Dyslexia and Inclusion: Triple R Model for Teaching Vocabulary to Dyslexic and Regular English Language Learners Co-Existing in the Mainstream Classroom. (Case Study)

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ABSTRACT

Dyslexia is a learning disability that primarily affects language skills such as reading, writing, and spelling. Due to the lack of awareness and expertise on the condition, dyslexic learners face numerous academic, social, and emotional complexities. The purpose of this case study was to design an instructional model to teach vocabulary to both dyslexic and regular ELLs in the mainstream classroom. To develop the instructional model secondary and primary data were collected. Foe the primary data collection two subject matter experts, experienced teachers, and dyslexic learners were selected employing purposive sampling and data was collected using questionnaires, interviews, and observations. Data was analyzed using thematic analysis. This study resulted in proposing the Triple R model; an original instructional model designed by the researcher. The findings of the study revealed several objectives an instructional model to teach both dyslexia and regular ELLs in the mainstream classroom should achieve, Further, findings also proposed that information processing theory, a right-brain approach, dyslexic and inclusive strategies would be beneficial to develop an instructional model. Finally, the Triple R model was developed by the researcher taking the challenges, needs, and goals of dyslexic learners into account and incorporating information processing theory, a right-brain approach and dyslexic-friendly, and inclusive strategies emerged in the data analysis. In mainstream English classrooms where the dyslexic population does not benefit from regular teaching methods teachers, schools, and educational decision-makers can adopt the Triple R model to help both regular and dyslexic ELLs simultaneously.

Key words: dyslexia, inclusion, dyslexia-friendly classroom, vocabulary acquisition, right-brain approach

INTRODUCTION

'Dyslexia' is surrounded by skepticism, confusion, and myths. This keeps teachers from differentiating the learner needs of regular and dyslexic learners in the classroom. Regular instructions that do not appeal to dyslexic learners can gradually halt their academic journey. This study aims to suggest an educational solution to render equal recognition to the needs of both dyslexic and regular learners.

Background to the Study

Language learning seems impossible for some learners. A ten-year-old may sit in a classroom with only a preschooler's ability to read and write. For their poor performance, they are naturally categorized as 'slow' 'weak' or 'struggling' since they do not acquire language as expected. It is non-evident that they ought to be blameless victims of Specific Language Difficulties (SpLD) like dyslexia.

Dyslexia is not merely a reading/writing difficulty; it is a developmental condition with a neurobiological basis that manifests in problems with reading and spelling. Deficits in phonological processing being the primary reason; dyslexia is characterized by difficulties with accurate/fluent word recognition, poor spelling, and decoding skills that primarily affect language learning. (International Dyslexia Association [IDA], 2003) However, symptoms of dyslexia are not limited to language learning. There exist many myths about dyslexia. Namely, children with reading/spelling difficulties have dyslexia. It is a disease that can be outgrown. Learners with dyslexia are lazy and not smart. (Nijakowska, 2019) It takes more than difficulties with reading and writing to be dyslexic. It is a lifelong condition that can be managed. Moreover, it is not caused due to lack of intelligence. Dyslexia exists independently of one's intelligence. (Shaywitz,1998). IQ differentiates dyslexic learners from learners typically identified as 'slow learners.' (Stanovich, 1996). Nevertheless, Dyslexic learners are prone to problematic social behavior and emotional distress due to the academic frustration they undergo in the classroom. (Peer & Reid, 2003) (Appendix A)

In Sri Lanka, SpLD, like dyslexia, is not given proper attention (Senrath, 2016), perhaps due to the lack of awareness about dyslexia among the general public. Furthermore, research has ascertained that most educators in Sri Lanka lack proper understanding and expertise on dyslexia. (Heetiarachchi, 2021; Indrarthne, 2019; Senerath, 2016; Senrath, 2019). Hence, it is clear that individuals with dyslexia, without an outward defining characteristic apart from learning difficulties, could suffer in the classroom by being mistaken as 'lazy' or 'weak' learners. As individuals with dyslexia do not receive appropriate instructions due to teachers' obliviousness, compared to their regular peers, they are subjugated to academic discrimination and inequality.

Nonetheless, inclusive education (IE) offers a solution for the discrimination learners with LD endure. There has been a paradigm shift from viewing disability as a punishment of God to protecting the educational rights of individuals with disabilities. In the trajectory of special education, the Salamanca conference is a cornerstone. Under the patronage of UNESCO, it called to provide education for all in inclusive settings. (UNESCO, 1994). Ninety-two countries, including Sri Lanka, agreed to implement IE. IE is the "recognition of the need to work towards 'schools for all' / institutions which include everybody, celebrate differences, support learning, and respond to individual needs" (UNESCO, 1994, p.1). In Sri Lanka, the background of IE is laced with solid legislation and policies (Jayawardhana & Abeywickrama, 2016). However, the question is whether these policies are enforced at the grassroots due to various barriers. (Abeywickrama et al., 2014; Hettiarachchi et al., 2018). Hence, dyslexic learners remain victimized further.

Including dyslexic learners in mainstream education as a solution to academic discrimination should not remain limited to only 'physical inclusion'. Many dyslexic learners are already included physically in mainstream education yet unrecognized. Thus, inclusion in this study refers to acknowledging the presence and probable existence of dyslexic learners in the classroom and serving their needs equally. Non-specialized, mainstream instructions may not benefit dyslexic learners.

Problem Statement.

Particularly in Sri Lanka, dyslexia as a research area is still in its infancy. Studies have discovered educators' awareness, experiences, and attitudes toward dyslexia (Hettiarachchi, 2016; Peris et al., 2021; Senerath, 2016; Senerath, 2019) linguistic characteristics of Sinhala and Tamil dyslexic learners. (Lokubalasuriya et al., 2019; Prahalathan, 2016). Related to dyslexia and inclusion, only one study has been conducted to reform mainstream ELT professionals' attitudes towards accommodating dyslexic learners in the classroom and spread awareness about inclusive strategies to be used for ELT. (Indrarathne, 2019). Although inclusive strategies that can be used to teach a mainstream classroom with dyslexic ELLs have been proposed, there is a lack of instructions proposed to teach different components of the English language (grammar, speaking, reading) in a dyslexia-inclusive environment. If there are specified

instructions to teach the respective component in a classroom where dyslexic and regular ELLs co-exist, it would be more effective than generalizing a common set of inclusive strategies to teach various aspects of the language. Thus, this study aims to fill the above gap by addressing the lack of vocabulary instructions in a dyslexia-inclusive English classroom. as vocabulary is a crucial component of language learning.

Objective of the Study

Given the academic discrimination experienced by ELLs with dyslexia in a mainstream classroom due to the lack of specialized instructions for ELT, this study aims to propose an educational solution with regard to vocabulary acquisition to minimize such burdens. Thus, the purpose of this qualitative case study is to design an instructional model for teaching vocabulary to both dyslexic and regular ELLs co-existing in the mainstream classroom, utilizing primary and secondary data.

Research questions

1. What should the objective/s of an instructional model designed to teach vocabulary to both dyslexic and regular ELLs be?
2. To achieve the objective/s, how should the instructional model be structured?

LITERATURE REVIEW

Dyslexia – Disability or Different Ability?

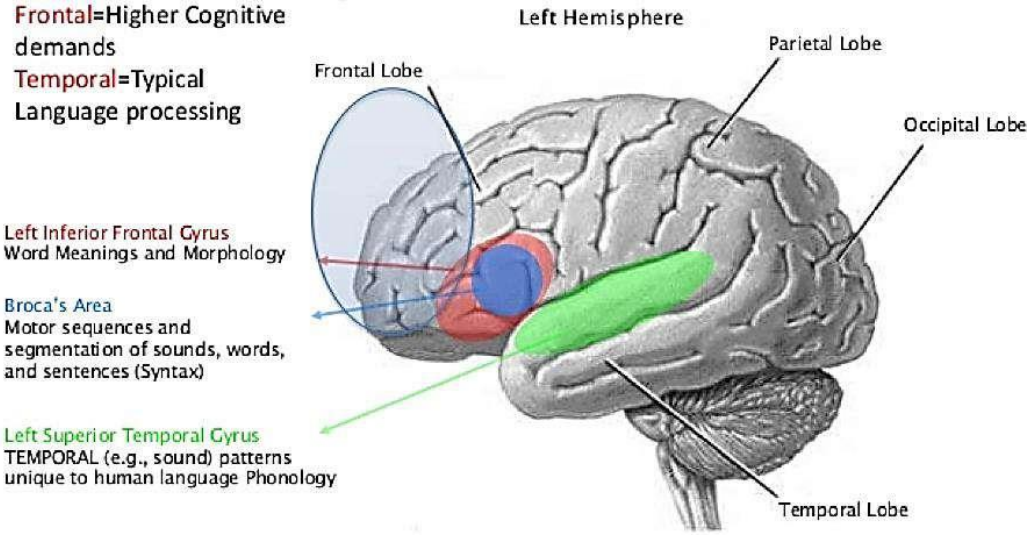
Dyslexia is commonly recognized as difficulty with reading, writing, and spelling – "a disorder in children who, despite conventional classroom experience, fail to attain the language skills of reading, writing, and spelling commensurate with their intellectual abilities" (World Federation of Neurology, 1968, p. 26). Dyslexia is a neurobiological, specific learning disability characterized by difficulties in word recognition, orthography, and decoding, resulting from a deficit in phonological processing primarily affecting language learning. (International Dyslexia Association [IDA], 2003). However, signs are not only related to language learning. Reduced phonological processing and phonological short-term memory, poor grapheme-phoneme correspondence (GPC), poor words retrieval and verbal memory, poor decoding and encoding, difficulty acquiring an L2, reduced short-term memory capacity, poor gross motor skills, and mathematical challenges are some signs of dyslexia (Nijakowska, 2010; Velutino et al., 2004).

Since dyslexia is a non-evident physical or non-sensory impairment, there exist skepticism and a lack of awareness about it. Dyslexic learners are forced to perform better when they are already trying. This results in chronic social, psychological, and emotional upheavals (Peer & Reid, 2003). They are labeled as 'stupid' or 'careless' in schools. (Riddick, 2001). Consequently, dyslexia is adjoined with various misconceptions; children with spelling and reading difficulties have dyslexia, dyslexia is a disease that can be outgrown, and dyslexic learners are lazy, not bright. (Nijakowska, 2010). She clarifies that dyslexia is greater than mere spelling and writing difficulties. It is life-long and dyslexic learners can be bright. They can be gifted, creative and excel in science, art, and sports. (Nijakowska, 2010; Snowling and Hulme, 2011).

The dyslexic brain is assembled uniquely and blueprinted to kindle differently. (Eide & Eide, 2012). With perceptive instructions, dyslexic learners attain success (Senerath, 2016). As Figure 2.2 shows, for over a century, it has been established that the left hemisphere (LH) of the human brain is specialized for language, specifically, Broca's area (associated with production) and Wernicke's area (associated with comprehension). (CNN Health, 2016). LH is analytical, logical, sequential, and recognizes parts of a whole. (Kitchens et al., 1991). Neuroimaging (fMRI) scans (as Figure 2.2) displays that specific regions of the LH are activated during reading tasks in typical readers, whereas there is under-activation in the LH of Dyslexic learners. (Jung-Beeman, 2005; Krafnick et al., 2011). Researchers agree that the primary issue with dyslexia

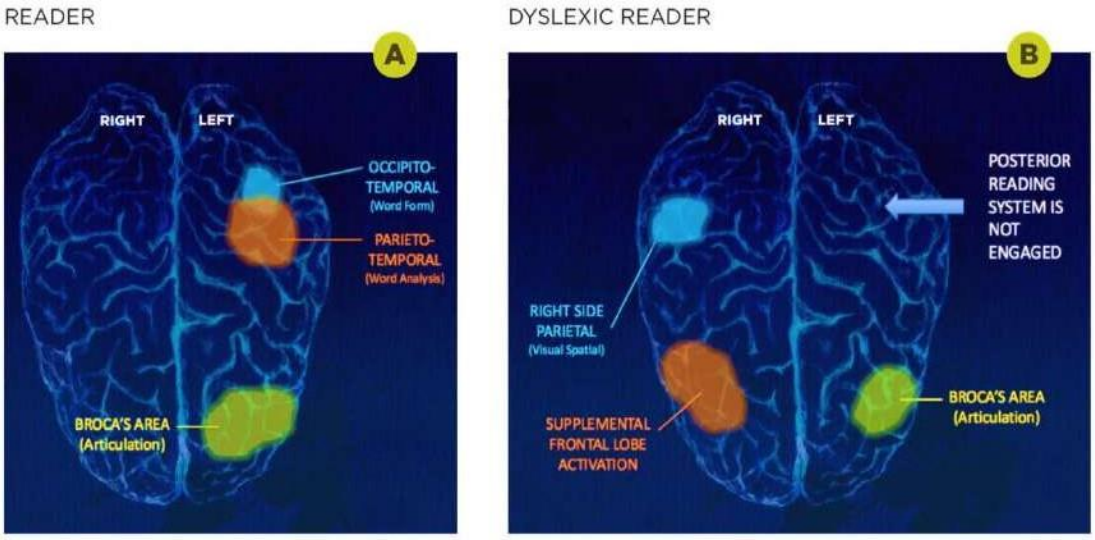
is caused by a functional deficit in brain regions responsible for language processing in the LH– specifically, phonological analysis. (Simos et al., 2002). However, neuroimaging also shows that during reading tasks, there is increased activity in the right hemisphere (RH) of dyslexic learners. (Krafnick et al., 2011; Shaywitz et al., 2002). Further, research has discovered that dyslexic individuals use their RH for processing than the LH. (Armstrong, 2010; Eide & Eide, 2011). As Kitchens et al. (1991) state, if the LH is a computer, the RH is a kaleidoscope. It performs higher-order language skills, drawing inferences, understanding metaphors and jokes, deriving themes, and detecting inconsistencies. (Jung-Beeman, 2005). Due to the RH prominence, the latest findings view dyslexia as an advantage within an impediment (Paul, 2012).

Figure 2.1 Language Areas of the Brain



Note. From Language area of the brain by WikiMedia Common, n.d. CC-BY-SA-4.0

Figure 2.2. Dyslexic Brain VS Non-Dyslexic Brain



Note. From What is dyslexia, by Aspire Academy, n.d. https://aspireiowa.com/services/reading/what-is-dyslexia/. Copyright 2022 by Aspire Academy.

Dyslexia and Vocabulary Acquisition

As Wilking (1972) states, while very little can be said without grammar, nothing can be said without vocabulary. Vocabulary teaching is essential as students can only understand others or express their opinions with sufficient vocabulary (Lessard -Clouston, 2013). However, vocabulary learning is a complex

process that involves word recognition, exploiting phoneme- grapheme correspondences, and learning morphosyntactic and semantic properties (Ellis, 1994). Dictated by the primary difficulties, poor vocabulary growth is categorized as a secondary consequence of dyslexia (IDA, 2003). In their longitudinal study Kormos and Kontra (2008) discovered that the vocabulary size of individuals with dyslexia is smaller due to slow growth compared to non-dyslexics, and vocabulary knowledge is poor due to being less exposed to reading. Moreover, English being a deep orthography language makes it more difficult for dyslexic learners to acquire new vocabulary as English has letters representing 44 phonemes with over 548 GPCs to be recognized. (Mather & Wendling, 2012). Nijakowska (2001) studies a dyslexic learner with vocabulary difficulties due to English being a deep-orthography language. However, as research suggests, different strategies can facilitate vocabulary acquisition for dyslexic learners. (Nijakowska 2001; Sarkadi, 2008; Schneider & Crombie, 2003).

Top-Down Processing

Interventions based on the RH advantage, primarily holistic, top-down processing, help Dyslexic learners who struggle with learning language through fine-detail processing (Eide & Eide,2011; Hedican, 2013). A study by Helland et al. (2011) found that a top-down approach is best for learning spelling, and word reading, implying the effectiveness of top-down processing for vocabulary acquisition of dyslexic learners.

Multi-Sensory Structured Language Teaching (MSLT)

MSLT is an approach that aids learners' memory through visual, auditory, tactile, and kines the tic pathways. (Indrarathne, 2022). It helps dyslexic learners to activate multiple senses, relying more on their stronger learning channels and developing the weaker ones (Hallman, 2021). Studies show that kinesthetic methods in MSLT are specifically effective for teaching dyslexic learners. Air writing, a kinesthetic tracing method that uses muscle memory to encode information into the brain, is ascertained as a technique that facilitates phonemic awareness and word formation. (Nijakowska, 2001; Sarkadi, 2008).

Mnemonics

Another technique that seems useful is mnemonic devices. (Schneider & Crombie, 2003). Mnemonics enhances the ability to remember through unique associations, acronyms, and keywords and helps dyslexic learners retrieve information from long-term memory. (Nijakowska, 2010; Peer & Reid, 2003). Keyword mnemonics help teach spelling and pronunciation (Sarkadi, 2008), humorous and rude mnemonics also help teach spelling. (Turner and Pughe, 2003)

As other strategies, Mind maps that enable holistic processing of information (Gyarmathy, 2001), strategies that stimulate visual channels, flashcards, drawings (Robinson-Tate, 2003), and miming (Sarkadi, 2008), are also found beneficial for teaching vocabulary to dyslexic learners.

Teachers can systematically use strategies as such to teach both dyslexic and regular learners, ensuring those strategies benefit dyslexic learners. (Hallman, 2021).

Dyslexia and Inclusion

Educational sciences qualify individuals with dyslexia as a special educational need group (SNE) (Kormos & Nijakowska, 2017; Peer & Reid, 2003). Due to the notion that they should be treated differently, denoted by the word 'special', some do not have access to the same opportunities as their regular peers. (UNICEF, 2003). They suffer in the classroom without sufficient assistance or being deprived of achieving their language goals. (Indrarathne, 2019). Inclusion which creates a positive change in attitudes promotes higher achievement, and enhances acceptance of disability (UNICEF, 2012), is a solution for the ongoing obstacles dyslexic learners encounter due to stigma, discrimination, and the frequent refusal of decision-makers to

include disability in educational programs. (Bombardelli, 2020).

Inclusive Education in Sri Lanka.

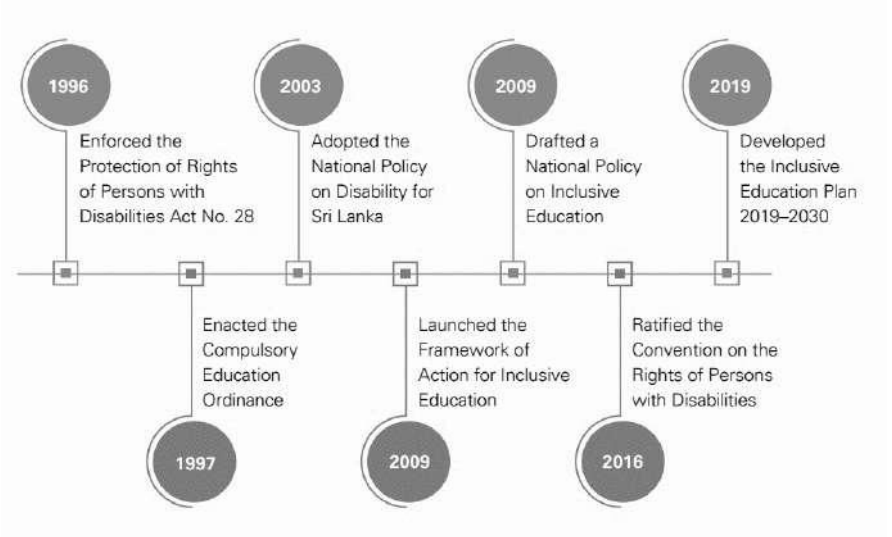
Inclusive education is a new concept in Sri Lanka (Hettiarachchi & Das, 2014). According to the Ministry of Social Welfare (2003), inclusive education is,

The education system itself and each school and classroom recognize and respond to the diversity of each child's particular needs and abilities within one school system by using child-centered teaching methods etc. A child who has a disability is not viewed as a "disabled child" but as a child who has certain particular needs as do many children in the same classroom. (p,16)

Following the Salamanca conference on special needs education in 1994, Sri Lanka signed an agreement to implement inclusive education. (UNICEF, 2021). The conference's main focus was on policy changes that would support inclusive education and allow schools to serve all students, including those with special needs and disabilities. (Jayawardhana & Abeywickrama, 2016). Since then Sri Lanka has advocated the implementation of inclusive education by introducing legislation and educational action plans. (see Figure 2.3). Although the legislation and policies provide solid groundwork for inclusive education in Sri Lanka, persons with disabilities, including dyslexia, face multiple challenges when accessing inclusive education. (Hettiarachchi & Das, 2014; Heetiarachchi et al., 2018; UNICEF, 2021)

In Sri Lanka, SpLDs like dyslexia receive only minimal attention (Hettiarachchi, 2021). Thus, many teachers (excluding SNE teachers) lack knowledge about dyslexia (Senerath, 2016), leaving them to combat dyslexia secretly in the language classroom (Indraratne, 2019). Thus, identifying and accommodating learners with SpLD, like dyslexia, is a vital responsibility of language teachers (Indrarathne, 2019).

Figure 2.3. Milestones in Disability Inclusive Education in SL



Note. From Disability inclusive educational practices in Sri Lanka, by UNICEF, 2021. Copyright 2021 by UNICEF.

Towards a Dyslexia-friendly Mainstream English Classroom

Accommodating dyslexic learners in the mainstream classroom allows them to intermingle with their regular peers. (Awada & Gutierrez, 2018). However, it would not minimize their challenges if teachers lack awareness of dyslexia and inclusive practices essential to take the burden away and vouchsafe the privileges of mainstream education upon dyslexic learners. (Indrarathne, 2019). Specialists are no longer solely held

accountable for meeting the needs of dyslexic learners. (Olagboyega, 2008; Reid, 2005; Turner and Pughe, 2003). Indrarathne (2019) shows how a two-day workshop spreads awareness of inclusive practices among mainstream teachers. Another study investigated how mainstream teachers were trained to use inclusive practices after participating in a massive open online course (MOOC). (Kormos & Nijakowska, 2017).

Studies discover various inclusive strategies for dyslexic learners; Cooperative learning, peer-tutoring, formative assessment, evaluation and feedback, direct instructions, metacognitive strategies (Hattie, 2009), multi-sensory, cumulative, sequential, overlearning as four characteristics of successful teaching for dyslexic learners (Reid, 2003). An evaluation study by Walkers (2000) discovered the effectiveness of these characteristics. Mitchell (2014) discovers 20 inclusive approaches and Nijakowska et al. 2016 list various inclusive strategies to accommodate dyslexic learners in EFL classrooms. However, Wearmouth and Miles (2014) propose that inclusive strategies in mainstream classrooms may not always be as successful as expected.

Learners with disabilities like dyslexia learn better in mainstream classrooms (Awada & Gutierrez, 2018). However, it cannot be guaranteed that dyslexic learners in a mainstream classroom receive the advantage of inclusive education (Reid, 2005). Inclusive education limited to social inclusion without prominence to academic attainment is problematic. (Donohue & Bornman, 2014). In Sri Lanka, only Indrarathne (2019) conducted a study to include dyslexic learners academically in mainstream English classrooms by spreading awareness of inclusive practices through a teacher training workshop. Although inclusive strategies that can be commonly used in the mainstream English classroom have been studied, specific instructions to teach different components of the English language (vocabulary, grammar, speaking) in a dyslexia- inclusive classroom are yet to be proposed. Further, since inclusion is a new concept, Abeywickrama et al. 2014 state that designing culturally appropriate educational models is necessary to shift Sri Lankan community towards inclusive education. Considering the above dearth of instructions, vitality of vocabulary acquisition, and the need for more inclusive educational models in SL, this study designs an instructional model for vocabulary acquisition that benefits both dyslexic and regular learners, aspiring to equip teachers with a solution as Richardson, 1996 suggest offering educational benefits to the dyslexic population in the mainstream classroom and making a valuable contribution to inclusive education in Sri Lanka.

METHODOLOGY

- **Research Design**

For the emergence of the Triple R model, this exploratory research was governed by the interpretivist paradigm and an inductive approach. The study was conducted as a qualitative case study research as it enables an in-depth analysis of a particular case (Creswell, 2013; Yin, 2009), thereby allowing the researcher to study participants extensively, propose a solution (the model) that is unique for their circumstances and comprehensively examine the applicability of the solution in resolving existing complications.

Setting and Participants

This study was mainly based at Galle International College, a school that accommodates learners with various abilities and disabilities and practices inclusive education. This school was selected as it is one of the few schools where both dyslexic and regular learners co-exist in the mainstream classroom.

To design the instructional model, data was obtained from a sample comprising two subject matter experts (SME), two dyslexic learners, and two teachers from the research setting, selected employing purposive sampling. The two Sri Lankan professors who participated in the research were well-versed in dyslexia. One, a pediatric neurologist who has years of experience treating dyslexic children, and one is a trainer of

dyslexia and inclusive practices. The two dyslexic learners, referred to by their pseudonyms Saswi and Yenul hereafter, were confirmed as dyslexic by their teachers. Saswi, an L2 speaker of English, was a medically proven dyslexic learner diagnosed at the age of 9 and has since been receiving specialized instructions. Yenul, an L1 speaker of English, was diagnosed as potentially dyslexic by his teachers. He has been under observation for a few years. Due to the many dyslexic characteristics, he showcases that differentiate him from being a slow learner, the teachers identify him as a dyslexic learner. Unlike Saswi, Yenul had only minimal management of his condition. The researcher selected the two dyslexic learners employing CLDQ-R checklist. The two teachers selected were a mainstream teacher experienced with inclusive teaching and a special needs teacher from the school.

Data Collection: Procedure and Instruments.

Data was collected for three months employing data triangulation. Multiple data sources were used for the study to increase the density of the datasets.

Data was collected from questionnaires to the SMEs, semi-structured interviews with the teachers, and unstructured observations of the two dyslexic learners. Secondary data was also collected from books, research articles, and journals to understand the theocratical foundation when designing an instructional model. The SMEs were sent a questionnaire with five sections of open-ended questions focused on the awareness of dyslexia, dyslexic vs non-dyslexic learners, dyslexia and inclusion and dyslexia and learning English. Semi-structured interviews were conducted with the two teachers from the school to understand how they perceive dyslexia and inclusion, accommodate dyslexic learners in the mainstream classroom and their views on potential interventions for dyslexic learners. Two dyslexic learners from the school were observed as they engage in English language learning with their regular peers to obtain a hands-on experience on the classroom dynamics of a mainstream English classroom with dyslexic learners. Quality, relevance, and reliability of the secondary data were considered before employing them in the study. The model was developed by the researcher using these datasets.

Data Analysis.

Thematic analysis method (Clerk & Braun, 2015) was used to analyze data using an inductive descriptive coding approach. The themes that emerged from the data analysis of questionnaires, interviews, and secondary sources in the first phase were used to develop the model. Denver software was used to maintain data collected from various sources.

Ethical Consideration.

This study adheres to the Ethical Standards of the Ethics Review Committee (ERC) of Faculty of Medicine University of Kelaniya. In place of ERC University of Kelaniya Department of English Language Teaching scrutinized the research for ethical clearance. Participants were chosen for the study with informed consent, explaining the research proceedings and ensuring their anonymity and confidentiality. Mainly the dyslexic learners were selected with the informed consent of the school and their legal guardians with the right to withdraw from the research if they wished. Measures were taken to ensure the anonymity and confidentiality of the participants.

FINDINGS AND DISCUSSION

What Should the Objective/s of an Instructional Model Designed for Teaching Vocabulary to BothDyslexic and Regular ELLs be? – RQ 1

Before designing the model, it was essential to determine what such a model should ultimately accomplish.

When analyzing data collected from the SMEs, dyslexic learners, teachers, and secondary sources, several themes emerged that helped the researcher determine the objective/s the model should ultimately achieve.

Perception of Dyslexia.

The findings simultaneously proved and disapproved what other studies reveal about the lack of understanding and negative perception of dyslexia. (Heetiarachchi, 2021; Indrarthne, 2019; Senerath, 2016). While the SMEs confirmed the above claim. The remaining participants responded differently.

- Educators and parents seem to have minimal awareness and insufficient understanding of dyslexia. E.g.: Parents of children with dyslexia force their children to show high achievements which those children may not be able to fulfil. (SME2)
- They are labeled as 'slow' ''stupid' (SME1)
- We have so many learners with various learning needs, autism, down syndrome dyslexia We don't make them visible sticking points. Diagnosing as dyslexic is actually beneficial but labeling them as dyslexic is needless. I think everybody in the school is aware, that there might be students whose quality of work, isn't similar. Out teaching staff and the students operate with a fairly high degree of empathy. Dyslexics are just different like we all are. (T1)
- Saswi and Yenul being dyslexic are not bullied or negatively perceived. (observation)

Since the teacher and learners are from one of the few institutions (similar to what Peer & Reid (2003) call 'dyslexia-friendly schools') that accommodates inclusive education in Sri Lanka, they possess positive attitudes towards disabilities, including dyslexia compared to the majority of the other educators in Sri Lanka who lack understanding about dyslexia and inclusive practices due to minimal awareness as many other studies have discovered. When developing the instructional model to teach both groups, what was understood through the contradictory perceptions was as follows.

- From SMEs: The abilities of dyslexic learners should be prioritized to portray them as capable
- From T1: Dyslexia as a disability should not be

Hence, it was clear that the model should be able to highlight the abilities of dyslexic learners, preventing it from emerging as a disability.

The 'Dyslexic' Challenge.

While there are many common challenges dyslexics face when learning English, the two predominant challenges highlighted in the findings were writing and memorizing.

The data revealed that reading could be improved than writing comparatively.

- Something I find interesting from my observations is that their reading level can still be maybe a little bit behind age level but when asked to write something they just read immediately there's a disconnection. (T1)
- There was a dyslexic kid who knew so much about science but he gets blocked with (T1)
- If you're very smart and you have something in your mind, like you want to tell something about a witch in a village you have the story in your head, but you can't get it on the paper, that's frustrating. (T2)

Difficulty memorizing what is learned was often observed in the two dyslexic learners. Potentially due to reduced short-term memory capacity being a secondary consequence of dyslexia. (IDA, 2003)

- Yenul could remember only one word out of the same five words taught in more than two lessons.

(observation)
- Saswi experienced difficulty answering questions about a passage she just read in class. (observation)

These challenges are not caused by a physical impairment but by typical dyslexic difficulties. (Poor phonological awareness, orthographic processing etc.) These revelations imply that if an instructional model for teaching vocabulary is proposed, it should minimize the memorization difficulties and lead to reducing the writing challenges dyslexic learners experience.

Lateralization

Further, data revealed that,

- The education system that trains the three 'R's (Reading, Writing, and Arithmetic) contributes to the dominance of the left hemisphere, discriminating the right. (Sperry,1975).
- Individuals with dyslexia show a right brain prominence. (Armstrong, 2010; Eide & Eide, 2011).
- Top-down processing can be adapted to teach language optimizing the RH advantage (Hedican, 2013)
- Dyslexic learners use their right hemisphere for processing, making them out-of-the-box and holistic thinkers who draw insightful connections and see the bigger picture. (Eide & Eide, 2011).
- Dyslexics are holistic thinkers. (SME2)
- They rely on the context when doing tasks. (T2)

Although the claim on education is dated, the current system is still biased towards the left hemisphere. (Abeypala, 2022). This is presumably why learners with LDs like dyslexia with prominence in RH get abandoned in the learning process. As mentioned earlier, RH is prominent for holistic thinking, which explains why dyslexic learners are considered big-picture thinkers. According to these findings, it is understood that if the model can be developed with a holistic approach, including top-down processing, dyslexic learners will be benefited.

Accommodating 'Dyslexia' in the Mainstream English Classroom

SMEs and teachers firmly opted that dyslexic learners should be taught in mainstream English classrooms. Following are their views on involving dyslexic learners in the mainstream learning process.

- Learners with dyslexia don't need different curriculum goals, only additional support to achieve the same goals (SME1)
- Inclusive language teaching helps both learners with and without dyslexia to learn English in the same class. (SME2)
- We have to remember that as teachers, it's our responsibility and part of our training to teach each child as to who they are including dyslexics. (T1)

The above findings suggest that dyslexic learners are unique, and they should be given equal opportunities and goals to attain, with additional support. Earlier, it was discussed how dyslexia should not be highlighted as a disability. Since additional support only given to dyslexic learners can be a defining factor of their disability, it seems best to develop the model using more dyslexia- friendly and inclusive methods to which regular learners can adapt.

From the above findings, the following were devised as the objectives of the model.

The instructions of the model should be able to

1. Accentuate the advantages and abilities of dyslexic

This objective was devised with the finding that dyslexia should be highlighted not as a disability but

ability. The model should be developed with an RH approach using top-down processing, as it is one of the significant abilities of dyslexic learners.

2. Facilitate memorization of the target language.

3. Minimize the challenges dyslexic learners face in writing.

This objective focuses on the memorization and writing challenges of dyslexic learners. To achieve this through the model, vocabulary should be taught in a more retaining manner for the learners to decrease their challenge in writing.

4. Optimize the use of dyslexia-friendly and inclusive strategies in teaching both groups equally.

A model as such should undoubtedly benefit dyslexic learners. However, it should not have a sole focus on them. Hence this objective was created to modify the dyslexia-friendly approach to help both groups. The model should be structured to attain the above goals ultimately.

To Achieve the Objective/s, How Should the Instructional Model be Structured? RQ2

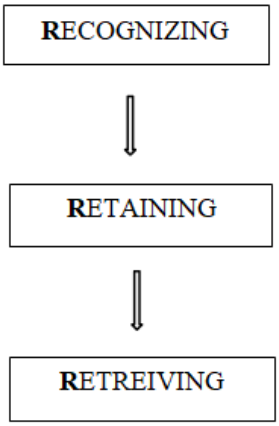
To achieve the objectives discussed in the previous section, the researcher designed an instructional model for teaching vocabulary to both dyslexic and regular ELLs co-existing in the mainstream classroom, named the **Triple R model.** As devised, the model was designed prioritizing the abilities of dyslexic learners, addressing the writing and memorizing challenge, and incorporating dyslexia-friendly and inclusive strategies. The following presents an account on

1. The structure of the Triple R
2. The rationale behind the structure of the

The discussion is supported by the thematic analysis of the data employed in creating the model. Data from books, research articles, and journals were extensively used to build a solid theoretical foundation for the model.

Structure of Triple R model.

The Triple ‘R’ model.



The model comprises three main stages:

1. **Recognizing stage**– Identifying the form and meaning of the
2. **Retaining stage**– Storing the form and meaning of the words through repetitive
3. **Retrieving stage**– Recalling the form and meaning of

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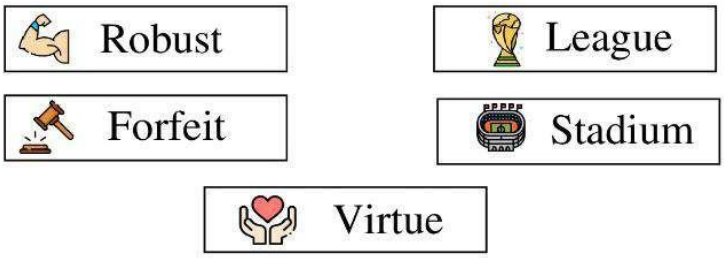
Recognizing Stage.

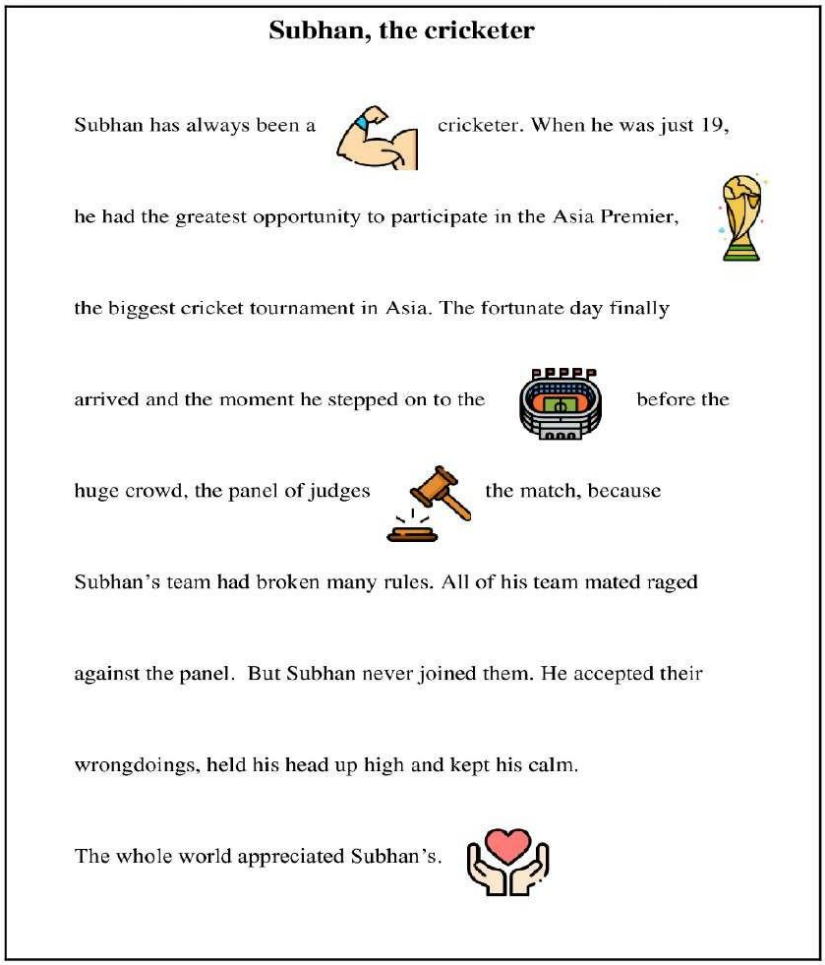
In this stage, the target words are introduced through a story. A mini story is fabricated incorporating the target words. However, it is presented by replacing the target words with pictures that are closely related to the meaning of each. (Figure 4.2) It is displayed visually and read out loud to the students. Terms that suit the pictures should be elicited from the students. Ex– *What do these pictures mean? When you read the whole story, what can you tell about each image? What clues do you have from the story to guess the words?* After guessing the words, the target words are presented using flash cards. (Figure 4.1) Each flash card is displayed, pronunciations of words are taught through drills, and the correct meaning is established in association with the mnemonic images, clarifying any confusion that occurred during eliciting.

Figure 4.1. Flashcards



Note. Flashcards used in the intervention. Own work.

Figure 4.2. Story



Note. This is the story used in the intervention. Own work.

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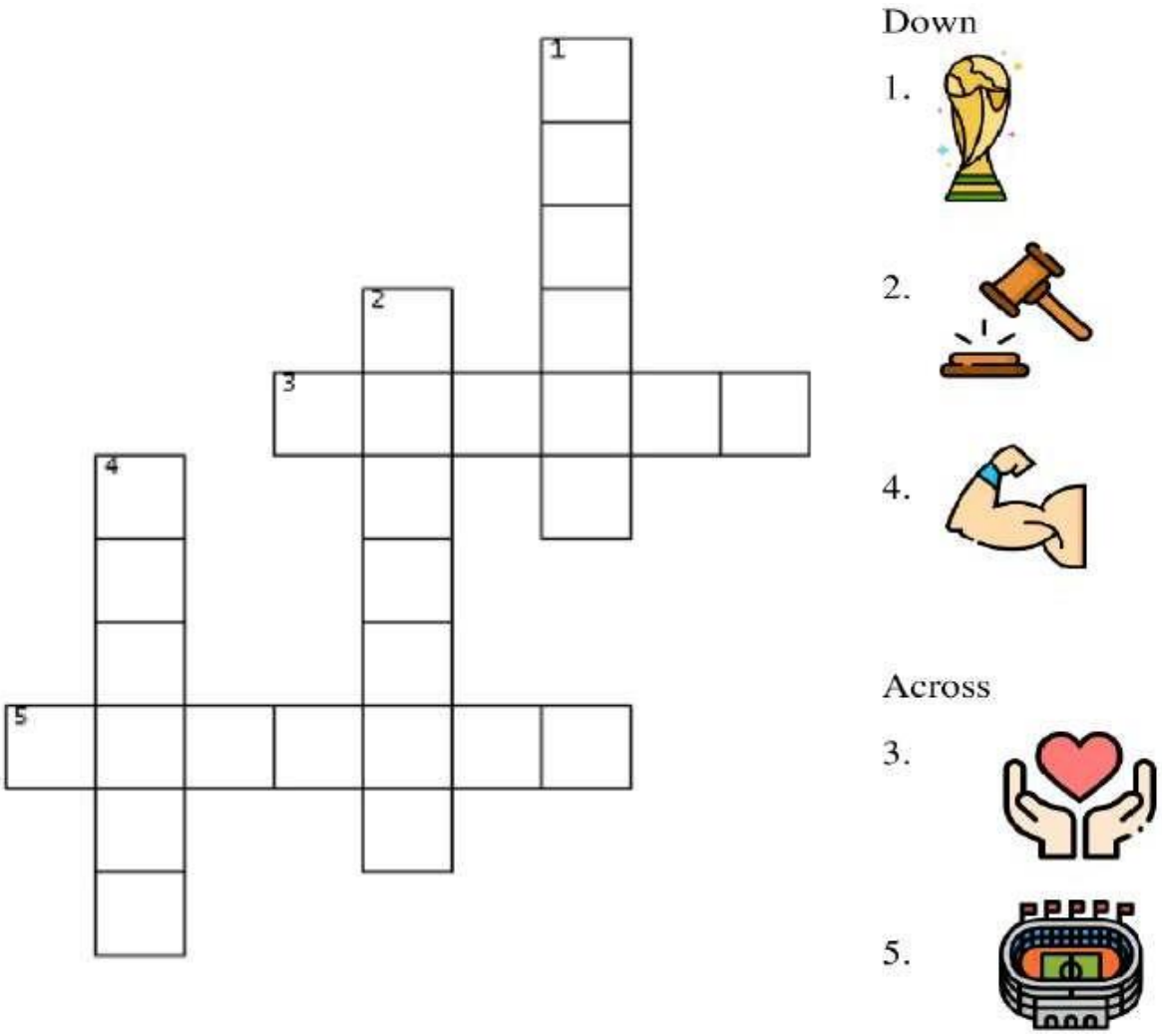
Retaining Stage.

The second stage of the model focuses on practicing the form and meaning of the words. First, the spellings of the target words are practiced through skywriting. Once the words are practiced at least three times, a crossword puzzle customized for the target words (Figure 4.3) is given with the mnemonic images introduced in the previous stage as clues to complete individually. Once the activity is finished, the meanings each clue (mnemonic) represents, and the answers are discussed.

Figure 4.3. Crossword

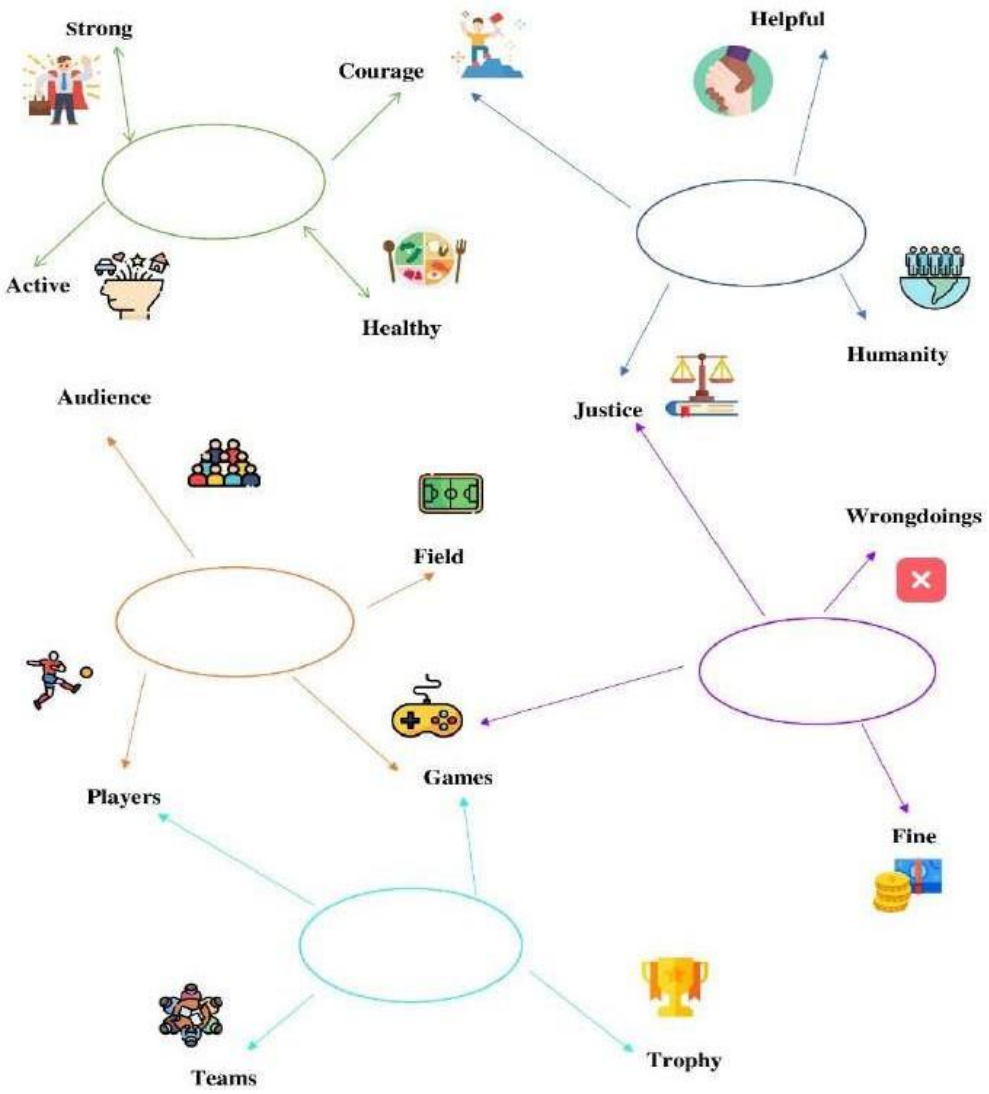


Note. This was used for the intervention. Own work.

Retrieving Stage

In this stage, first, students engage in peer tutoring. The dyslexic and regular learner sit in pairs and teach each other. In the first round, one learner shows the mnemonic image, the other learner tells the meaning and writes the word. In the next round, one student writes a word for the other to draw the relevant mnemonic. The two students take turns to complete the two rounds. Students can correct each other's mistakes. Next, a semantic map is given (Figure 4.5). A network of words is created, connecting the target words with words that are conceptually related to them (presented as written words and pictures). Students make connections between the words on the map and retrieve which word out of the target word they learned suits each circle.

Figure 4.4. Semantic Map



Note. This was used for the intervention. Own work

Rationale Behind the Structure

The data analyzed under the theme, (1.5) cognitive learning was used to develop the three stages of the model. A key finding from secondary sources was,

- Miller (1950) information processing theory (IPT) is a theoretical framework that provides implications for teaching-learning process. (Slate & Charlesworth, 1998).

Drawing from computer processing, the theory explains how humans process and encode information into memory in stages. First, information is received through the senses, then used to perform tasks while storing it in short-term memory, and finally encoded into long-term memory for later retrieval. The researcher adopted the same cognitive process for the model to teach vocabulary. As discussed in RQ1, it was essential to address the memorization issue of dyslexic learners through the model. Information processing theory was adopted as it postulates how information gets permanently stored in long-term memory. In the first stage, 'recognizing' students receive the words, thereby identifying their forms and meanings. In the second stage, 'retaining', students actively practice the form and meaning of the words storing them in short-term memory. In the third stage, 'Retrieving', students retrieve and use the acquired words in context, facilitating the encoding of words into long-term memory. Several activities are built into each stage to foster the cognitive process. The rationale behind each stage is explained below.

Recognizing Stage

As in IPT, in this stage, the target words are first received through the senses. This stage was structured to achieve the first objective- '***the model should be able to accentuate the advantages and abilities of dyslexic learners***. Under the theme (l.3), RQ1 discussed how dyslexic learners show prominence in the RH, making them holistic thinkers and consequently better at top- down processing. Eide and Eide (2011) identify this as the 'dyslexic advantage'. The recognizing stage was structured to increase the RH reliance through top-down processing using a story and eliciting.

It was essential to find a different way to introduce the words to learners than directly presenting the form and meaning. Thus, a story was chosen to present the words for two reasons,

- Top-down processing can be achieved through a
- The two dyslexic learners enjoyed making and relating stories. (observation)

After synthesizing a set of findings related to theme (1.4) as below, the researcher thought to replace the target words in the story using pictures.

- *Dyslexic learners are strong at visual learning and multisensory structured language teaching (MSLT) is effective for both dyslexic and non-dyslexic learners*. (SME2,1)
- *Dyslexics are strong at visual learning* (T2)
- Methods such as multisensory teaching is especially beneficial for learners with dyslexia. (Nijakowska et al., 2016)
- Mnemonics is an effective teaching strategy to use to teach dyslexic (Nijakowska et al., 2016; Nijakowska, 2010; Peer & Reid, 2003; Sarkadi, 2008;)
- A successful education program for dyslexic learners is based on multisensory-teaching, sequential approach, cumulative progression, and over-learning. (Reid,2005)

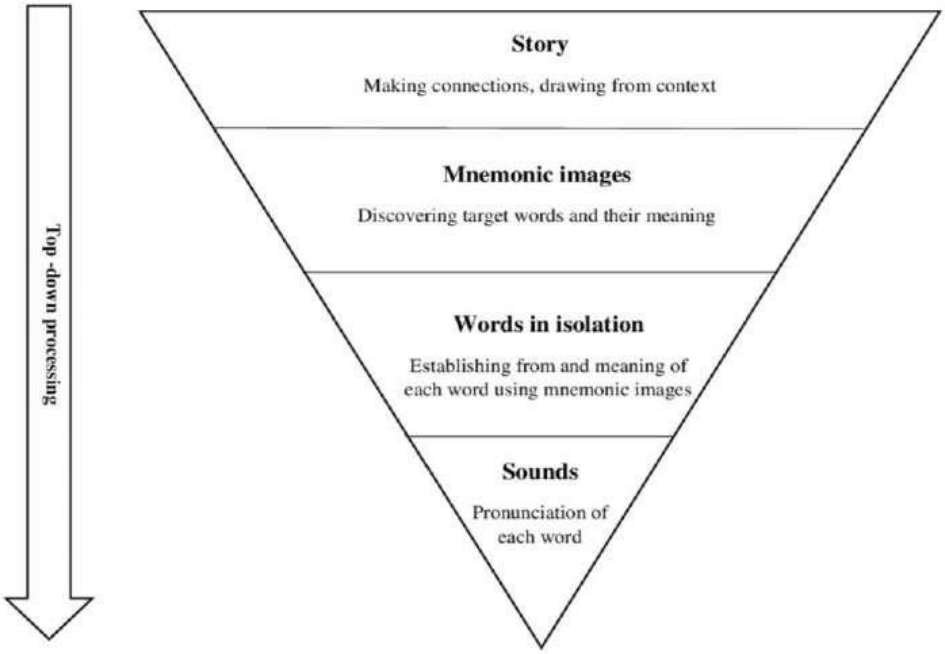
When considering the above findings, pictures emerged as an optimal technique to incorporate into the model. As discussed previously, due to the primary deficit in phonological processing in dyslexic learners, they display poor grapheme-phoneme correspondence (GPC). Hence, without incorporating the target words into the story in written form, they were replaced by pictures closely related to the meanings of the target words. The usage of pictures can facilitate visual learning and is also a technique in MSLT. Pictures offered the benefit of further advancing into an inclusive strategy, mnemonics. Mnemonics are memory techniques that increase the ability to store and retrieve information. In this model, a picture is associated with each target word, known as an image mnemonic. The reason behind using image mnemonics is to trigger the meaning and form of a target word that the image is associated with upon seeing them. Forgetting newly learned words is common to everyone, irrespective of the differences in ability. Thus, it is effective for both dyslexic and regular learners.

In the recognizing stage, mnemonic images are used in the story as clues for the students to discover the target words and their meanings. At the end of the stage, the teacher assigns each mnemonic image the designated meaning and form. The researcher further developed the usage of image mnemonics to achieve the objective; ***the model should be able to facilitate memorization of the target language***. The mnemonic images were further merged with cumulative and overlearning aspects (which Reid (2005) states a dyslexia-friendly program should include) and were incorporated in the following two stages (clues of the crossword, semantic map, and peer tutoring) to encode the forms and the meanings of the target words into long-term memory.

It was articulated before that the model should be designed with an RH approach to learning supported by top-down processing. Thus, eliciting meanings for the pictures in the story was used as a medium to increase RH reliance by making connections, big processing, and drawing from context. Questions are asked in a

manner in which students can process the meaning of the whole story, make connections and find clues from the context to discover the target words and meanings. EX. *What do these pictures mean? When you read the whole story what can you tell about each picture? What clues do you have from the story to guess the words?*

Figure 4.5. Top -down Processing



Note. How processing takes place according to the model. Own work.

Retaining Stage

The second stage of information processing theory states that the information received from sensory organs is then temporarily stored in short-term memory. Miller (1956) introduced 'chunking', theorizing that an individual's cognitive load is limited to seven plus or minus two chunks of information. A chunk refers to digits, words, or people's faces. Further, if the information is not familiarized or repeated, it will likely to be forgotten. Drawing from this proposition of Miller's, after receiving the target words from the recognizing stage, the five target words are stored temporarily in the working memory and practiced through skywriting and a crossword puzzle. This stage explicitly addresses the two objectives; ***the model should be able to minimize the challenges dyslexic learners face in writing*** and ***facilitate memorization of the target language*** in unison. The researcher adopted the technique used in learning sight words to practice the form of words. Sight words are memorized by sight and instantly recognized without decoding. This indicates that sight words have a whole-word approach to learning. If dyslexic learners can be taught to memorize the spelling of a word as a whole, they can automatically write the words without having to use any strategies of decoding or blending. This poses the question; how can learners memorize the forms of a word as a whole? Moreover, dyslexic learners are comparatively more challenged with memorization difficulties.

Related to theme (1.4) it was discovered that,

- Skywriting is a technique used in Orton Gillingham[1] It is a gross motor activity predominantly used in multisensory learning. (Peavler & Rooney, 2019).

The objective of skywriting is to use movement and muscle memory as a strategy to reinforce correct spelling. In skywriting, the whole body is used to write each letter, and the muscle memory it triggers transfers the information into the brain, thereby storing it for later use when writing using a pencil. It also

helps learners memorize the correct spelling of a word, letter-by-letter, gaining their confidence in spelling words. (Hoffman, 2022). It was evident that skywriting which is a multisensory learning strategy follows the same whole-word approach seen in sight words, and this whole-body kinesthetic approach minimizes the challenge of memorizing letters as a whole. Hence, the researcher thought it is ideal for practicing words using skywriting to automatize the forms as a whole.

Previously it was discussed that overlearning is a characteristic of a good educational program for dyslexic individuals (Ried, 2005). The crossword was employed to provide repeated practice on the form and meaning of the words while the words were still in short-term memory. More findings related to the theme (1.4) revealed the following.

- You can give them spelling frames to practice words. (T2)
- Using clay and playdough can help dyslexics learn letters effectively. (SME2)

While T2's suggestion was utilized, SME2 's was not since using clay or dough could be time- consuming in a staged-teaching process and seems slightly extraordinary in a regular classroom. Other than providing frames for each word, the researcher decided to use a crossword as an integrated frame for all words.

The mnemonic images were used for the clues as a repetitive measure to facilitate memorizing the word's form and meaning in relation to the image. In seeing the images as clues the word and its meaning is triggered in their minds. Through practicing spelling using the crossword, students actively process the words they temporarily retain in short-term memory confirming the claims of Miller (1956) mentioned above.

Retrieving Stage

This stage is analogous to the long-term memory stage in Miller (1956) information processing theory. Long-term memory retains information received and processed in short-term memory for an extended period and is used for later retrieval. If learning is to occur, instructions should be obtained to make connections between existing memory structures and new information (Lutz & Huitt, 2003). Thus, in this stage, the five target words processed in the working memory are combined with other conceptually-related words to be encoded into long-term memory.

Findings related to the theme (1.4) revealed the following.

- All the SMEs and teachers proposed that regular peers can help dyslexic learners in the classroom.
- Peer tutoring is an evidence-based strategy that can be used in inclusive classrooms. (Hattie, 2008)

These findings suggest that regular learners can take charge of dyslexic learners in learning. Considering the above, peer-tutoring was incorporated into the model, however with a slight change. Allowing only the regular learner to teach the dyslexic learner may establish a strong- weak relationship between the learners submitting the dyslexic learner further into 'disability'. In the previous discussion, it was discussed how dyslexia should not emerge as a disability. As mentioned, T1 firmly stated that dyslexic learners are different like we all are. Thus, both dyslexic and regular learners were given equal status in peer tutoring. Further, peer-tutoring was used as another opportunity for overlearning the meanings and forms of the target words.

Findings of theme (1.5) also revealed,

- When concepts of the words are related, it is easier to activate words with similar (Brennan, 2022)
- Words are stored in the mental lexicon as a network connected according to their shared meanings. (Thornbury, 2002)

Considering the above, the semantic map as a network of conceptually related words was employed in the model to facilitate retrieving target words for the activity and help students encode the target words acquired, to their long-term memory in a more reliable manner, thereby expanding their mental lexicon. Semantic map also enables top-down/holistic processing.

The rationale behind the structure of the model can be explained as above. Furthermore, when adopting the IPT into learning, Lutz and Huitt (2003) state that information should be presented in a manner that it can be encoded to memory structures. The model achieves this through,

- organizing the target words in association with mnemonic
- adhering to Miller (1956) '5 plus or minus 2' concept, the model only proposes to teach

only five words through one lesson.

- Following Brennan (2021) and Thornbury (2002), words are selected according to a particular theme, sports and

The study addressed two key research questions. Firstly, it aimed to identify the objectives for an instructional model tailored to teach vocabulary to both dyslexic individuals and regular ELLs. The second research question delved into the development process of the instructional model, seeking an understanding of how it should be formulated. Subsequently, the study successfully crafted the instructional model in alignment with the objectives outlined in response to the first research question. The researcher developed the model according to a cognitive learning theory using the dyslexic advantage, dyslexia-friendly, and inclusive strategies. In developing the instructional model, insights from prior studies were carefully integrated. The RH approach that was found to be a dyslexic advantage, (Shaywitz et al., 2002; Amstrong, 2010; Krafnick et al., 2011; Eide & Eide, 2011) was adopted to construct this model. To optimize the RH approach, top-down processing (Eide & Eide, 2011; Helland et al., 2011; Hedican, 2013) was used to complement the RH approach. Kinesthetic methods in MSLT especially air writing which is effective when teaching dyslexic learners (Nijakwska, 2011; Sarkadi, 2008) was incorporated in the second phase of the model. Similar to the utilization of mnemonics in Sarkadi (2008) and Turner and Pughe (2003), mnemonics were also integrated in the model. Moreover, drawing from Gyarmathy (2001) incorporation of mind maps to foster holistic processing, semantic maps were used as a parallel method to construct the model that enables holistic processing.

The RH approach complemented by top-down processing was adopted **to accentuate the abilities and advantages of dyslexic learners.** Using inclusive strategies like peer tutoring, mnemonics and drawing from Reid (2003) dyslexia-friendly elements (Multisensory, cumulative, sequential, and overlearning) and the model was structured with a multisensory approach, involving a step-by-step process with each step progressing into the other (the words are first received then the words are temporarily stored and processed finally combined with new information to retain them permanently) **to optimize the use of dyslexia-friendly and inclusive strategies in teaching both groups equally.** The model adopted IPT and incorporated practicing form and meaning of words through repeated activities like skywriting, crossword, and semantic map to **facilitate memorization** and **minimize the writing challenge of dyslexic learners.**

CONCLUSION

This study aimed to propose an educational solution in relation to vocabulary acquisition for the difficulties experienced by dyslexic English language learners being unattended or segregated by their regular peers. The study's key findings were the emergence of the Triple R model. The Triple R model is a deliberate product of the researcher's consideration of the contemporary challenges inherent in dyslexic learners'

vocabulary acquisition. It is meticulously structured based on cognitive learning theory, integrating inclusive and dyslexia-friendly strategies. The design of the model reflects a deep understanding of the obstacles dyslexic learners encounter during vocabulary learning and outlines the essential goals a model of this nature should achieve. By incorporating cognitive learning theory, inclusive, and dyslexia-friendly strategies, the Triple R model not only addresses immediate challenges but also sets a foundation for advancing pedagogical approaches tailored to the distinctive needs of dyslexic individuals.

Pedagogical Implications

The study has pedagogical implications for educational stakeholders with regard to ELT. Serving the language needs of dyslexic learners tends to get dictated by the non-specialized mainstream teaching in the English classroom. As this model was designed prioritizing the abilities, goals, and needs of dyslexic learners, through its application, the dyslexic population can be active participants in vocabulary learning in the mainstream English classroom. Thus, dyslexic learners need not to stay invisible or discriminated in school. This model seeks to provide equal opportunities for both dyslexic and regular learners. English language teachers and schools can adopt this model to teach vocabulary in classrooms where dyslexic learners secretly suffer, although it may not bring instant results. Educational decision-makers can further advance models and systematically implement them to benefit dyslexic learners and establish inclusive education in Sri Lanka.

Limitations and Further Research

The study encountered potential limitations. Due to the lack of understanding and expertise on dyslexia, many dyslexic learners remain unidentified. Hence, the researcher could not obtain the expected number of dyslexic learners needed for the study. Thereby the sample of dyslexic learners was reduced. However, adapting to the circumstances, the study was conducted as a case study, as Stake (1995) says in ‘particularization’ than ‘generalization’. Furthermore, the unavailability of many SMEs limited data access through questionnaires when gathering data to design the model. To minimize the effect of this data triangulation was incorporated.

There exists a dearth of instructions proposed on how to accommodate dyslexic learners in mainstream English language learning. Thus, this study has strived to contribute to the above by proposing instructions for vocabulary teaching. With the help of future research on this model, supposedly measuring its applicability and its effectiveness across various geographical and educational contexts, the Triple R model has the potential to be established as an educational model that makes significant progress in shifting our community towards inclusive education.

List of abbreviations

Abbreviation	Definition
BDA	British Dyslexia Association
CEFR	Common European Framework of Reference
ELL	English Language Learners
ELT	English Language Teaching
ERC	Ethics Review Committee
fMRI	Functional Magnetic Resonance Imaging
GPC	Grapheme Phoneme Correspondence
IDA	International Dyslexia Association
IE	Inclusive Education

IPT	Information Processing Theory
LD	Learning Disability
LH	Left Hemisphere
MOOC	Massive Open Online Course
MSLT	Multi -Sensory Structured Language Teaching
RH	Right Hemisphere
RQ	Research Question
SME	Subject Matter Expert
SL	Sri Lanka
SpLD	Specific Learning Disability
UNICEF	United Nations Children's Fund
UNESCO	United Nations Educational Scientific and Cultural Organization

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FOOTNOTE

Related to theme (1.4) it was discovered that,

[1] The first structured multisensory teaching approach designed to help struggling learners like Dyslexics.