, for example; ‘pet’ and ‘bet’ are distinguished by /b/ and /p/; the sounds of the initial consonants, but this sounds can easily elude a dyslexic person. Dyslexia is essentially a disorder of phoneme processing: feasibly in visual and hearing. (Dyslexic Fact Sheet, 2008).

Dyslexia may not necessarily be attributed to lack of intelligence or a desire to learn. However, with appropriate teaching methods, dyslexics can learn successfully. This is because many schools of thought have it that, people with dyslexia are often gifted in areas that do not require strong language skills. These include subjects such as art, computer science, design, drama, dance, music, electronics, math, mechanics, physics, and sports. Problems associated with dyslexia are not only in school, its impact is in fact well beyond the classroom and very often; a person’s self-image and emotional state are compromised

The most common effects of dyslexia are problems of reading, writing and spelling. Some dyslexics do not have difficulty with early learning of spelling tasks. However, they do experience countless problems when more complex language skills, such as in grammar, understanding textbook material and writing essays are involved. Phonological errors, confusion of sound, differentiating the sequence of sounds, tendency to omit some sounds, wrong spelling etc. e.g. say – ysa, they - yeht become the utmost problems of dyslexics.

In general, research evaluation which assesses intellectual ability, information processing, psycho-linguistic processing, and academic skills reveals that, people with dyslexia are often gifted in areas that do not require strong language skills; such as art, dance, music, computer science, design, drama, electronic, math, mechanics, music, physics, and sports etc.

2. Dysgraphia

Dysgraphia is a condition that causes trouble with written expression. It is a brain-based issue and not in any way attributed to the child’s laziness. This type of learning disability affects writing abilities and can manifest itself as difficulties with spelling, poor handwriting and trouble putting thoughts on paper, etc.

Because writing requires a complex set of motor and information processing skills, poor handwriting or spelling are not sufficient grounds to justify that, a student has dysgraphia. It is also important to note that, just having bad handwriting does not mean a person has dysgraphia. (<https://www.nclld.org/>)

People who have trouble in any of the areas indicated below may be classified as showing signs of dysgraphia. These include; tight, awkward pencil grip and body position, illegible handwriting, avoiding writing and/or tiring quickly while writing, saying words aloud while writing, unfinished or omitted words in sentences, difficulty organizing thought on paper, difficulty with syntax structure and grammar etc. (Dysgraphia Fact Sheet, (2012), National Center for Learning Disability.

3. Dyscalculia

Developmental dyscalculia is a specific learning disability affecting the normal acquisition of arithmetic skills. Genetic, neurobiological and epidemiologic evidence indicates that, dyscalculia, like other learning disabilities, is a brain-base behavior. (Shalev, 2004). Based on the similarity between the deficits associated with Mathematics Learning Disability (MLD) and those associated with acquired dyscalculia, neuropsychological studies of dyscalculia provide insight into potential neural system contributing to deficit of children with MLD. (Geary & Hoard 2001).

Individuals with dyscalculia caused by damage to the right hemisphere sometimes show difficulties with procedural components of counting, especially pointing to succession of objects as they are enumerated. (Seron et al., 1999). However, the relation between this feature of dyscalculia and the procedural deficits of children with MLD is not clear. The breadth and complexity of the field of mathematics make the identification and study of the cognitive phenotypes that defines MLD a formidable endeavor. (Temple, 1997).

Dyscalculia is a specific learning disability in mathematics. It has been observed that no single presentation of dyscalculia exhibits itself at different levels and ages. This is because the condition is often said to be a 'specific learning disability in mathematics'. As researchers in mathematics rightly indicate, in theory a learning disability can result from deficits in the ability to present or process information in one or all of the many mathematical domains (e.g. geometry) or in one or a set of individual competencies with each domain. The goal is further complicated by the task of distinguishing poor achievement due to inadequate instruction or from poor achievement due to an actual cognitive disability (Geary, Brown & Samaranayake, 1991). Another complication arises from contention, regarding instructional goals and approaches which in turn may influence whether a particular deficit would be considered a learning disability at all. (Loveless, 2001). Whichever way this is looked at, the fact remains that; people must find alternate ways to solve problems, and their status should not be the basis of doing so. This is because Mathematics is a daily or routine affair.

5. Research Objectives

To inspire children with dyslexia, dysgraphia or dyscalculia, explore *Thinking in Pictures* as an essential module for their development.

6. Approaches that can help Performance in Cognitive Patterns for Dyscalculia, Dysgraphia and Dyslexia

The use of cognitive theory and its associated methodology to study children with dyscalculia and /or MLD has yielded a number of insights for potential of their learning disability. These studies have primarily focused on a number of things.

For instance, MLD which refers to children with low achievement scores; relative to IQ in many of the studies – in mathematics, may be solved in various ways.

E.g. $5 + 3$; in the finger counting strategy or verbal counting strategy which is very common with children in Ghana, will be solved with *the counting on* and *count all* strategy. e.g. $5+3$ will be; 5 6 7 8. Meaning 5 which is already there, as the five fingers of one hand, in addition to 3 fingers of the other hand in a counting on strategy. The answer then is 8.

In the direct retrieval strategy, $5 + 6$ (i.e. 11) will be calculated as $5 + 5$ which is equal to $10 + 1$.

So that, adding $5 + 6 = 5 + 5$ and adding 1. This means that the children already know the sum of $5 + 5$.

Alternative and creative ways of solving mathematical and other problems must be looked at. Thinking in pictures and doing things practically should also be a way out. Demonstration in lower classes using concrete things instead of abstract examples are also possible considerations. Eg dividing an orange into portions to teach division.

In a case example of Edem who showed clear signs of dyscalculia or MLD; she often uses her fingers, pebbles or sticks to calculate and give answers to simple mathematical problems. She also sometimes does the counting and summing up using the people around her. However, she cannot give a mentally calculated answer or do calculations with high or complex figures on paper.

The retrieval-based process is moderated by confidence criterion. Children with rigorous criterion only state answers that they are certain are correct, whereas children with lenient criterion state any retrieved answer, correct or not. At the same time, many children may not show the shift from procedure-based problem solving to memory-based problem solving that is commonly found in typically achieving children.

For a student with disorders in written expressions, specific accommodations in the learning environment with additional practice can make that student an accomplished writer. Help can come from specialists or those who are closest to the person. For example, early writers can use paper with lines for a sensory guide to staying within the lines, or to find the most comfortable pen/pencil or practicing writing letters and numbers in the air with big arm movements to improve motor memory of these shapes. In other words, picturing the letter you are writing and making the shape with the hand in the air. This can also be done by practicing letters and numbers with hand or finger motions.

Learners can also be encouraged to maintain a proper grip, posture and paper positioning for writing. It is important to reinforce this in the learner's early years, as it is difficult for many students to unlearn bad habits later.

The use of multi-sensory techniques for learning letters, shapes and numbers or the process of thinking in pictures while writing, may be of great help. E.g. "b" is "big stick down, circle away from by body." In other words, imagining in picture form of a stick and a ball attached.

Currently in these days of computer, a word processor on a computer may be an early intervention. This may help by alleviating the frustration of forming letters.

However, handwriting is a vital part of a person's ability to function in the world, therefore, it is important to also assist in the process of handwriting.

Having bad handwriting alone does not mean a person has dysgraphia. Since dysgraphia and dyslexia are learning disabilities that can linger on throughout a lifetime, but with early identification appropriate interventions and support, children with such conditions can improve. Those working with children with cognitive impairment especially, must therefore make conscious efforts to help special needs children discover themselves in other artistic areas.

Dyslexia may not necessarily be attributed to lack of intelligence or a desire to learn, but with appropriate teaching methods dyslexics can learn successfully. Problems associated with dyslexia are not only in school, its impact is in fact well beyond the classroom. Very often, a person's self-image and emotional state are compromised. In general, research evaluation which assesses intellectual ability, information processing, psycho-linguistic processing, and academic skills reveals that, people with dyslexia are often gifted in areas that do not require strong language skills; such as art, dance, music, computer science, design, drama, electronic, math, mechanics, music, physics, and sports etc.

6.1 Thinking in Pictures

In her *"Thinking in pictures"* Grandin explains that visual thinkers like her are good at hands on work and experiments. She developed her area of strength in visualization. Grandin (2006) notes that; *"If I could snap my fingers and be non-autistic, I would not; Autism is part of what I am"*. Autism can also have desirable and enabling consequences, both to the individual and the society. She expounds that, today, in raising the standards; Einstein for example, who did not speak until three years of age, would not have been successful. Would a Physics Journal accept a paper from an unknown clerk today? Several famous scientist, musicians, engineers, and artists had learning problems or were on the Autism Spectrum. Many high functioning autistic and Asperger's or dyslexic students who go into successful careers, did not only inspire themselves, they also had teachers who motivated them to succeed. Good teachers try different methods and use the one that works for a particular child. Good teachers are worth their weight in gold (Grandin, 2006, pp. 229-234).

"The right hemisphere is however more into artistic or visual imagery, and processes intuitively, holistically and randomly" (Melina, 2011). The emphasis on visualization or thinking in pictures has its foundation in the use of the right hemisphere or the artistic talent. Most often, special educators put so much emphasis on deficits of the children with special needs, that, they forget the importance of developing the children's talents. In a positive environment, the child is able to progress, and the developmental processes applied benefit parents, the entire family and the community at large.

According to Rubin (1987):

"There is only a thin line between active imagination and art...there is magic in both healing and creating... While we are involved in this process of active imagination

through any of the arts, we do not only place emphasis on the aesthetic aspect of our work but also on the healing.” (p.119).

Art and healing are closely related, but one must see beyond the ordinary in a relentless effort; to see deeper and in a more profound way than the art work appears. That is the only way; our interpretation of the art work would give a new meaning in a dimension of breakthrough to users.

The “Humanistic Approach to Art Therapy” based its core tenets on well-established practices of Humanism. One assumption is that; self-actualization resulting from the adoption of life-styles of genuine self-disclosure and honesty remains sterile unless the self-actualizing person is able to formulate a self-transcendent goal that makes life more meaningful. (Rubin, 1987, pp. 189-197).

Suggestions as solutions may include; emphasis on life-problem solving, encouragement of self-actualization through creative expressions, and relating this self-actualization to intimacy and trust in interpersonal relations as well as the search for self-transcendent life goals

The impact of dyslexia differs from person to person, and depends on the mildness or severity of the condition on the affected individual. Approaches of remediation; show a lot of progress once the right instructions are offered. An experience with Edem, (not the actual name) brought about some revelations about the concept of “*thinking in pictures*”.

6.2 A Case Example of Edem

This is a case example of Edem a Down syndrome girl who showed clear signs of thinking in pictures at a very tender age even before the parents became aware of the concept. Interviews with the parents indicate that her condition did not exhibit itself until she was seven months old, and after a day of malaria attack and convulsion. Series of tests conducted during her hospitalization diagnosed her of having Down syndrome. Edem walked at the age of one year two months, like many regular children of her age. Her speech however delayed until she was four years old. During this period, she would murmur things her family did not readily understand. So in an attempt to explain what she was communicating, she would painstakingly act them and everybody would make sense of what she was communicating.

A painstaking observation of Edem, when she was in class six (6) in an Inclusive Education setting is worth mentioning. The parents decided not to enroll her in a special school. The choice of school enhanced her social life remarkably She got along well with her peers but most often she likes playing with children younger than her age. During recessions and free periods, she leaves her class to go and play with the children in nursery or the kindergarten classes.

Edem’s strengths are in dancing, acting and drawing. She can identify all the letters in the alphabet but has difficulty in writing most words correctly and reading them well. She most often interchanges the letters in her name; for example instead of Edem Kofie, she writes Emed Koeif. Since she has also exhibited difficulties attributed

to dyslexia, by the way, she swaps words arbitrarily, and changes positions of letters, sketching and gestures helped her a lot in her communication with teachers and peers. During her homework sessions, and confirmation from class teachers indicate that she frequently narrate or tells stories using these creative methods, an excellent exhibition of the *thinking in pictures* module.

Building on Edem's areas of strength; such as dance, art and drama will bring progress. Edem continues to count in the correct sequence of numbers but has difficulty solving complex arithmetic problems. Currently, she uses marbles, sticks and bottle top counters to solve simple mathematical problems. She needs more logistics to improve her skills so that basic and fundamental procedures in phonics, picture reading and number sequence, etc. can be achieved.

6.3 Recommendation and Conclusion

Dyslexia, dysgraphia and dyscalculia may be said to be a life-long conditions, but with appropriate support systems and alternative means of assessment students can benefit immensely. Generally, accommodation, modifications and remediation are authentic. Educators must also assume a nonjudgmental attitude and encourage alternative means of assessing knowledge, such as oral reports or visual projects must be encouraged. Sometimes, praise for effort motivation can also be encouraged

The creative approaches to teaching and developing learners should be strengthened and encouraged immensely. Children whether in or out of the classroom, whether special needs or regular should be allowed to imagine and visualize ideas freely, and envisage outcomes. The conditions under which the creative processes are nurtured should aim at making the learners whether they fall in the category of dyslexia, dysgraphia or dyscalculia become more observant, curious, responsive and independent thinking individuals.

Finally, exploring the creative arts for such purposes therefore places more emphasis on the process than the product. The moment of discovery in creativity in this visualization problem solving mission is the quest for articulating the self in fullness, and trusting in how the creative work inspires the user to achieve his or her goal.

References

- Dyslexic Fact sheet, (2008) The International Dyslexia Association (IDA) Promoting literacy through research, education and advocacy Journal. <http://www.interdys.com>.
- Geary D.C., Brown S.C., Samaranayake V.A. (1991) Cognitive Addition: A Short Longitudinal Study of Strategy Choice and Speed-of-Processing Differences in Normal and Mathematically Disabled Children. *Journal of Developmental Psychology*. 5: 787-797.
- Geary, (2004) *Journal of Learning Disabilities, Mathematical and Learning Disabilities* www.journals.sagepub.com.

- Grandin, T. (2006). Thinking in pictures: And other reports from my life with autism: Vintage. National Center for Learning Disability (<https://www.nclld.org/>).
- Patino, E. Understanding Dysgraphia, <http://www.understood.org>.
- Remy, M. (2011). What's the Difference between the Right and the Left Brain. www.livescience.com
- Rubin, A.J. (1987). Approaches to Art Therapy: Theory and Technique. New York: Brunner/ Mazel Publishers.
- Shalev, R.C. et al., (2001), Developmental Dyscalculia, <http://www.ncbi.nlm.nih.gov>
- Tenple, C.M. (1997) Cognitive Neuro Psychology and its Application to Children. Journal of Child Psychology and Psychiatry, 38: 27-52.
- Understood.org. <https://www.understood.org>.

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