The Impact of Phonological Awareness Instruction to Improve Reading among Grade 3 EFL Dyslexic Learners: An Intervention Mixed-Method Research in One Mainstream Primary School in Maseru

by

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DECLARATION

I, Puseletso Lebajoa, hereby declare that I am the sole author of the thesis entitled "The Impact of Phonological Awareness Instruction to Improve Reading among Grade 3 EFL Dyslexic Learners: An Intervention Mixed-Method Research in One Mainstream Primary School in Maseru." This thesis was submitted in partial fulfillment of the requirements for the Master's Degree at the National University of Lesotho, under the supervision of Dr. Tawanda Wallace Mataka. I confirm that this is my original work and has not been submitted for any academic qualification to the best of my knowledge. Furthermore, I confirm that all information and concepts used in this work, whether directly quoted or paraphrased, have been appropriately cited and referenced. By signing this statement, I affirm that the work presented in this study is an accurate and authentic reflection of my own efforts, and that I have adhered to the highest ethical standards in the conduct of my research.

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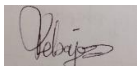

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Dedication

This research project is dedicated to my wonderful mother, Malebajoa Lebajoa, whose unwavering love and support have been the driving force behind my academic journey. Despite the challenges of raising us as a single mother after the untimely loss of your husband, you persevered, ensuring that I reached my fullest potential. I am confident and accomplished today because you, my mother, are my role model. Your comforting embrace during my darkest days was like the warmth of the sun on a freezing winter's day. Your belief in me and your constant engagement have been a continual source of inspiration, for which I am eternally grateful.

I also dedicate this work to my daughter, Bokhabane Lebajoa: *"All that I am and hope to be, I owe to you, my angel."*

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ABSTRACT

Dyslexia is a distinctive learning difficulty that affects reading and language processing, posing significant challenges for learners, particularly in English as a Foreign Language (EFL) contexts. This study investigated the efficacy of phonological awareness instruction as an intervention technique to improve reading abilities in dyslexic learners within an EFL setting. The theoretical foundation of the research draws on Cognitive Load Theory, Dual Code Theory, and Multisensory Language Education Theory. A mixed-method explanatory sequential design was employed, integrating both quantitative and qualitative approaches to comprehensively assess the impact of the intervention.

The study involved 41 participants: 20 dyslexic learners in an experimental group who received targeted phonological awareness instruction, and 20 dyslexic learners in a control group who followed traditional reading methods. Additionally, one special education teacher assisted the researcher with classroom observations and administering two tests: The Bangor Dyslexia Test and the Rapid Automatized Naming Test. Quantitative data were analysed using inferential statistics via SPSS, while qualitative data were thematically analysed using Atlas.ti software.

The findings revealed a strong correlation between phonological awareness instruction and the improvement of reading skills among Grade 3 EFL dyslexic learners. The study concluded that the success of the intervention is influenced by explicit instruction, a supportive learning environment, and recognition of individual learning styles. Future research may explore the role of morphological awareness in enhancing word-level understanding for EFL dyslexic learners.

Keywords: *Dyslexia, Phonological Awareness Instruction, Reading, English as a Foreign Language*

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CHAPTER 1: BACKGROUND AND RATIONALE

1.0 Introduction

This chapter serves as the introductory component of the study. Its primary aim is to outline the rationale for conducting the research. It also presents the research hypotheses and the research question that guided the research process and informed the selection of relevant literature for review. Additionally, the chapter discusses the significance of the research, its limitations and delimitations, provides definitions of key terminology and acronyms, and presents an overview of the structure of the study.

1.1 MOTIVATION

As a special education teacher with expertise in instructing ESL learners, I have personally witnessed the significant impact that reading challenges can have on learners' academic performance. These difficulties often stem from deficits in phonological awareness, which is crucial for successful reading, as has been consistently demonstrated by research. My experience as an ESL teacher has provided me with insights into the ways language acquisition processes differ across languages and how these variations can affect dyslexic learners. Developing phonological awareness is instrumental in helping dyslexic learners, who frequently struggle with these foundational skills, become more proficient readers. Therefore, my objective in implementing phonological awareness instruction is to equip dyslexic learners with the tools necessary to decode words more effectively.

1.2 BACKGROUND OF THE STUDY

Reading and writing skills are essential for full participation in society and future educational opportunities. Reading is a complex process that requires both cognitive and physical abilities to comprehend the written text (Cain, Aokhill, & Elbro, 2014). According to Andi and Arafah (2017), learners should be able to decode text, recognise sight words, and integrate what they read with their existing knowledge. Similarly, Catels, Rastlr, and Nation (2018) agree that as children begin to read, they acquire the concept of phonological recoding. Thus, learning the grapheme-phoneme (G-P) conversion rules and developing representations of intermediate units and words are crucial for attaining reading proficiency (Suarez-Coalla et al., 2020). These skills are necessary for reading fluency, accuracy, and comprehension. However, despite repeated interventions, some learners struggle with reading due to learning disorders.

Cainelli and Bisiacchi (2019) note an increase in research on specific learning difficulties, driven by global trends in literacy rates among schoolchildren and a rise in the prevalence of neurodevelopmental disorders. Learning challenges in the core academic areas of reading, writing, and mathematics often indicate specific learning difficulties, as noted by Stevani and Tarigan (2022). Poor performance in these areas, even when the content is appropriate for the learner's age and grade level, often signals the presence of a learning difficulty. Developmental dyslexia, classified under Specific Learning Disorders (SLD) in the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (DSM-V), is one such difficulty (American Psychiatric Association, 2013; Cainelli & Bisiacchi, 2019; Colen-Brander, Ricketts & Brendmore, 2018).

Developmental dyslexia, also referred to as dyslexia, was formally recognised in the 1980s and 1990s as a lifelong cognitive impairment with neurobiological origins (Navas, Ciboto & Borges, 2017). The term "dyslexia" is derived from the Greek words "dys" (meaning "impairment") and "lexis" (meaning "word"). Dyslexia, sometimes referred to as Developmental Dyslexia, is defined as "a neurological disorder characterised by difficulties with accurate and fluent word recognition, poor spelling, and decoding abilities" (International Dyslexia Association (IDA), 2002, 2013, 2017, p. 28). It is further explained as resulting from a "deficit in the phonological component of language" (IDA, 2017, p. 347). According to Wydell (2023), learners with developmental dyslexia face persistent challenges in learning to read, despite receiving adequate instruction and having normal intellectual abilities.

Montgomery (2017) adds that Developmental Dyslexia (DD) refers to a "difficulty in learning to read by the method normally used in the classroom" (p. 1-2). This suggests that dyslexic learners may require specialised remediation to improve their reading skills. As previously noted, DD is primarily associated with difficulties in processing a language's phonological structure. Consequently, children with DD often struggle with phonological processing, which includes recognising rhymes, segmenting words into syllables, and differentiating between sounds (Nijakowska, 2022). Indrarathne (2019) clarifies that DD manifests in any activity involving the matching of orthographic symbol sequences to their corresponding phonemes.

Similarly, cross-linguistic research indicates that learning a foreign language, such as English, presents a significant challenge for dyslexic learners (Kormos & Nijakowska, 2017). This difficulty is linked to the orthographic systems of various languages, as dyslexic learners struggle to master alphabetic codes and form orthographic representations of words. Kormos

(2017) explains that dyslexic learners find it challenging to establish connections between phonology and orthography. There is a paucity of empirical evidence indicating that the cognitive load associated with processing foreign orthographic patterns exacerbates learning difficulties in dyslexic learners (IDA, 2017; Snowling, 2019; Daiglosi, 2017; Wydell, 2023). Languages such as English have deep orthographies (Dimitra, 2023), in contrast to Sesotho, which has a transparent orthography (Makutoane, 2022). Due to the irregular nature of English orthography, learners may rely on their L1 phonology when spelling words in the target language. Therefore, explicit phonological training in grapheme-phoneme relationships should be provided in both English and Sesotho (Galuschka et al., 2020).

Due to the orthographic depth of each language, as previously mentioned, there appear to be variations in the way language is taught (Daloiso, 2017; Goulandris, 2013). According to Stadler (1994), orthographic depth is proportional to the extent to which a written language deviates from a one-to-one correspondence between sound and letter. Daloiso (2017) emphasises that English is considered an opaque language due to its 26 letters, 44 sounds, 250 ways to spell those sounds, and irregular spelling. Owing to its orthographic complexity, it has been observed that dyslexic readers experience greater accuracy issues when learning English as a foreign language (EFL), as the language exacerbates their pre-existing difficulties. Consequently, the challenges faced by learners with dyslexia persist despite their higher levels of cognitive academic capability (The International Dyslexia Association, 2017).

Conversely, Millin et al. (2017) argue that the difficulties dyslexic readers face in EFL extend beyond phonology, particularly in the area of morphological processing. They further clarify that part of morphological processing involves identifying the smallest units of meaning in a language and manipulating those units to construct coherent sentences. An example of this is the addition of "s" or "es" to verbs to indicate tense. Dyslexic learners often struggle to comprehend why words need to change form to convey different meanings (Kormos, 2020). This highlights that phonological difficulties alone cannot fully explain the reading challenges dyslexic learners face; deficiencies in morphological abilities are also significant (Ben-Doir et al., 1995; Leikin & Haggit, 2006; Shu et al., 2006; Ben-Zion et al., 2023).

The prevalence of developmental dyslexia (DD), according to the International Dyslexia Association (2017), affects approximately 15-20% of schoolchildren. In the United States alone, it is estimated that 5-10% of primary school learners are diagnosed with DD. Despite its status as a global superpower, the United States continues to struggle with inconsistencies in

the identification and understanding of DD (Schiff et al., 2016). This inconsistency has been linked to the misdiagnosis of learners, inappropriate support practices, and learners falling behind. Reports by Kormos (2018) suggest that teachers may not fully grasp the struggles faced by dyslexic learners, especially in contexts where English is the native language, necessitating further training on appropriate interventions.

In a study conducted in China, Yelland and Nudds (2019) found that 2-10% of school-aged children have DD, with a higher prevalence of 7.6% among primary school learners in Shanghai. Lama (2019) notes that Chinese dyslexic learners showed improvement after receiving phonological awareness instruction, which may be attributed to their native language's transparent orthography, reducing confusion when learning the opaque orthography of English. In Japan, however, only 5% of school-aged learners have been identified as having DD, with concerns over possible under-diagnosis or misdiagnosis (Snowling et al., 2020). Moreover, research has revealed that a significant number of EFL teachers in Japan lack confidence in their ability to meet the linguistic needs of dyslexic learners, indicating a need for training and support (Kormos & Nijakowska, 2017; Nijakowska et al., 2018).

There is limited literature on dyslexic learners in African countries. It has been illuminated that dyslexia prevalence rates in Africa vary due to differences in diagnostic criteria, research methodologies, and cultural perspectives. Some studies estimate the prevalence to be around 5-10%, with a higher prevalence in EFL contexts (Russak, 2016). Sharma and Sokal (2016) highlight that minimal research on dyslexia in Africa is connected to a lack of awareness, understanding, and support for dyslexic learners. A study conducted in Botswana did not provide statistics on dyslexia prevalence nor clarify its impact on English language learning. However, Nkomo and Dube (2023) argue that the reading abilities of dyslexic learners could improve if EFL teachers first familiarise themselves with the orthographic systems of the learners' native languages. Native language proficiency seems essential for successful phonological presentation in a foreign language and should be acquired by both teachers and learners.

In Zimbabwe, while there are no clear statistics on the prevalence of dyslexia, there have been some advancements in accommodating learners with reading difficulties. Chimhenga (2017) reported that the Schools Psychological Services use the Wide Range Achievement Test-Level 1 (WRAT-R1) to assess and place learners with reading challenges. However, it was also pointed that teachers are not sufficiently trained to teach dyslexic learners and face challenges

such as large class sizes, which limit their ability to provide necessary remediation. The Zimbabwe Disabled Persons Act of 1996 advocates for the non-discrimination of people with disabilities but does not explicitly address learners with Specific Learning Disorders (SLD) such as dyslexia, dysgraphia, dyscalculia, and Attention Deficit Hyperactivity Disorder (ADHD) (Chireshe, 2013).

South Africa, however, has made more progress in supporting dyslexic learners, with 9% of learners reportedly receiving assistance during their academic journey (Knight, 2018). Previous studies (Howie et al., 2011; Rule & Land, 2017; Spaull, 2016; Willenberg, 2018) provide substantial evidence of a reading crisis in South Africa, with an estimated 10-15% of learners being dyslexic. Much of the research in South Africa has focused on teacher training for accommodating dyslexic learners. According to Abid Rauf et al. (2018), dyslexic learners require specialised language teachers who understand the multiple orthographies of the nine Bantu languages spoken in the country. This extends to the support needed for learning English as a second or third language.

Lesotho, like many African countries, lacks precise data on the prevalence of dyslexia among pupils. According to Lumina and Hodgson (2023), Lesotho is obligated to submit annual reports on its compliance with treaty provisions such as the African Charter on Human and Peoples' Rights, the African Charter on the Rights and Welfare of the Child, the International Covenant on Economic, Social, and Cultural Rights (ICESCR), and the Convention on the Rights of the Child (CRC). However, despite several reporting violations, Lesotho has only sporadically submitted reports, such as one to the Committee on the Rights of the Child, which failed to address concerns about the limited educational provisions for children with disabilities (Lumina & Hodgson, 2023). This indicates a persistent failure to provide adequate support for students with disabilities in both special and general education settings, despite coordinated efforts with various organisations.

In light of these challenges, this research seeks to implement innovative pedagogical strategies that can enable teachers to support learners with developmental dyslexia. Phonological awareness instruction not only helps dyslexic learners improve their reading skills but also assists teachers in identifying and diagnosing developmental dyslexia (Chao, Forlin & Ho, 2016). Studies consistently show that phonological awareness is essential for reading development, particularly for learners with dyslexia, who often struggle with recognising and manipulating the sounds of language (Johnson & Miller, 2015; Lama, 2019). Fatima (2019)

emphasises that dyslexic learners, especially those learning multiple languages, may require explicit instruction in both their home and second languages to effectively generalise their skills.

Wagner et al. (2022) further assert that phonological awareness, irrespective of language script, is crucial for reading development, with deficits in this area contributing to most cases of dyslexia. Effective phonological awareness instruction develops learners' ability to identify phonemes, syllables, and other sound elements that distinguish meaning in language (Kormos, 2016). For example, in English, phonemes significantly affect word meaning and pronunciation, necessitating a strong phonological, orthographic, and semantic network (Park et al., 2016).

Phonological awareness instruction is the explicit teaching of a language's sound structure, focusing on decoding printed words (Alzahrani & Algethami, 2023; Wagner et al., 2019). Phonics interventions have proven particularly effective in improving word and pseudo-word reading abilities (AI-Tamimi, 2016). Shane (1995) proposed that phoneme-grapheme knowledge serves as a self-teaching mechanism, enabling dyslexic learners to acquire orthographic and sight word reading skills more efficiently (Elhassan et al., 2017; Ibrahim, 2018).

Bowers and Bowers (2017, 2018) challenge the sole focus on phonological awareness, advocating for the integration of morphological awareness to better understand word meanings. Treiman and Kessler (2014), however, recommend prioritising phoneme-grapheme correspondence in reading instruction, with morphological knowledge introduced later. Theoretical models of literacy acquisition and empirical findings support this approach, especially for learners with dyslexia in EFL contexts (Castles, Rattle & Nation, 2018; Ehri, 2000; Frith, 1985).

Rastle and Taylor (2018) highlight that phoneme-grapheme correspondences learned during phonological awareness instruction are sufficient to decode most age-appropriate reading materials and provide a strong self-teaching tool for unfamiliar words in EFL. This suggests that while morphological interventions may have limited effectiveness for dyslexic learners, phonological awareness instruction remains critical to their reading development.

In conclusion, this study aims to explore phonological training strategies to enhance reading among dyslexic learners. It recognises that while phonological deficits are a primary factor in dyslexia, they are not the sole cause. Chapter 1 will provide an informative background on dyslexia and its relationship with reading skills, outline the role of phonological awareness instruction, and present the study's problem statement, hypotheses, research questions, and significance. Additionally, key terms and acronyms will be clarified, followed by a chapter summary.

1.3 Statement of the Problem

Despite significant advancements in understanding and treating dyslexia, learners with the condition continue to face challenges in developing reading skills. EFL teachers often struggle to adopt suitable strategies for supporting these learners. As discussed earlier, learning a foreign language, particularly one with a complex orthography like English, poses considerable difficulties for dyslexic learners. Kormos (2018) emphasises that "the ability to communicate in a foreign language is essential in a multitude of contexts." In Lesotho, English holds a prominent role as both a second official language and the medium of instruction, making proficiency in English reading essential for all learners, regardless of learning difficulties.

However, many educational institutions remain ill-equipped to meet the needs of learners with dyslexia. Jarsve and Tsacari (2022) argue that EFL teachers predominantly use the global method, which introduces meaning, pronunciation, and spelling simultaneously. Pennycook (2013) links this method to linguistic imperialism, describing it as the dominance of English language structures and pedagogical practices. This approach presents significant challenges for dyslexic learners, as it imposes a high cognitive load, fostering exclusivity in the classroom.

To address these challenges, the Ministry of Education and Training (MOET) in Lesotho, in collaboration with educational stakeholders, introduced the Inclusive Education Policy (LIEP) in 2018. The policy aims to "eliminate exclusion that is a consequence of negative attitudes and lack of response to diversity in learning" (LIEP, 2018, p.5). It ensures that all learners, regardless of ability, have access to high-quality instruction, intervention, and support. Despite these efforts, a study by Lumina and Hodgson (2023) highlights Lesotho's continued struggles to implement inclusive education. Although the country now operates six special schools, one resource centre, and fifteen inclusive schools, many children with disabilities, particularly

those with less visible conditions like dyslexia, remain excluded from mainstream education due to limited institutional capacity.

The International Commission of Jurists (2022) further reports that the quality of education provided to children with disabilities in both special and inclusive schools falls short of international standards and domestic law. This shortfall is attributed to limited awareness of various disabilities, a rigid, examination-oriented curriculum, and insufficient governmental support (Lumina & Hodgson, 2023). In response, this research seeks to explore interventions that may help EFL teachers include dyslexic learners in reading lessons. By addressing the pedagogical gap in EFL and acknowledging the limited literature on accommodating dyslexic learners in Lesotho, this study aims to test the impact of phonological awareness instruction on dyslexic learners' reading skills in English.

1.4 Hypotheses Development and Research Question

To guide this multi-phased study, eight Null Hypotheses were tested in the first phase and one research question was addressed in the last phase of the study.

The Null Hypotheses:

H1: There is no significant main effect of treatment (Phonological Awareness Instruction) on dyslexic learners' reading skills in EFL.

H2: There is no significant main effect of age on dyslexic learners' reading skills in EFL.

H3: There is no significant main effect of gender on dyslexic learners' reading skills in EFL.

H4: There is no significant main effect of English language orthography on dyslexic learners' reading skills in EFL.

Research Question:

- What implications do Phonological Awareness interventions have for dyslexic learners' reading skills in EFL?

1.5 Purpose of the study

There has been substantial research on accommodating learners with disabilities in schools, particularly those with specific learning difficulties (Francis et al., 1996; Akyle & Ozek, 2010; American Psychiatric Association, 2013; Snowling, 2017; Stevani & Tarigan, 2022). However, solutions for assisting these learners remain poorly understood, revealing a pedagogical gap in

enhancing dyslexic reading abilities in EFL classrooms. This study aims to incorporate phonological awareness training to improve reading among learners with developmental dyslexia (DD) through the frameworks of Cognitive Load Theory (Sweller, 1980), Dual Code Theory (Paivio, 1977), and Multisensory Language Education Theory (Sparks & Miller, 2000). Additionally, the Critical Realism paradigm guided the exploration of various realities, including comorbidities with dyslexia, English spelling, misconceptions about dyslexia, and the influence of gender, English orthography, and age on the language development of learners with DD.

Data were collected through pre-tests and post-tests administered to dyslexic learners aged 6 to 12. The diagnostic tools employed to identify dyslexic learners, as well as those not yet identified, included the Bangor Dyslexia Test (Miles, 1993) and the Rapid Automatized Naming Test (IDA, 2024). These tests were conceptualised and standardised to fit the context of Lesotho, aiming to identify the impact of the intervention (phonological awareness instruction) on learners' reading skills. Data were also gathered from participatory observations and classroom observations conducted by an assistant special education teacher.

The research sought to demonstrate that, with appropriate intervention, dyslexic learners can succeed academically and develop reading skills (Snowling & Melby-Lervåg, 2016). The International Dyslexia Association (2017) highlighted that early intervention in DD is strongly correlated with improved reading outcomes; thus, the research was conducted in a mainstream primary school in Maseru. Gay et al. (2011) emphasise the importance of researchers clearly defining the scope of their studies, including variables such as location, timeframe, and issues to be addressed. The participants in this study included dyslexic students in Grade 3, the special education teacher assistant, and myself as the researcher. The mixed-method research project was conducted over ten weeks, employing a sequential explanatory design to produce data. As a special education professional, I administered the standardised dyslexia tests, the Bangor Dyslexia Test and the RAN Test, following the guidelines set out in the test manuals (Miles, 1993), to generate quantitative data in the initial phase, while qualitative data were derived from observations.

The study primarily focused on phonological awareness skills related to reading, examining only the phonological aspects of the language, rather than reading comprehension. According to Shu and Ho (2018), phonological abilities are strong predictors of reading skills as one progress in language learning, particularly in a foreign language such as English. Consequently,

this study aims to provide valuable insights into addressing pedagogical disparities, fostering an inclusive classroom environment, and mitigating inequities in foreign language learning, thereby closing the academic gap.

1.6 Significance of the study

This study aims to address classroom challenges in special, mainstream, and regular schools, with the potential to enhance understanding among stakeholders involved in the education of dyslexic learners. By implementing Phonological Awareness Instruction, it is anticipated that literacy rates will improve, benefiting the educational system, the economy, and learner achievement. Literacy is fundamental to the meaningful development of any nation; thus, strong literacy skills are essential for functioning in today's contemporary society (Zua, 2021).

Furthermore, this study may assist policymakers and curriculum designers by providing evidence-based recommendations for improving reading outcomes among learners with dyslexia. Such insights can inform policy decisions related to education and Special Educational Needs. The researcher expects that the findings will lead to a deeper understanding of evidence-based methods for supporting dyslexic learners. Additionally, teacher training institutions may benefit from this study by recognising the significance of phonological awareness in the classroom. As a result, these institutions can provide appropriate training to equip teachers with strategies for enhancing learners' reading skills. The findings may also enlighten teachers on differentiated instruction, ensuring that learners with dyslexia receive the necessary support in various classroom settings.

Ultimately, this study focuses on meeting the needs of learners with dyslexia. Previous research (Casalis et al., 2004; Deacon et al., 2008, 2019; Leikin and Hagit, 2006; Martin et al., 2012; Schiff et al., 2016; Tong et al., 2017) has demonstrated that phonological awareness instruction is the most effective approach for dyslexic learners, particularly given the significant challenges posed by phonological deficits. As such, dyslexic learners may benefit from this study's findings, as improving their reading skills enables them to engage more fully in the academic environment and explore their areas of interest. It is important to note that developmental dyslexia does not correlate with learners' intellectual abilities; rather, it reflects a specific deficit in reading. This study will also contribute to a greater understanding of dyslexia, including how learners can be diagnosed and assessed within the school setting.

Additionally, it will enhance the scholarly research and literature in the field of special education.

1.7 Assumptions

One of the study's assumptions was that, despite Lesotho's inclusive education policy, the rehabilitation and provision of quality education in special, mainstream, and public schools continue to pose significant challenges for English as a Foreign Language (EFL) learners with dyslexia. The researcher also acknowledged that not all teachers have received training on how to include dyslexic learners in EFL or general education settings. In consequency, EFL learners with dyslexia are unlikely to receive the necessary support and accommodations during reading activities, exacerbating their difficulties.

The study examined the possibility that the country's teacher training and in-service programmes may not effectively equip educators with the skills and knowledge required to assist these learners in improving their reading skills. Another presumption was based on the understanding that learners with dyslexia possess normal intelligence (IDA, 2014), leading some teachers to mistakenly perceive them as simply lacking motivation. Furthermore, the study posited that some teachers may be disinterested in teaching dyslexic learners or may lack awareness of what dyslexia entails. This prompted the researcher to conduct a comprehensive study aimed at elucidating and highlighting a crucial intervention for dyslexic EFL learners to assist them in developing their reading abilities.

1.8 Definition of terms and acronyms

Dyslexia: a neurological disorder characterised by difficulties with accurate/fluent word recognition, poor spelling, and decoding abilities (International Dyslexia Association(IDA), 2002;2013;2017).

Phonological Awareness Instruction: the explicit teaching of the sound structure of a language (Alzahrani & Algethami, 2022)

Phonological Awareness: the ability to recognise and manipulate the sounds of a spoken language (Wydell, 2023).

Phonological Processing: A pace at which a person takes in, makes sense of and responds to information (McGrath & Stoodly, 2019).

Phonemic Awareness: is a subset of phonological awareness, and focuses specifically on the ability to identify and manipulate individual phonemes in spoken words (Wydell, 2023).

Phoneme: the smallest unit of sound in a language that can distinguish one word from another (Scott et al 2019).

Grapheme: the smallest unit of written language that represents a phoneme (Ben-Zion et al 2023).

Syllable: a unit of pronunciation that typically contains a vowel sound and may include surrounding consonants (Scott et al., 2019).

Language orthography: conventional spelling system of a language (Aloufi, 2021).

Comorbidities: the existence of two or more disorders in a single individual (Snow & Willingham 2017).

Phonological Deficit: Difficulty in the representation of speech sound (Snowling, 2017).

The Bangor Dyslexia Test: an assessment tool designed to identify and measure dyslexia in individuals (Miles, 1993)

Specific Learning Disorders (SLD): Neurodevelopmental disorders that involve impairments in reading, writing and Mathematics (DSM-5).

DD: Developmental Dyslexia

MOET: Ministry of Education and Training

ANCOVA: Analysis of Covariance

IDA: International Dyslexia Association

CRPD: The Convention on the Rights of Persons with Disabilities

ICESCR: The International Covenant of Economic, Social and Cultural Rights

ICCPR: The International Covenant on Civil and Political Rights

CRC: The Convention on the Rights of a Child

IGJ: International Commission of Jurists

LIEP: Lesotho Inclusive Education Policy

EFL: English as a Foreign Language

RAN: Rapid Automatized Naming

1.12 Research Layout

This study comprises six chapters that elucidate the intricacies of the research process. Below is a synopsis of the content of each chapter.

Chapter 1: Introduction of the Study, Background, and Rationale
This chapter introduces the research, highlighting the identified gap in existing literature. It presents the hypotheses to be tested and articulates the research question, which serves as a primary guide for the areas requiring investigation. Additionally, the chapter outlines the significance of the study, its purpose, assumptions, and definitions of key terms and acronyms.

Chapter 2: Literature Review
This chapter explores the underpinning theories, providing a conventional literature review of concepts related to developmental dyslexia and phonological awareness instruction. It includes an empirical review, a conceptual framework, and a discussion of gaps in previous research findings.

Chapter 3: Research Methodology
This chapter outlines the research methodology employed by the researcher, detailing the steps followed, the methods used for data generation and analysis, and the measures taken to ensure the reliability, validity, and trustworthiness of the research. It also addresses ethical considerations.

Chapter 4: Data Presentation and Interpretation
This chapter presents and interprets the data collected. Both qualitative and quantitative data presentations are included, highlighting the findings from the research.

Chapter 5: Discussion of Findings
This chapter discusses the findings presented in Chapter Four. Each hypothesis is examined in relation to the reviewed literature and the theoretical frameworks underpinning the study.

Chapter 6: Conclusions, Recommendations, Limitations of the Study, and Reflections

Chapter Six summarises the conclusions drawn from the findings, offering recommendations for further research and guidance on implementing phonological awareness instruction in diverse contexts. It also discusses the challenges encountered during the study and includes reflections on the research process. A list of references follows this section.

Chapter Summary

This chapter introduced the research and highlighted the identified gap. It presented the hypotheses and research question that guided the investigation, outlined the significance and purpose of the study, and defined key terms and acronyms. The chapter also detailed the study's structure. The next chapter will explore into the literature review, focusing on the philosophical perspectives of this research, the complexities of dyslexia among EFL learners, and the relationship between phonological awareness instruction and reading skills.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

Chapter 1 presents the study's background, problem statement, research hypotheses, research questions, goals, significance, definitions of key terms and acronyms, limitations, and delimitations. Its objective is to provide an overview of research on developmental dyslexia and phonological awareness instruction, alongside empirical investigations into phonological awareness as an intervention. The relevant literature is organised into sections and subsections. Additionally, the chapter analyses the theoretical underpinnings that informed the intervention and presents a conceptual framework illustrating the relationships between concepts and variables. Finally, it highlights the gaps and strengths in empirical research on developmental dyslexia and reading skills in EFL contexts.

2.1 THEORETICAL FRAMEWORK

To address the learning challenges faced by dyslexic learners, particularly in EFL classes, a framework that fosters an inclusive classroom environment with appropriate accommodations, teaching strategies, and support networks is essential. This study has therefore adopted three relevant theories to enhance the effectiveness of the intervention in the classroom setting, each addressing specific gaps. The theories examined are Cognitive Load Theory, Multisensory Structured Language Education Theory (MSLE), and Dual Code Theory. Cognitive Load Theory emphasises the limitations of working memory in dyslexic learners and the importance of managing cognitive resources (Sweller, 1980). In contrast, Dual Code Theory focuses on how phonological awareness exercises are presented to dyslexic learners (Paivio, 1977). Additionally, the MSLE theory builds upon Dual Code Theory by promoting the use of multiple senses in phonological awareness instruction, thereby creating a socially equitable learning environment (International Dyslexia Association, 2015).

2.1.1 The Cognitive Load Theory

The theory was developed by Sweller (1980) to inform educators that the volume of input or cognitive load can have either positive or negative effects on learning outcomes. According to this theory, when the human cognitive system reaches its limit, learning becomes less effective. Sweller (1988) posits that “the learning process is the process in which the schema has been constructed and the information has been stored in long-term memory, within the range of the limited working memory capacity of learners. When the cognitive resources consumed in this process exceed the total amount of cognitive resources possessed by the learner, there will be an overload, resulting in an unsatisfactory learning effect” (p. 245).

It can thus be concluded that learning is more effective when instructional methods manage and optimise the cognitive load imposed on learners. Accordingly, the cognitive load of learners should align with their capacity, enabling them to learn and retain information effectively (Lu, Huang & Wu, 2023). The theory distinguishes between three types of cognitive load that may be experienced in the classroom.

The first principle is intrinsic cognitive load, which concerns the inherent complexity of materials, content, or tasks in the learning process (Sweller et al., 2019). For example, when implementing phonological awareness, the context was introduced along a complexity continuum. Classroom activities were logically structured from simple to complex, allowing learners to engage with tasks appropriate to their abilities, beginning with phonemes, then syllables, and subsequently words.

Extrinsic cognitive load, on the other hand, refers to unnecessary mental effort imposed by instructional design or the presentation of lessons. This can include irrelevant noise or distractions during tasks. Ayre and Sweller (2014) argue that extrinsic cognitive load may arise from irrelevant information, poorly organised materials, or complex instructions that do not contribute to learning objectives. According to Csachova and Kidonova (2022), effective instruction for learners with dyslexia in EFL should be explicit, direct, and cumulative. To create a conducive learning environment, the researcher conducted lessons in a calm, clutter-free setting, particularly when using flashcards, as some dyslexic learners exhibit secondary symptoms of Attention Deficit Hyperactivity Disorder (Csachova & Kidonova, 2022). Owen (2016) indicates that dyslexic learners may be overwhelmed by excessive visual information. Resultantly, the researcher provided only necessary visual aids and removed any irrelevant posters from the classroom walls to minimise distractions.

The final type of cognitive load is germane or interactive cognitive load (Sweller, 1998). This load pertains to interactions within the classroom that encourage mental effort for meaningful learning (Huson, 2016). It reflects how learners engage with one another and with the researcher throughout the learning process. For dyslexic learners receiving phonological awareness instruction, germane cognitive load was optimised through explicit, systematic instruction that built skills step by step. For instance, during syllable blending, when learners shared word-building blocks, the researcher repeatedly explained the instructions to avoid cognitive overload. Collaborative work allowed learners to support one another, with those

who grasped the instructions assisting their peers who struggled. Clay (2016) posit that collaboration provides access to each other's memory, making learning less challenging.

In summary, the theory primarily addresses the need to optimise learners' cognitive load by achieving a balance between excessive and insufficient load. It guided the researcher in focusing on the learners, the learning tasks, and the environment during the phonological awareness instruction intervention. The subsequent theories concentrate on the effective modes of delivering instruction to learners.

2.1.2 The Dual Code Theory

Successful phonological awareness instruction for dyslexic learners' hinges on its capacity to strengthen the phonological code, thereby enhancing reading skills (Snow & Willingham, 2017). In light of this assertion, the Dual Code Theory is relevant to this study. This cognitive theory posits that there are two distinct yet interconnected systems involved in reading and language processing: the verbal system and the non-verbal system (Clark & Paivio, 1986).

According to Paivio (1977), in phonological awareness instruction, the verbal system processes written words through phonological decoding, which entails converting written symbols into their corresponding sounds. Barsahou (2003) emphasises that the verbal system processes conceptual and abstract information that is not directly conveyed by a physical input. For instance, both learners and the researcher focused on the verbal system during spelling tests and classwork, as well as in the pronunciation of words and sounds associated with each presented word. Conversely, the non-verbal system processes written words through visual recognition, which involves recognising whole words as visual patterns (ibid). This system processes concrete attributes such as size, colour, and shape, which are directly represented by the physical stimulus (Paivio, 2007).

During the learning process, instruction in phonemic representation included the pronunciation of alphabets called out by both the researcher and the learners, with large coloured letters displayed on the classroom walls. Lin et al. (2017) confirm that when both systems are engaged simultaneously, dyslexic learners can adopt a more integrated approach to improving their reading skills. Importantly, the literature suggests that learners with dyslexia benefit from receiving information from a single integrated source, as this minimises extraneous cognitive load (Pouw et al., 2019). Furthermore, Trahorsch's (2018) study revealed that supplementing

verbal descriptions with visual aids can render resources more concrete. The findings indicate that when dyslexic learners engage with phonological skills both vocally and visually, they are more likely to identify, remember, and retrieve this information in the long term.

Research has shown that dyslexic learners exhibit diverse learning styles and often struggle within traditional classroom environments (Alsobhi & Alyoubi, 2020; Dalosio, 2017). Given that learning English as a second language compounds their existing challenges, instructional materials and delivery modes must align with the preferences of dyslexic learners. As a result, the following language learning theory offers insights into how to accommodate the learning styles of these students.

2.1.3 MULTI-SENSORY STRUCTURE LANGUAGE EDUCATION (MSLE)

Margaret Rawson, a former President of the International Dyslexia Association (IDA), stated:

"Dyslexic learners need a different approach to learning language from that employed in most classrooms. They need to be taught slowly, the basic elements of the target language; the sounds and letters which represent them; and how to put these together and take them apart. They have to have lots of practice in having their writing hands, eyes, ears, and voices working together for conscious organisation and retention of their learning."

To foster a socially just, inclusive, and accommodating learning environment, the Multisensory Structured Language Education (MSLE) theory/model has been adopted in this study. By emphasising the use of various senses to enhance the learning process, the theory builds upon the Dual Code Theory (Sparks & Miller, 2000). This theory posits that all of the brain's learning pathways are activated during teaching. Farrell and Sherman (2011) assert that the theory supports both a multimodal approach, which encourages active participation, and an instructional framework that facilitates effective learning. The researcher selected this hypothesis because it acknowledges the diverse learning preferences and styles exhibited by dyslexic learners.

The MSLE theory suggests that, to create neural connections that promote mastery in reading instruction, learners should engage their auditory, visual, kinesthetic, and tactile (VAKT) modalities (Brish & Ghassemi, 2010). Visual instruction in English as a Foreign Language (EFL) classes involves representing words or syllables with visual aids such as images, videos, and charts, as described in the Dual Code Theory as a non-verbal system (Dimeo, 2021).

According to the National Institute of Child Health and Human Development (2000), dyslexic learners can benefit from using image flashcards for phonological awareness, as these aids can enhance comprehension and memory retention. Supporting this, Clark and Paivio (1991) contend that the ability to recall a mental image is a significant determinant of knowledge retention.

Auditory instruction, on the other hand, focuses on engaging learners through listening activities, such as audio recordings, music, and spoken language exercises (Fernaudez & He, 2019). An example of this is listening to recordings of the pronunciation of specific speech sounds in English, which may yield improved outcomes in speech articulation, particularly since many English phonemes are also found in Sesotho but pronounced differently. Furthermore, Trahorsch (2018) asserts that auditory instruction can enhance the pronunciation of sounds, emphasising that auditory stimulation in phonological awareness helps learners identify intonation patterns in EFL compared to their native language.

Another principle involves stimulating the kinesthetic-tactile component in the EFL classroom. Fernaudez and He (2019) presents a strong correlation between physical movement, hands-on activities, and language learning, particularly in reading. For instance, during spelling and pronunciation exercises, learners made physical movements to represent how the letters of the alphabet are formed. The sense of touch was engaged by providing textured surfaces for tracing letters and tactile word cards for spelling practice. Learners explored alphabetic representations by drawing letters in sand while simultaneously clapping and vocalising them. Jarsve and Tsagari (2022) concur that tactile engagement enhances memory retention and reinforces connections between linguistic concepts and physical sensations.

In this context, Dr. Orton proposed that "kinesthetic-tactile reinforcement of visual and auditory associations could correct the tendency to confuse similar letters and transpose the sequence of letters while reading" (IDA, 2013, p. 23). For example, learners can be taught to differentiate between /d/ and /b/ by sketching in sand. This is accomplished by instructing them to draw a vertical line followed by a circle to form the letter /b/. Fernandes et al. (2018) conducted a study examining the effects of drawing, writing, and viewing photographs on participants' retention of knowledge. They found that the majority of individuals were able to recall phrases they had drawn or embellished from memory.

In conclusion, Alsobhi and Alyoubi (2020) acknowledge that learners with dyslexia can thrive in a classroom environment where they are not disadvantaged by prejudicial perspectives regarding their challenges. By engaging multiple senses to align learners' preferences during phonological awareness instruction, Kuppen and Bourke (2017) confirm that learners activate both hemispheres of their brain, facilitating improved retention and pattern recognition in their learning.

2.2 DEVELOPMENTAL DYSLEXIA

The capacity to rapidly sequence phonemes within syllables and words is crucial for reading (Dimitra, 2023). To appropriately sequence these sounds, Snowling (2020) asserts that it is necessary to perceive variations in the frequency and amplitude of sounds and to remember their order. However, research has demonstrated that individuals with developmental dyslexia (DD) exhibit reduced sensitivity to variations in sound intensity and frequency (Colling et al., 2017; Kraus et al., 1996; Menell et al., 1999).

Neuropsychologists have explored evidence of brain dysfunction to identify the causes of developmental dyslexia prior to initiating treatment. Benton (1975) identified eight neuropsychological correlates associated with dyslexia, including difficulties with directionality, right-to-left discrimination, finger recognition, visual and auditory perceptual abilities, and general language deficits. Extensive research has been conducted to elucidate the nature of auditory processing issues in individuals with dyslexia, with a focus on deficits affecting the phonological structure of speech (Griffiths & Snowling, 2001; Snowling, 2019; Dimitri, 2023). Snowling (2019) provides evidence supporting the notion that phonological difficulties hinder the ability to map orthography to phonology, as well as vocabulary development, verbal short-term memory, word retrieval, and image recognition.

The National Institute of Child Health and Human Development (NICHD) defines developmental dyslexia as a "brain-based type of learning disability that specifically impairs a person's ability to read," while the International Dyslexia Association (IDA, 2017) characterises it as a specific learning difficulty in which learners struggle with poor spelling and decoding abilities (2017, p. 167). According to the NICHD, individuals with dyslexia exhibit deficiencies in phonological awareness, decoding, fluency, and text comprehension, among other reading-related areas (Stevani & Tarigan, 2023). Inevitably, they face significant

challenges in distinguishing speech sounds and understanding the relationships between letters and word forms.

Researchers have proposed various classifications of developmental disorders, all of which tend to define the same condition by encompassing its secondary symptoms. After reviewing several definitions, the IDA (2017) arrived at a consensus definition of developmental disorder, characterising it as a neurodevelopmental disorder marked by poor reading ability, difficulties with accurate and fluent word recognition, decoding, and appropriate spelling and pronunciation of speech sounds. Furthermore, Dickman (2017) highlights additional factors contributing to the neurocognitive impacts of dyslexia, including deficiencies in processing speed and other spoken language skills alongside phonological processing difficulties.

According to Fletcher et al. (2019), dyslexia has neurological origins and substantial hereditary evidence. Nevertheless, environmental factors also play a role in influencing and mitigating the risk of dyslexia (Colling et al., 2017). In cognitive terms, developmental dyslexia is associated with abnormal structure and function, particularly within the left hemisphere of the brain, which houses the neural networks involved in reading and language (McArthur & Castles, 2017). Moreover, Erbeli et al. (2018) contend that environmental influences may arise from brain trauma, malnutrition, and the prenatal and postnatal care provided by parents, all of which could affect the development of a child's brain and potentially increase the likelihood of dyslexia.

2.2.1 Neurological Basis of Dyslexia

This study is predicated on the premise that dyslexia has a neurobiological foundation. According to the British Dyslexia Association (2018), dyslexia originates within the central nervous system, specifically in the regions of the brain responsible for learning and processing linguistic information, such as sounds and letters. Evidence suggests that the significant deficiencies associated with dyslexia can be traced to various neurological causes that are rooted in neuronal variables (Boros et al., 2016; Carreiras et al., 2015; Cavalli et al., 2017). Therefore, dyslexia is linked to cognitive deficits across multiple areas of the linguistic domain, encompassing both spoken and written language. The International Dyslexia Association (IDA, 2021) asserts that the neurological basis of dyslexia involves variations in brain anatomy, function, and connectivity.

Individuals with dyslexia are more likely to exhibit abnormalities or underdevelopment in brain areas implicated in language processing, particularly in the left hemisphere, which includes the frontal, parietal, and temporal lobes, as well as the connections among these regions. Such structural and functional anomalies can result in difficulties with phonological processing. Moreover, neuroimaging studies have demonstrated that individuals with dyslexia often display diminished or atypical activation patterns in these brain regions during reading tasks (Gabay et al., 2015). According to Paz-Alonso et al. (2018), these neurological variations can adversely affect word decoding, sound recognition, and memory retrieval.

Additionally, Cavalli et al. (2017) propose that dyslexia may possess a genetic component, as certain genes associated with brain development and language processing have been linked to the disorder. Research has further shown that early intervention and tailored reading strategies can enhance brain activation patterns and improve reading skills in individuals with dyslexia (Jedurog et al., 2015; BDA, 2010; IDA, 2017). These findings underscore the neurological basis of dyslexia, emphasising the importance of recognising and addressing these underlying abnormalities in order to provide effective interventions and support for dyslexic students.

2.2.2 Core Symptoms of Dyslexia

Dyslexia is a hereditary learning disability that primarily impairs the skills necessary for accurate and fluent word recognition and spelling (Snowling, 2019). Snowling further elucidates that dyslexia is characterised by difficulties in phonological processing, Rapid Automatized Naming, working memory, fluency, and comprehension. Evidence suggests that, while the severity of these challenges varies among individuals, they can have significant academic, occupational, and social repercussions (IDA, 2017; Van Vierse et al., 2016). The IDA (2017) also highlights that, if dyslexia remains untreated, it can lead to co-occurring conditions such as anxiety, low self-esteem, and diminished educational and career expectations. This may explain the persistent issue of dropout rates among dyslexic learners in recent years. Furthermore, Roitsch and Watson (2019) emphasise that medium to high-level language processing difficulties that coexist with dyslexia can restrict not only reading and writing but also conversational engagement in both first and second languages.

As previously noted, dyslexia is also associated with challenges in learning to spell (Snowling, 2019). It appears that while reading may be less impaired for English as a Foreign Language (EFL) learners compared to their monolingual dyslexic counterparts, phonological awareness

and difficulties with the opaque English orthographic system (Houdaneu, 2023) present significant challenges. In Aloufi's view (2021), writing in a foreign language poses considerable difficulties, as learners may struggle to discern the phonetic features of different languages. He asserts that the three skills most likely to be impaired are phonological and phonemic awareness and verbal short-term memory (Aloufi, 2021), which contribute to difficulties in learning phonics, reading, and spelling, as well as in acquiring high-frequency irregular words (Drigas & Elektra, 2016).

2.2.2.1 Rapid Automatized Naming

Phonological, orthographic, lexical, and morphological core skills that support phonological processing suggest that an individual's success in phonological processing is related to performing the Rapid Automated Naming (RAN) task efficiently and automatically. The degree of success in this task determines the level of fluency achieved (Norton, 2022). Dr Norton states, "The production of fluent speech depends on how quickly the components of the words are defined and related sounds are accessed" (Norton, 2022, p. 26). This relationship may arise because efficient phonological processing relies on the rapid retrieval of information from phonological storage. In agreement with Petscher et al. (2019), dyslexia is known to hinder reading development and result in poor phonological processing. Notably, individuals with dyslexia exhibit reduced capability to quickly access speech sounds and to establish adequate RAN functionality.

Norton (2022) defines RAN as the speed at which visually presented, non-linear arrays of potentially familiar stimuli are labelled phonologically. Supporting this view, Lovett et al. (2017) emphasise that RAN activities challenge learners to name a variety of familiar items as swiftly as possible and that RAN has a strong correlation with reading ability across grade levels, measures, and languages (Drigas & Elektra, 2016). Thus, performance in RAN may facilitate reading acquisition by linking an object to its appropriate phonological label. For instance, during reading, visual input is recognised, and letters are matched to their corresponding sounds. Similarly, Norton (2022) notes that the initial process is slow and phonemically mediated, followed by a quick but non-phonological whole-word recognition. Rapid automatised naming (RAN) involves converting a visual image or object into a phonological representation (Hietland et al., 2017).

Wolf and Bowers proposed the double deficit hypothesis in 1999, suggesting that dyslexia may arise from impairments in phonological awareness (PA) and RAN, with children exhibiting both deficits experiencing severe difficulties. This is because RAN predicts reading ability beyond the scope of phonological awareness deficits alone. Importantly, RAN requires the coordination of several cognitive processes, including visual recognition, lexical access, and articulatory response (Van de Kleij et al., 2017). However, learners with dyslexia have shown significant deficiencies in these areas (Snowling, 2019), with the primary challenge in RAN stemming from deficits in phonological working memory, which are associated with broader issues related to processing speed. Thus, insufficient working memory is likely to impair processing speed, leading to a deficit in RAN.

2.2.2.2 Phonological Working Memory

Children with dyslexia and severe reading difficulties have long been associated with a deficiency in phonological working memory (Alkhadim, 2022; Daloiso, 2017; McGrath & Stoodly, 2019). Previous research indicates that individuals with working memory deficits face greater challenges in reading, particularly in recognising familiar words and retaining the phonological forms of those words (Scott et al., 2019). To address these issues, Scott et al. (2019) argue that the decoding process involves forming phonological representations for print, suggesting that individual differences in the phonological working memory component can explain variations in reading ability. Furthermore, a substantial body of literature highlights that individuals with dyslexia encounter difficulties in reading text due to deficiencies in phonological working memory (Ben-Zion et al., 2023).

Smith-Spark (2020, p. 36) defines phonological working memory as "mnemonic structures capable of briefly storing and maintaining linguistic knowledge." This indicates its role in temporarily storing information necessary to complete a task. For instance, when learners are asked to read the word /cat/, their phonological working memory must first hold the three phonemes in short-term memory, discern the sounds associated with the letters, and then articulate the word. Reading becomes challenging when learners struggle to remember the first letter of a word or the position of each letter (Moradi & Kheirzadeh, 2024). Martin et al. (2015) confirm that phonological working memory significantly contributes to the acquisition of letter knowledge and the recognition of words.

However, individuals with dyslexia face difficulties in retaining an accurate memory trace of short-term spoken information (Smith-Spark, 2020). Smith-Spark emphasises that they exhibit significant deficits in two sub-systems of phonological working memory: the phonological loop and the visuo-spatial sketchpad. He demonstrates that the phonological loop stores verbal information, whereas the visuo-spatial sketchpad stores visual and spatial information. For example, when given a reading task, a learner should be able to connect letters with the appropriate sounds, combine them to form a word, maintain that sound in memory while reading the subsequent word, string all those words together to form a sentence, and ultimately derive the meaning of the sentence.

In contrast, learners with dyslexia struggle to retain both verbal and spatial memory. According to Moll et al. (2016) and Kastamoniti et al. (2018), dyslexic learners with deficient verbal memory find it challenging to follow lengthy multi-step instructions due to cognitive overload. Furthermore, learning new words and spelling proves difficult, as verbal memory is necessary to organise letter sounds in the correct sequence (Song et al., 2020). Ben-Zion et al. (2023) demonstrated that dyslexic children could overcome deficits in the phonological memory buffer and enhance their reading and spelling skills by learning to encode and decode for spelling and reading, as well as by recombining and organising local decoding processes and stored forms in memory. Specifically, Castillo and Gilger (2018) propose that any intervention or strategy aimed at improving literacy in dyslexic individuals should address two key components: the connection between phonological short-term memory deficits and literacy, and the changes in information processing strategies that dyslexic learners develop to manage their short-term memory challenges.

2.2.3 Comorbidities

In his recent research, Dimitra (2023) outlines that dyslexia can occasionally be linked to other specific learning difficulties, resulting in its coexistence or comorbidity with other specific learning disabilities. According to Snow and Willingham (2017), comorbidity refers to the presence of two or more disorders within a single individual. Although the prevalence of co-occurring neurodevelopmental disorders and reading difficulties varies widely, approximately 40% of children with one specific learning disorder are likely to have another (Moll et al., 2020).

Certain dyslexic children meet the criteria for Developmental Language Disorder (DLD), which is characterised by persistent difficulties with expressive and/or receptive language (Bishop et al., 2017). McArthur et al. (2000) found significant verbal deficits in 40% of children facing specific reading challenges, with these reading difficulties most likely to arise in children diagnosed with DLD (Bishop & Adams, 1990). Similarly, Daloiso (2017) posits that reading difficulties represent the most apparent dysfunction within a broader neuropsychological profile that may encompass several language-related processes. Although often underdiagnosed, these language difficulties can influence the efficacy of interventions (Adlof & Hogan, 2019).

Additionally, attentional and motor coordination problems are associated with developmental dyslexia (Gooch et al., 2014; Rochelle & Talcott, 2006). This suggests that during classroom activities, learners with dyslexia may experience challenges with fine and gross motor skills. Pennington and Bishop (2009) also noted a correlation between internalising disorders, such as anxiety and depression (Francis et al., 2019), socio-emotional and behavioural difficulties (Carroll et al., 2005), and both dyslexia and speech sound disorder. Mathematics disorder, often referred to as dyscalculia, is another issue commonly co-occurring with dyslexia. Similar to reading disorders, mathematics disorder or dyscalculia is classified in the DSM-5 as a specific learning condition (American Psychiatric Association, 2013). Research by Landerl and Moll (2010) and Moll et al. (2016) indicates that dyscalculia is likely to be identified in 30–70% of students with developmental dyslexia.

Additional co-occurring disorders include Attention-Deficit/Hyperactivity Disorder (ADHD), which is characterised by impulsivity, hyperactivity, and inattentiveness in the classroom (McGrath & Stoodly, 2019). The International Dyslexia Association (2017) highlights that when a learner has both dyslexia and ADHD, the use of working memory may be significantly challenging, as difficulties in focusing on specific tasks are symptomatic of ADHD. Consequently, reading is likely to be severely impaired, as the skills necessary for processing written words are compromised. This is attributed to the learner's difficulty in maintaining attention while reading or listening to instructions (McGrath & Stoodly, 2019). Lastly, dysgraphia, which manifests as difficulties with handwriting, spelling, and structuring ideas on paper (Aloufi, 2021), is often comorbid with dyslexia. It can be argued that the spelling and writing deficits observed in dyslexia may result from an inability to properly sequence letters in relation to their corresponding sounds to form words.

Dickman (2017) states that while these comorbidities can affect the presentation of dyslexia and its responsiveness to treatment, none of them are fundamental aspects of the disorder. The clinical and pedagogical reality, according to the IDA (2013, 2017), is that poor reading constitutes one constellation of problems for many children, each reflecting a distinct dimension. As language impairments, speech sound disorders, and hyperactivity disorders are likely to manifest earlier, focusing on these clinically relevant comorbidities may provide predictive insights into a child's likelihood of experiencing future reading difficulties (Stevani & Tarigan, 2022). Understanding these coexisting conditions is essential, as it equips researchers and educators with appropriate strategies to address inequities and inclusivity within the classroom. While all learners may share certain foundational traits of developmental dyslexia, their learning styles may diverge due to the presence of current comorbidities.

2.2.4 Dyslexia and language orthographies

Essential cultural elements that affect the development of literacy as well as the potential for developmental dyslexia to occur include language and spelling. According to Future Learn (futurelearn.com, 2018), variations in orthographies place distinct, culturally-specific demands on the processes involved in learning and performing reading. Therefore, in addition to learning L2, its orthography also affects the level of difficulty dyslexic learners may encounter. This is as a result of the two separate alphabetic codes they must master.

In accordance with Ylinen et al. (2018), orthography is the collection of writing standards for a language, which includes spelling rules and patterns. Shallower orthographies are simpler to learn than deeper orthographies, according to the orthographic depth hypothesis (ODH) (Katz, 1992; Lama, 2019). Furthermore, the incidence of DD was reported to range from 2.2% to 12.7% in alphabetic scripts, where letters stand in for phonemes (Miles et al., 1998; Fluss et al., 2008; Wydell, 2023). However, characters in graphical scripts, like Chinese, represent monosyllabic morphemes and are the smallest written units (Hu et al., 2010; Cao & Perfetti, 2017). These characters also have a grapheme for phoneme mapping. Dyslexia was thought to be less common as it necessitates rote memorisation of characters that resemble pictures (Wydell, 2023).

On the one hand, some psycholinguists asserted that the complexity of a language's orthography influences the severity and prevalence of dyslexia, arguing that a more regular system would minimise the number of cases (Landerl et al., 1997). Snowling (2019) stressed

that language orthography is associated with the difficulty of learning to read in that language. This suggests that the more complex the spelling, the greater the challenges faced by dyslexic learners.

The theory of psycholinguistic grain size and the graph linguistic equilibrium hypothesis, on the other hand, proposed that, while the manifestation of DD may vary depending on orthographic consistency, its prevalence is likely to be similar in both consistent and inconsistent orthographies (Ziegler and Goswami, 2005; Verhorve & Perfetti, 2017). Further studies revealed that, despite varying orthographies, all dyslexics face the similar reading challenges, including reading RAN and phonological awareness (Diamanti et al., 2018; Hoef et al., 2015). According to the findings in this research, orthographic discrepancies have no substantial impact on the primary obstacles that people with dyslexia face and how to overcome them.

Learners with dyslexia will learn English as a foreign language with Sesotho as their mother tongue in this study. The Sesotho orthography, according to Makutoane (2022), is based on the Latin script since missionaries created it during the colonial era. For this reason, this orthography is erratic. According to Matlosa (2017), the written language only employs the five vowel letters found in the regular Latin alphabet, despite the spoken language having nine distinct vowel phonemes. For instance, the vowels /I/, /ɛ/, and /e/ are represented by the letter {e}, whereas the vowels /ʊ̈/, /ɔ/, and /o/ are represented by the letter {o}. Based on the limited number of vowels and sound patterns, Sesotho appears to have a transparent orthography.

According to literature, many who struggle with reading in their first language (L1) are likely to have difficulties when learning a second language (EFL) (Perfetti et al., 2019). Accordingly, early issues with the foreign language will be related to phonological and orthographic processes in the first language (Chodkiewicz, 1986, Durgunolgu et al., 1997, Cisero & Royer, 1995, Geva et al., 1997, Comeau et al., 1999, August et al., 2001, Howitz et al., 2006, Suarez Coalla et al., 2023). As such, research on reading in EFL from various countries, including China, France, Italy, and Poland, has shown that learners with DD perform worse on English reading assessments than do typical readers, regardless of the L1 orthographic system's features (Ho & Fong, 2005, Chung & Ho, 2010, Palladino et al., 2013, Lockiewicz & Jaskulska, 2016).

In order to create appropriate reading instruction for learners with DD, the researcher in this study had to have a thorough grasp of the orthographic systems of both Sesotho and English. By emphasising the need for individualised assistance for learners and acknowledging the extra difficulties they could encounter in EFL, the orthographic depth hypothesis aided the researcher.

2.2.5 Misconceptions about Developmental Dyslexia

Despite extensive research, there are several myths concerning developmental dyslexia that can lead to misunderstandings and misinterpretations of the illness. According to Berent & Platt (2021), one of the most common misconceptions concerning DD is that learners with DD have poor IQ. This fallacy, according to Fletcher et al. (2019), derives from a misunderstanding of DD as a merely cognitive issue, rather than a specific difficulty with reading and language processing. In reality, DD does not correlate with intelligence, and most individuals with dyslexia have average or above-average IQ (IDA, 2017).

Aside from that, DD is occasionally seen as a visual issue. This is because students with DD frequently write backward or reverse letters in words. The symptoms, however, are caused by their inability to decode, namely in matching letters to sounds and distinguishing basic morphemic units of sound in written language (Snowling & Melberg, 2016). In support, a vast body of studies suggests that DD is best described as an issue with processing language sounds rather than a problem with vision (Rayner et al., 2001, Lyon et al., 2003, Vellutino & Fletcher, 2004, Thorwarth, 2014; Sang et al., 2020).

Furthermore, some educators think that reading more will benefit students who struggle with dyslexia. More reading opportunities are beneficial for all children, however giving students with DD more reading practice is an "inadequate" strategy (Vaughn & Fletcher, 2019). In summary, Boryga (2022) claims that "improving home literacy through reading homework will not resolve reading challenges faced by learners with DD," even though "opportunities to read are beneficial to all learners" (P.13). He goes on to say that students with DD need specialized teaching that incorporates fluency and decoding exercises.

Additionally, some individuals are certain that medication and brain training may treat dyslexia, while others think it can be outgrown. Although some students may be taking medication because of the previously stated comorbidities, drugs solely address those additional conditions, such as autism and ADHD. DD cannot be outgrown or treated with

medicine, according to Snowling & Melbylervag (2016). According to Francis et al. (1996) and Castillo & Gilger (2018), there is compelling evidence that students with dyslexia do not just grow later than typical children—rather, they persevere in their reading challenges. Likewise, methods intended to "train" the minds of students with developmental disabilities typically do not help them achieve better reading results (Boryga, 2022). To foster a better awareness of DD and guarantee that students receive the necessary assistance and interventions; the researcher concludes that it is imperative to address the misconceptions.

2.2.6 DYSLEXIA, GENDER, AND AGE

Considerable research has been undertaken to comprehend the demographic most affected by dyslexia. Several myths have propagated the misconception that dyslexia selectively impact certain genders and age groups. As the British Dyslexia Association (2023) highlights, dyslexia is a persistent and unique learning difficulty that endures throughout a person's life. It cannot be 'overcome', but effective management strategies can be developed if it is identified early in life. Crucially, Osborn (2023) asserts that while the symptoms of dyslexia may vary with age, it is not something one can outgrow. He emphasises that individuals can show signs of dyslexia at any stage of life, although the disorder's effects may shift across different phases (IDA, 2018).

This study underscores the importance of early intervention, particularly in the lower primary grades, to bolster phonological awareness and improve reading skills in affected learners. Research indicates that dyslexic learners studying English as a Foreign Language (EFL) continue to struggle with phonological skills well into late adolescence (Melberg-Lervag et al., 2012; Moreno, Peteirs, & Simoes, 2015). As such, phonological awareness instruction would greatly benefit these learners, enhancing their reading abilities. Dandache, Wonters, and Ghesquiere (2014) assessed phonological awareness in dyslexic learners from elementary school through to grade 7, finding that phonological deficits persisted across different grade levels. This highlights the need for direct, explicit phonological instruction for dyslexic learners, regardless of age. This is particularly crucial when learners encounter languages with complex orthographic systems.

According to the International Dyslexia Association (2018), "Developmental Dyslexia (DD) is a long-term language-based condition." Notably, DD is not more or less prevalent in specific age groups, and when left undiagnosed, phonological deficits and associated symptoms may

persist throughout life (American Dyslexia Association, 2017). Without diagnosis and tailored instructional strategies, students are more likely to experience social isolation, depression, or early school leaving, largely due to their underperformance relative to peers in reading and other academic areas (Dickman, 2017). Hudson (2016) suggests that with proper diagnosis, learners should be supported through age-appropriate language learning interventions. It is further recommended that all interventions include phonological awareness instruction tailored to the learners' developmental stages, as phonological processing difficulties continue to affect dyslexic learners as they grow older (Van Setten, 2017).

There is considerable debate surrounding the issue of gender and dyslexia. Since the 1990s, researchers have posited that dyslexia is more prevalent among boys than girls (Shaywitz et al., 1990). Neuroscientist and speech pathologist Dr. Martha Burns illuminate that male brains develop at a different pace, making boys more susceptible to neurodevelopmental issues, including dyslexia. Several studies have supported the notion of a male preponderance, with ratios ranging from 1.5:1 to as high as 3-4:1 in historical estimates (Almahrag, 2021; Dimitra, 2023; Ritter, 2004; Pennington, 2009; Quinn et al., 2013).

In contrast, the IDA (2018) maintains that dyslexia affects all genders and can range from mild to severe. Hulme (2015) contests the notion of gender disparity, arguing that the cognitive predictors of reading ability are evenly distributed across boys and girls in all languages. He further contends that cultural factors, underdiagnosis in schools (IDA, 2021), and ineffective approaches to foreign language learning may account for perceived gender differences in reading proficiency. Wagner (2018) adds that boys may receive less reading instruction than girls, exacerbating their reading challenges and leading to more severe dyslexic symptoms. Boys may also be less inclined to engage actively in classroom activities, which could further hinder their learning.

While boys are believed to have a higher prevalence of dyslexia, evidence suggests that girls may exhibit different symptom profiles or coping strategies (Fletcher et al., 2019). Girls with dyslexia may develop compensatory mechanisms, such as relying on context clues, which can mask their difficulties and delay diagnosis (Wagner, 2018). Furthermore, Joyne and Wagner (2020) observe that boys with dyslexia tend to show greater deficits in decoding and phonological processing, whereas girls may exhibit better decoding skills but struggle more with higher-level language functions, such as morphological awareness and syntax. This suggests a divergence in symptomatology rather than a lower incidence in girls.

In conclusion, dyslexia manifest uniquely in each individual, irrespective of age or gender (Erbeli et al., 2018). Therefore, effective diagnosis and intervention require a nuanced understanding of the cognitive and environmental factors contributing to the disorder.

2.3 THE CORRELATION BETWEEN READING AND PHONOLOGICAL AWARENESS

Proficient reading depends on the ability to extract the phonological representation of a word from its corresponding sequence of letters and understand the written text (Wanger et al., 2022). Accordingly, readers must possess a sufficient grasp of the phonological structure of spoken language in order to effectively apply the alphabetic principle. As previously discussed, dyslexic learners face increased cognitive challenges when learning a new language, particularly English, which exacerbates their pre-existing difficulties.

The English language comprises 44 distinct phonemes, represented by 1,120 different graphemes. The relationship between graphemes and phonemes in English, known as Grapheme-Phoneme Correspondence (GPC) or Phoneme-Grapheme Correspondence (PGC), is characterised by a one-to-many mapping and is inconsistent (Dimitra, 2023; Nyikos, 1988). For instance, the phoneme /f/ can be spelt in seven different ways: 'fan', 'cliff', 'phone', 'laugh', 'calf', and 'often'. English monosyllabic words can be grouped into four distinct categories: (1) words where the pronunciation of the component 'ink' remains consistent across words sharing the same component, such as 'ink', 'link', 'pink', and 'mink'; (2) irregular words like 'hint', 'mint', and 'tint', where the word body 'int' is pronounced similarly except for the word 'pint', which deviates from the regular pattern; (3) words such as 'beak', 'leak', and 'peak', which have inconsistent pronunciations when compared with 'bread', 'head', and 'spread', or 'steak', and similarly, the word 'learn' is pronounced differently from 'earn' despite sharing the same word stem 'ea'; and (4) exceptional words with the word body 'ough', such as 'through', 'thorough', 'bough', 'cough', and 'dough', which all have distinct pronunciations. Uncommon words like 'yacht' and 'colonel' further deviate from the standard patterns of English GPC.

Kuppen and Bourke (2017) argue that the English language presents a complex relationship between written letters and spoken sounds, requiring a robust understanding of phonological awareness, particularly with specific phonemes. Ehri (1987, 1998, 2014) asserts that mastering the alphabetic code is a fundamental stage in the process of reading acquisition. This highlights the importance of phonological awareness in classrooms for dyslexic learners of English as a Foreign Language (EFL). Daloiso (2017) emphasises that learners must be able to recognise a

set of written symbols, combine them, and accurately associate them with the corresponding sounds of the foreign language in order to correctly pronounce foreign words. By providing clear guidance and fostering the development of phonological awareness, the reading proficiency of dyslexic EFL learners can be improved, reducing their reading difficulties.

Van Setten et al. (2017) conducted a study examining the reading abilities of dyslexic teenage learners in both their native language (L1) and second language (L2), which was English. The findings revealed that individuals with dyslexia demonstrated greater impairments when learning their second language (L2), attributed to their limited ability to acquire phonological structures. The authors also argued that, despite the diminishing correlation between reading and phonological awareness as individuals age, dyslexic learners continue to experience persistent phonological processing difficulties into adulthood. Regardless of age, dyslexic learners would benefit from intensive instruction in phonological analysis of words and letter-sound correspondence to improve reading skills in English as a Foreign Language (EFL).

However, some researchers suggest that early reading development and sight vocabulary are influenced by basic phonological awareness and extensive exposure to written material, rather than advanced phonemic awareness and expert knowledge of letter-sound relationships (Fletcher-Flinn & Thompson, 2004; Stuart et al., 2000; Thompson et al., 2015). This claim is challenged by Double et al. (2019) and Niklas et al. (2016), who emphasise that both dyslexic and non-dyslexic learners risk lacking essential reading skills if they do not receive explicit phonological awareness training. According to Wanger et al. (2022), phonological decoding and encoding skills play a crucial role in initiating the self-teaching process necessary for acquiring new vocabulary and developing independent reading abilities. To achieve successful reading, it is therefore essential to decode text effortlessly, allowing the majority of cognitive resources to focus on comprehending the text.

2.4 Dyslexic Learners' Learning styles

Dyslexia is a complex and multifaceted disorder that affects learners in diverse ways. Extensive research has demonstrated that no two individuals with dyslexia exhibit identical symptoms (IDA, 2024; Alsobhi & Alyoubi, 2020). In consequence, to provide effective learning interventions, educators must tailor learning experiences to the specific needs of dyslexic learners (HESA, 2015). Dyslexic learners possess distinct learning styles, differing from both non-dyslexic individuals and other dyslexic learners. Mortimore (2008) found that

understanding and acknowledging the varied learning styles associated with dyslexia can help learners reach their full potential. By recognising and accommodating these differences, an inclusive learning environment that meets the needs of all learners can be fostered.

According to HESA (2015), learning styles refer to the different approaches individuals prefer when learning and processing information. This implies that, despite learning barriers, every learner has a preferred method of acquiring knowledge. In this context, teachers must ensure that any instruction provided is adapted to the learner's preferred style. Importantly, Exley (2003) demonstrated that aligning classroom instruction with learners' preferred methods significantly improves performance and achievement. Alsobhi and Alyoubi (2020) concur, arguing that by recognising individual learning preferences, a broader range of resources can be developed to accommodate diverse learning styles.

The IDA (2024) identifies several learning styles commonly associated with dyslexic learners, including visual, auditory, kinaesthetic, and multi-modal learning (Morgan & Klein, 2020; Alsobhi & Alyoubi, 2020; IDA, 2024). In the case of visual learning, the IDA (2024) emphasises that dyslexic learners process information most effectively through visual aids such as charts, diagrams, and graphs. Kolb and Kolb (2005) further explain that dyslexic learners who prefer visual learning rely on visual stimuli to comprehend and retain information. For instance, during an alphabet identification lesson, teachers may use flashcards with coloured letters. Islam (2019) also suggests that teachers could employ visual metaphors to simplify abstract concepts, allowing dyslexic learners to better understand and retain information by associating complex ideas with familiar images.

The IDA (2024) also affirm that some learners prefer auditory instruction. Research indicates that these learners excel in processing information through sound and benefit from engaging in verbal activities (Islam, 2019). For such learners, effective teaching should include interactive verbal instruction (Fleming & Zigward, 2018), which allows them to process information through listening and participation. Fleming and Zigward (2018) argue that participatory techniques, such as rhymes, mnemonics, and songs, enhance comprehension and make learning more enjoyable by tapping into learners' natural affinity for rhythm and melody.

Kinaesthetic learning is another style observed among dyslexic learners. Kolb and Kolb (2005) found that kinaesthetic learners absorb information more effectively through hands-on experiences and physical activities. They emphasise that such learners thrive in interactive

environments where they can engage their senses and manipulate objects. For example, a teacher might ask learners to spell the word "soccer" by forming the letters with their bodies, making the learning process more dynamic and helping the letters stick in their memory.

Additionally, some learners benefit from a combination of these methods, known as multi-modal learning (Mortimore, 2008). These learners perform best when instruction engages multiple senses simultaneously.

In conclusion, recognising and incorporating various learning styles is essential when delivering phonological awareness instruction to dyslexic learners. Tailoring educational approaches to align with learners' preferred methods can significantly enhance reading proficiency, particularly in the context of learning English as a Foreign Language (EFL). As standard methods of reading instruction may not resonate with all learners, adapting to their specific learning styles can lead to more effective and successful learning outcomes.

2.5 PHONOLOGICAL AWARENESS INSTRUCTION

The science of reading is more widely understood among educators than the science of teaching reading. On this account, we now possess greater knowledge about the elements that contribute to improved reading outcomes at various levels than we do about how to effectively teach these elements to diverse groups of students, each with distinct learning styles. Since dyslexia is not associated with a lack of cognitive ability, it is reasonable to expect that learners with developmental dyslexia would respond well to targeted interventions aimed at improving their reading comprehension (Waldie & Austin, 2014).

As previously discussed, one of the factors contributing to dyslexic children's difficulties with selecting words to aid in understanding letter systems is their processing of the phonological features of language (Snow & Willingham, 2017). Before mastering the alphabet, students cannot develop into proficient readers. Given that letters form the fundamental building blocks of written language, Mataka et al. (2021) provide evidence supporting the assertion that letter recognition is a critical component of learning to read. That being so, it is essential that "learners with DD receive instructional approaches that are effective, involve direct, explicit teaching of letter-sound relationships, syllable patterns, and meaningful word parts, and provide ample opportunities for successful practice of taught skills" (IDA, 2017, pp. 236-247).

Moreover, Hulme and Snowling (2011), alongside Hulme (2015), argue that the optimal approach to teaching reading to learners with Down syndrome involves fostering proficiency in spelling, comprehension of sound relationships, and understanding the correspondence between spoken sounds and written symbols. Phonological awareness (PA), defined by Daloiso (2017) as "the recognition that words have constituent sounds" (p. 13), serves as the most appropriate method of instruction in this context. For example, there are three ways to identify the components of a word: phonemes (e.g., /b/, /oo/, and /k/), onsets and rimes (e.g., /b/ and /ook/), and syllables (e.g., /book/). Essentially, as children develop literacy skills, they strengthen the connection between their phonological abilities and the orthography of letters and symbols in written language (Scott et al., 2019). Phonological processing, therefore, is the primary area of difficulty for dyslexic learners.

Significantly, Marther and Wendling (2018) made the crucial discovery that phonological awareness (PA) is the cornerstone for the successful development of reading and decoding skills. To elucidate further, Van de Kleij et al. (2017) emphasise the reciprocal relationship between PA and reading ability, suggesting that the development of reading skills directly influences the enhancement of PA. This highlights that the EFL reading needs of dyslexic learners can be effectively addressed through the adoption of phonological training. Furthermore, Clay (2016) argues that since spoken and written words are intrinsically linked, PA is fundamental to the reading process. Clay continues to assert that in order to move from a printed word to a spoken word (reading), or from a spoken word to a written word (spelling), readers must first understand the speech sounds represented by individual letters and letter combinations.

Phonological awareness instruction is comprised of five stages, which when applied sequentially, foster the gradual and effective development of reading skills. Each stage progresses from simpler to more complex tasks, as illustrated in the accompanying image.

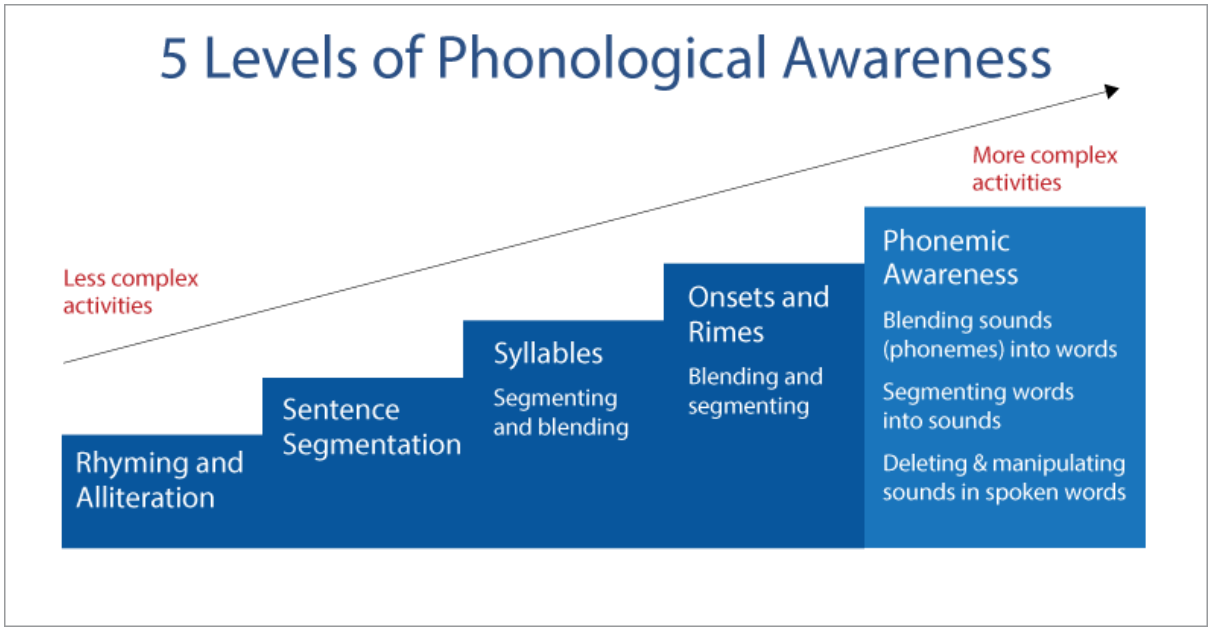


Figure 1. Phonological Awareness Complexity Continuum (Kilpatrick 2015)

Kilpatrick (2016) asserts that awareness of spoken language sounds is essential for learning letter-sound correspondences, combining sounds to decode words, and mapping words into long-term visual vocabulary. The first phase of phonological awareness (PA) instruction involves encouraging learners to detect alliteration and rhyme. Children typically recognise the recurrence of similar sounds at the end of phrases or sentences (Ellis, 2022), as seen in words such as "hat/cat" and "oak/poke." Adams (1990) suggests that the use of rhyme and alliteration stimulates the auditory system, which in turn enhances concentration and vocabulary recognition.

Segmentation, on the other hand, helps learners with developmental dyslexia (DD) understand that sentences consist of words, words are broken down into syllables, and syllables are further divided into phonemes (Hatcher et al., 2014). Learners must also grasp that certain sounds correspond to specific letters. This is where blending comes into play, as learners combine individual sounds or syllables to form words (Yokoyama & Kinoshita, 2017). Similarly, learners with DD must be able to construct new words by removing syllables from existing ones. Words like "cupcake" can be used in activities involving segmentation, blending, or deletion.

Phonemic awareness represents the final stage of PA instruction. Phonemic awareness is the ability to perceive and manipulate phonemes, the smallest units of sound in language (Le Roux

et al., 2017). This skill includes recognising where a sound occurs within a word and identifying the sound in a specific position (Talbot, 2020). Nijakowska et al. (2018) argue that understanding even the smallest unit of language can influence the meaning of a word. On that account, PA instruction is the most crucial skill for enhancing reading ability among learners with DD in English as a Foreign Language (EFL). Tasks involving sound substitution can aid learners in manipulating phonemes and acquiring new vocabulary.

Fanon (2018) observes that "understanding education necessitates a holistic approach beyond contemporary classrooms." Accordingly, the implementation of PA teaching has the potential to foster inclusion, reduce inequities in reading development, and address broader issues of social justice. By targeting phonological processing difficulties, PA instruction is likely to improve decoding skills, vocabulary acquisition, reading fluency, and, ultimately, reading comprehension.

2.6 EMPIRICAL REVIEWS

Despite various initiatives aimed at enhancing reading, some learners continue to struggle with learning to read. For these learners, improving phonological awareness, a key language skill, may facilitate more effective reading development. This study aims to improve reading skills in EFL dyslexic learners through the inclusion of phonological awareness instruction. A pertinent question for dyslexic learners is whether improving their phonological awareness skills can enhance their reading ability. The observation that dyslexic learners exhibit significant deficits in phonological awareness compared to typically developing readers provides indirect support for this hypothesis (Holland, 2017). This section, therefore, highlights previous studies in favour of phonological awareness instruction.

Dessemontet and Chambrier (2015) conducted a study evaluating the role of phonological awareness and letter-sound knowledge in the reading development of children with intellectual disabilities. An academic performance test was administered to 129 participants with mild or moderate intellectual disabilities aged 6 to 8. The study revealed that phonological awareness and letter-sound knowledge at ages 6–8 predicted growth in both word reading and non-word reading. Furthermore, the data demonstrated that combining phonological awareness training with explicit phonics instruction promotes reading progress in children with intellectual disabilities (Dessemontet & Chambrier, 2015).

Similarly, AI Otaiba et al. (2019) found that explicit and systematic instruction has the potential to improve reading skills. It helps learners understand how phonemes, or speech sounds, map to letters and patterns within words, which can significantly reduce the prevalence of dyslexia in EFL contexts.

Additionally, the National Reading Panel Report (2000) indicated that explicit phonological awareness instruction is highly effective. Foorman et al. (2016) and subsequent researchers, including Fletcher et al. (2018), reviewed the report and confirmed its conclusions. The researchers found strong evidence supporting explicit phonological awareness instruction to prepare learners to read words and comprehend text. Foorman et al. (2016) discovered that the best learning outcomes are achieved when teachers begin by introducing familiar terms and gradually focus learners' attention on smaller sound segments within those words.

According to Foorman et al. (2016) and Gillon (2017), this approach prepares learners to understand the specific sounds that letters represent and to distinguish those sounds and letters when they occur. Gillon (2017) further argued that learners with phonological impairments require precise instruction, consistent practice, and ample opportunities to apply their knowledge in order to develop their skills. He advised that teachers provide additional modelling and guided practice for struggling readers during instructional activities before allowing them to engage in independent practice (Gillon, 2017; Webb et al., 2018).

Snowling's (2015) study on "Early Identification and Intervention for Dyslexia" found that "the predominant cognitive explanation of dyslexia is that it arises from phonological deficits affecting the processing of speech sounds." Early signs of dyslexia include difficulties with phonological awareness development and, more significantly, phonological learning. These issues, in turn, impact letter knowledge acquisition, which is a key indicator of a learner's risk of developing reading difficulties (Snowling, 2015, p.2). Snowling's study explored different screening strategies to identify and provide appropriate solutions for dyslexic learners. Following extensive research, he concluded that the critical factor is not the screening instrument itself but how it is used. He also emphasised the need for interventions to be systematic, well-structured, and multisensory.

In a related study, Hauk (2021) conducted a qualitative investigation into the impact of phonics and phonemic awareness interventions on second-grade struggling readers. The study involved three participants, with data collected through benchmark assessments and field notes. The

findings revealed that phonetic coding improved accuracy rates, and participants demonstrated enhanced oral reading fluency in terms of words read correctly per minute. The intervention had a positive effect on second-grade dyslexic learners' basic reading skills, particularly phonetic decoding and oral reading fluency. Hauk (2021) concluded that interventions should focus on developing awareness and proficiency in areas such as phonemic awareness (the ability to identify and manipulate individual phonemes), phoneme-grapheme correspondence (the relationship between letters and their corresponding sounds), and phonological processing.

However, Graham et al. (2019) contend that while phonological awareness is vital for reading development, its effectiveness may be diminished in EFL environments where learners face both the challenges of dyslexia and the task of learning a new language. The study found that many EFL dyslexic learners struggle with the phonetic structures of English (Snowling, 2019), which often differ significantly from their native languages. As a result, standard phonological awareness practices may not yield significant improvements in reading skills. The authors argue that an overemphasis on phonological awareness risks neglecting other important aspects of literacy development, such as vocabulary acquisition and comprehension strategies. They propose a more integrated approach, combining phonological training with contextualised language usage and comprehension tasks, which may produce better outcomes for EFL dyslexic learners.

In line with this, Kormos and Smith (2012) conducted a study examining the influence of cultural and linguistic factors on the effectiveness of phonological awareness training for EFL dyslexic learners. Their findings indicate that phonological awareness tasks often do not align well with the linguistic backgrounds of these learners. For instance, students whose first languages have different sound systems or orthographic representations may struggle to apply phonological training techniques to their English reading practices. The researchers suggest that this misalignment may lead to frustration and disengagement, hindering reading progress. They advocate for culturally responsive instructional strategies that consider the diverse linguistic characteristics of EFL dyslexic learners. By incorporating elements of students' first languages into reading instruction, educators can improve learning outcomes.

Similarly, Hernandez et al. (2021) argue that comprehension strategies should take precedence over phonological skills when teaching reading to EFL dyslexic learners. Their study revealed that while phonological awareness is crucial for decoding words, it does not necessarily correspond to overall reading comprehension, particularly in a second-language context. The

research highlighted that focusing on improving comprehension strategies—such as summarisation, prediction, and inference—led to greater improvements in the reading abilities of EFL dyslexic students than traditional phonological training alone. According to the findings, incorporating comprehension-focused instruction can provide these learners with the tools to better navigate texts, thereby fostering a deeper understanding and appreciation of reading.

In conclusion, these findings raise important questions about the reliance on phonological awareness instruction to improve reading in EFL dyslexic learners. They underscore the need for a more holistic approach that considers linguistic diversity, cultural relevance, and comprehensive literacy development. However, this study primarily focuses on enhancing phonological awareness skills among dyslexic learners, enabling them to understand and apply the orthographic mappings of English as a foreign language. This is particularly important given that Sesotho, their native language, has a transparent orthography, whereas English has an opaque orthography, necessitating systematic and explicit instruction in phonological awareness before moving on to more complex skills such as reading comprehension. As the International Dyslexia Association (IDA, 2017) notes, "Dyslexic learners require a different approach to language learning than that typically employed in most classrooms." It is therefore essential to teach these learners the foundational intricacies of the target language and its orthographic structures before progressing to whole-word reading, in order to avoid confusion and cognitive overload.

2.7 GAPS AND APPRAISALS

Many researchers have identified word-level difficulties as the primary cause of reading challenges (Ellis, 2022; Marther & Wendling, 2015). Struggling readers who face difficulty in reading individual words often perform poorly in text comprehension, as they must devote significant cognitive resources to word decoding. Despite decades of research emphasising the importance of phonological awareness for the reading success of EFL learners (Marcuzz & Romeo-Naranjo, 2016), many teachers still misunderstand dyslexic EFL learners, who often struggle with word decoding and exhibit broader language difficulties (Daloiso, 2017). As a result, these learners frequently experience a disjointed educational curriculum in unsupportive environments, which places them at a distinct disadvantage in reading development.

This study highlights the challenge of teaching reading in an EFL context, where many learners are still developing their decoding skills in order to become independent readers. It is important to recognise that comprehension is a crucial aspect of reading, but learners must first acquire the ability to read individual words before they can understand any written text (Bowers & Bowers, 2017). Resultantly, instruction should pragmatically address word-level difficulties, as learners need to master both word accuracy and text comprehension simultaneously, whether the focus is on decoding single words or understanding broader passages.

Aloufi (2021) similarly asserts that dyslexic EFL learners often struggle with various sub-skills of reading, including phonological awareness. Numerous studies have demonstrated that intensive instruction in English phonological awareness can improve word-level literacy for both monolingual and bilingual dyslexic learners (IDA, 2013, 2017, 2018). However, current research on EFL dyslexia offers limited guidance on how to address phonological awareness difficulties through explicit, targeted instruction (Nijakowska, 2019; Cavalli et al., 2017; Gabay et al., 2015). Global research indicates that phonological awareness interventions can support struggling EFL readers in achieving higher reading standards by grade 6.

Recent policy reforms have been instrumental in advancing learner-centred approaches to education and service delivery (LIEP, 2018). Despite significant improvements in Lesotho's educational policies regarding access, equity, and quality, there remain considerable challenges in integrating phonological awareness training to enhance reading skills among dyslexic EFL learners (Lumina & Hudson, 2023). Much of the literature focuses on the attitudes, understandings, and external influences encountered during educational interventions, yet it often fails to sufficiently address the specific needs and conditions of dyslexic learners (Mosia, 2015).

Defining dyslexia within an EFL context is particularly complex due to differences in how learners acquire their native language (L1) compared to a foreign language (Dimitra, 2023). The educational approaches used in L1 contexts often mislead learners, parents, and teachers when applied to EFL settings, as they do not align with the instructional methods required for EFL reading development (ibid). The key difficulties in identifying the root causes of dyslexia in EFL learners may stem from discrepancies in the predictability of phonological awareness and variations in grapheme-phoneme correspondence.

Failure to incorporate phonological awareness instruction means that dyslexic EFL learners continue to struggle with recognising graphemes and phonemes (Wagner et al., 2022). Furthermore, Snowling et al. (2020) argue that without targeted interventions to address phonological awareness deficits, dyslexic learners will persist in encountering difficulties with EFL reading tasks. Modern approaches to dyslexia training increasingly consider the diverse learning profiles of dyslexic learners, including comorbidities, and adapt instruction accordingly. If phonological awareness is given equal prominence alongside other skills in the reading hierarchy, dyslexic learners' reading abilities can be more accurately supported, rather than overestimated.

2.8 CONCEPTUAL FRAMEWORK

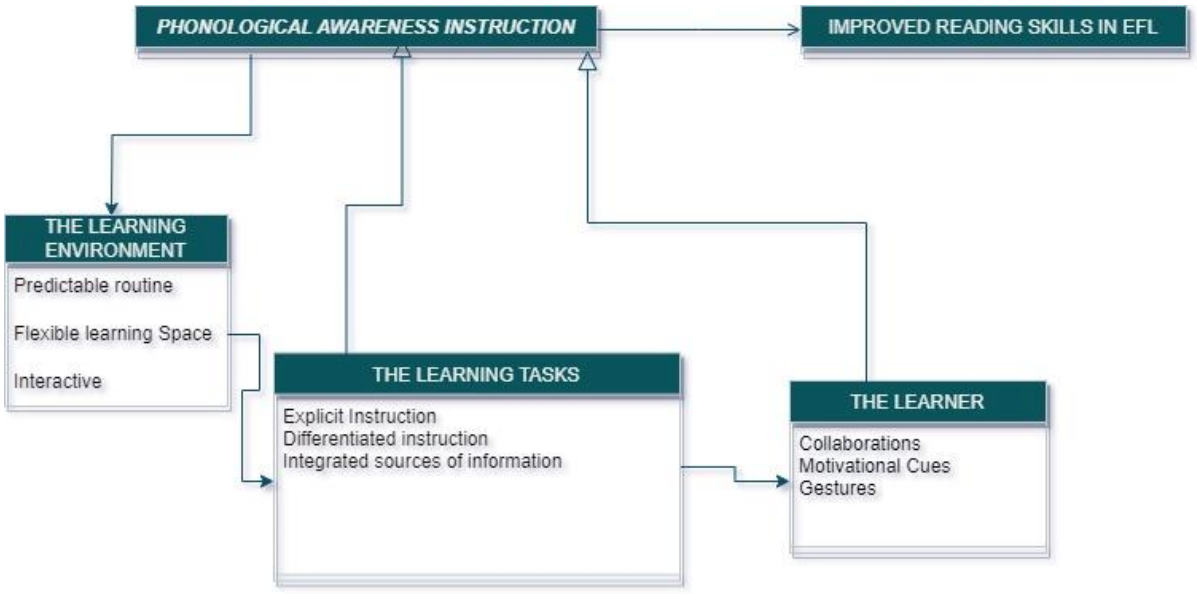


Figure 2. Conceptual Framework

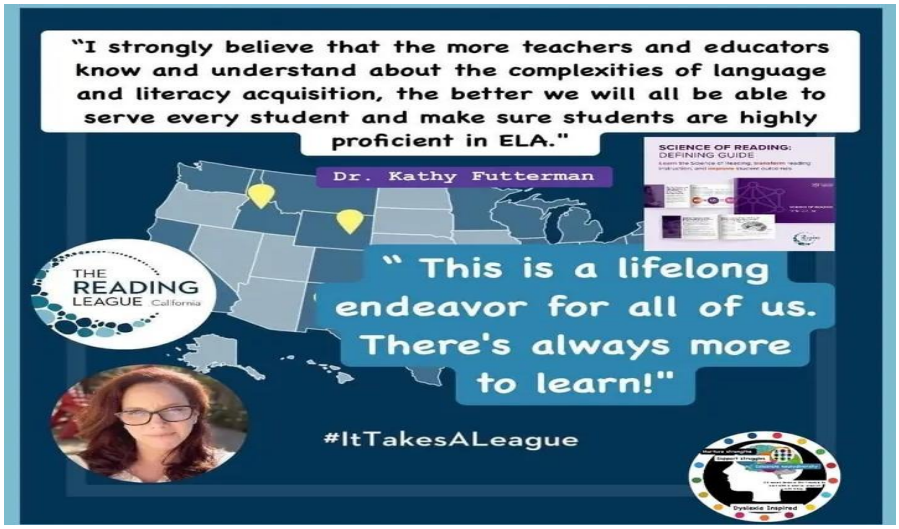


Figure 3. Motivation for Educators (dyslexiainspired.com)

"All learners are entitled to attend and participate in foreign language classes. Thus, today's foreign language educator... has the responsibility to meet all learners' individual needs in the 'least restrictive environment'" (Schneider & Crombie, 2003, p.1). Addressing the English language learning difficulties of dyslexic learners requires a multifaceted approach. The learning environment must accommodate each learner appropriately, implement individualised instructional strategies, and establish support systems to facilitate language development.

To create a positive atmosphere, the researcher established a consistent routine for each step of phonological awareness instruction. By developing clear and precise procedures, the researcher was able to create an organised environment (Song et al., 2020) that alleviated stress and anxiety for dyslexic learners learning to read a foreign language. Moreover, the International Dyslexia Association (IDA, 2021) highlights that when learners understand what to expect and how to complete their daily activities, they become more independent learners. This sense of control boosted their confidence and enabled them to actively participate in the learning process. For example, each reading class commenced with the singing of rhymes and alphabet songs, which not only fostered a positive learning environment but also helped regulate learners' cognitive and emotional functioning prior to introducing new content. Consequently, the learners' comorbidities were better managed (Castillo & Gilger, 2018).

Additionally, an EFL classroom designed for dyslexic learners must be adaptable and participatory, particularly when the focus is on strengthening phonological awareness skills (NCLD, 2021). This approach helps maintain learners' motivation throughout the learning

process. Therefore, the researcher incorporated interactive games into phonics instruction, such as word games, riddles, and alphabet songs, to keep learners engaged and active. Learners were also encouraged to communicate with peers and collaborate in pairs and groups, as well as interact with the outdoor environment through activities like drawing in the sand and participating in running and jumping games. Peer interaction, as Berent and Platt (2021) suggest, allowed learners to benefit from one another, as the researcher considered both strengths and weaknesses when forming groups and pairs. Importantly, having a peer who provides additional support during lessons can help reduce feelings of isolation and frustration in dyslexic learners (Fletcher et al., 2019).

Beyond the learning environment, tasks must be accessible and achievable for dyslexic learners. Learning a foreign language amplifies the challenges learners already face (Wagner et al., 2022). As such, detailed instruction is crucial. Given that dyslexic learners struggle with verbal memory (BDA, 2017), following longer or more complex instructions becomes difficult, resulting in a failure to acquire new sounds and words (Lu et al., 2023). To address this, the researcher provided explicit, structured, and sequential phonological awareness lessons, gradually building upon core skills. For example, the phonological awareness instruction followed a continuum, progressing from simple to complex and easy to difficult (Nijakoskowska et al., 2018), allowing learners to first master basic alphabet knowledge before advancing to more complex tasks.

Furthermore, learning activities and instruction must be differentiated, systematic, and cumulative (IDA, 2017). Each concept should build upon previously taught material, with varied delivery methods that cater to individual learning styles. Personalised instruction can significantly improve learning outcomes. For instance, many dyslexic learners benefit from hands-on activities, which improve their working memory. Phillip and Kelly (2016) argue that hands-on participation enhances automaticity and retrieval speed, as knowledge is stored in different areas of the brain. While some learners benefitted from hands-on activities, others preferred visual aids or music, prompting the use of both verbal and non-verbal modes of delivery.

Research shows that learners are more motivated when education is explicit, differentiated, and tailored to their needs (Alsobhi & Alyoubi, 2020). Celebrating small achievements and recognising effort boosted learners' confidence when reading in English, even when new words were introduced. Alkhadim (2022) notes that dyslexic learners often feel overwhelmed by

decoding tasks, and positive reinforcement is essential in helping them persevere through challenges. As discussed earlier, collaboration was an integral part of the process, with the teacher scaffolding each stage until mastery. A collaborative classroom enables learners to draw upon each other's working memory when tackling difficult tasks (Snowling et al., 2020).

In conclusion, for dyslexic learners to develop reading skills, they must be able to "call up things they already know from different parts of the brain, to meet up with the new information in the print presented" (Clay, 2016, p.45). Therefore, the learning environment must be supportive and accommodating, tasks must be manageable and accessible, and learners should be encouraged to utilise their preferred learning methods. As illustrated in the figure below, teachers must gain a deep understanding of their learners in order to tailor instruction to their specific needs. This includes understanding any comorbidities, considering how they may affect the success of interventions, and managing them effectively.

2.9 Chapter Summary

The chapter presented an overview of research on developmental dyslexia and phonological awareness instruction, alongside empirical investigations into the use of phonological awareness as an intervention. The relevant literature was organised into sections and subsections. Furthermore, the chapter analysed the study's theoretical foundations, elucidating how the intervention was implemented. The conceptual framework in this chapter demonstrated the relationships between key concepts and variables. Finally, the chapter identified both gaps and strengths in the empirical research on developmental dyslexia and reading skills in EFL.

CHAPTER 3: METHODOLOGY

3.0 Introduction

The insights gained from the literature review in the previous chapter inform the decision to adopt an ecological understanding of the three theories underpinning this research. This chapter examines the epistemological standpoint of critical realism and the advantages of employing a mixed-method approach. It evaluates the selection of data collection strategies, intervention procedures, and tools, alongside the methodologies for data analysis. Given the intrusive and sensitive nature of the study, ethical considerations and implications are paramount. The principles of ethical research are rigorously upheld, as the vulnerable population must not be exposed to any form of harm. Furthermore, the chapter addresses issues of reliability, validity, and trustworthiness in the research process.

3.1 RESEARCH PARADIGM: Critical Realism (CR)

Critical realism is a philosophical approach associated with Roy Bhaskar, who combined the philosophy of science (transcendental realism) with the philosophy of social science (critical naturalism). According to Bhaskar's argument for transcendental realism, knowledge can exist independently of experience (Bhaskar, 1986). He likened reality to an iceberg, with much of it hidden beneath the surface (Fletcher, 2017). As Hu (2018) explains, "The causal mechanisms exist below the surface and are invisible, but they give rise to experiences and events" (p.130). This paradigm is well-suited to the present research as it allows for an exploration of the observable characteristics of dyslexic learners, enabling researchers to consider the varied realities these learners face and to determine how phonological awareness may address their language-learning challenges after a thorough analysis of their situation.

Moreover, critical realism permits researchers to "evaluate and compare the explanatory power of different theoretical explanations and, finally, select theories which most accurately represent the 'domain of real' given our existing knowledge," given its presupposition of judgmental rationality (Hu, 2018, p.131). Ontologically, critical realism posits that reality is more complex than mere experience and that experience alone cannot fully capture the essence of the real (Hodgkinson-Williams et al., 2017). The core idea is that actions within social structures generate observable events, and these actions, in turn, cause those structures to evolve over time (Bhaskar, 1986). Although these processes are not immediately visible and occur beneath the surface, they can be discovered through inquiry. This is because critical

realism recognises that multiple explanations may exist for a specific behaviour or event (Stutchbury, 2021).

Ronkainen & Wiltshire (2019) assert that while a critical realist ontology acknowledges causation, it does not reduce it to empirical regularities. Critical realism recognises that, in addition to phonological processing difficulties, dyslexic learners may encounter other challenges in learning to read. Thus, it is essential to consider these additional variables when implementing phonological awareness instruction. On this point, critical realism acknowledges the limitations of our knowledge, as it is reliant on subjective observation, thereby adopting an interpretivist epistemological stance (North, 2017). It is also noted that critical realism bridges the opposing perspectives of positivism and interpretivism by recognising the existence of reality while acknowledging the subjective nature of knowledge about that reality (Fletcher, 2017). Furthermore, Stutchbury (2021) emphasises that critical realism goes beyond descriptive analysis, asserting that amidst the complexities of daily life, explanations may draw upon a range of social theories.

Fletcher (2017) suggests that critical realism encompasses three distinct layers of reality: the empirical, actual, and real levels. The empirical level consists of sensory experiences and perceptions of a subject, representing the visible part of the iceberg. At this level, dyslexic learners may exhibit similar phonological deficiencies when reading both in their native Sesotho and in English as a Foreign Language (EFL). The actual level concerns real-world events and occurrences that lie just beneath the surface and can be more easily researched. For example, misunderstandings about dyslexia can be clarified, allowing researchers to adapt their approaches to teaching dyslexic learners.

The "real" level constitutes the third layer. According to Ronkainen & Wiltshire (2019), this level is only accessible through theoretical re-descriptions and represents the hidden aspects of reality. This level focuses on deeper structural and causal mechanisms (Tikly, 2015). In this study, language orthographies are examined to address the real level, as they reveal comorbidities associated with developmental disabilities (DD) and the complexities of reading skills among dyslexic learners. This level is essential for evaluating additional confounding variables that may affect the outcomes of phonological awareness instruction, which aims to improve reading abilities.

The epistemology of critical realism is relativistic (Bhaskar, 1986), meaning that different individuals may acquire knowledge in various ways. Hodgkinson-Williams et al. (2017) agree that critical realism recognises that knowledge of social systems is subjective, relative, and constructed by individuals. Similarly, Tikly (2015) argues that reality cannot be fully understood, defined, or quantified and that it exists independently of our comprehension. Hu (2018) further emphasises that critical realism highlights the importance of social interactions and contexts in shaping our understanding of reality. He explains that this perspective aims to uncover the structural and social factors that influence knowledge and considers how power and ideology shape our perceptions of developmental disabilities. Additionally, it discusses how phonological awareness can address educational inequalities and improve reading comprehension for EFL learners.

Since critical realism advocates for a multi-method approach (Stutchbury, 2021), the following section outlines the methodology adopted in this study.

3.2 RESEARCH APPROACH

Given the ontology of critical realism, which accommodates both qualitative and quantitative approaches, the mixed-method approach is deemed an appropriate methodological framework for the current study. According to Creswell, Plano Clark, Gutman, and Hanson (2003), the mixed-method approach involves integrating data at one or more stages of the research process and entails the collection, analysis, and interpretation of both quantitative and qualitative data. It thereby merges the philosophical frameworks of interpretivism and post-positivism (Fetter, 2016), allowing for a comprehensive description of the study phenomenon by combining quantitative and qualitative data. The increasing complexity of research problems, alongside the need for both breadth (quantitative) and depth (qualitative) in understanding, has spurred interest in this approach (Mitchell, 2018). Consequently, the use of a mixed-methods research technique is said to overcome the limitations of a mono-method approach (Creswell et al., 2003; Greene and Caracelli, 1997; Johnson and Onwuegbuzie, 2003; Teddlie and Tashakkori, 2009; Johnson and Turner, 2003), particularly when a study involves variables with both qualitative and quantitative characteristics.

In essence, the mixed-method approach offers several advantages for addressing complex research studies. Maxwell (2016) highlights that it fosters logical reasoning, methodological adaptability, and a thorough understanding of research issues. This is particularly evident in its

facilitation of triangulation. As Carter et al. (2014) explain, triangulation is "the use of multiple methods or data sources to develop a comprehensive understanding of a research problem, or to test validity through the convergence of information from both qualitative and quantitative aspects of research" (p. 234). By combining the strengths of both methodologies and offsetting their respective weaknesses, this approach maximises the potential for addressing research questions effectively (Johnson & Onwuegbuzie, 2004).

In this study, the mixed-method approach allowed for the exploration of complex issues related to developmental dyslexia, including how phonological awareness instruction improved reading skills and how comorbidities could be managed within the classroom. As Enosh, Tzafrir, and Stolovy (2014) argue, this approach enables researchers to unpack intricate research issues. Cresswell (2015) further emphasises that the mixed-method approach captures a broader range of perspectives and addresses both breadth and depth in the analysis, thereby enhancing the rigour of the data analysis. He also suggests that this approach facilitates the generalisation of findings and implications to the wider population. In the current study, it allowed the researchers to investigate multiple facets of the research problem, providing a more nuanced and comprehensive view of the challenges faced by dyslexic learners and the impact of phonological awareness instruction on reading skills in English as a Foreign Language (EFL).

Finally, in this study, the quantitative phase focused on numerical data (Cresswell & Cresswell, 2018), which demonstrated the impact of phonological awareness instruction on dyslexic learners, while the qualitative phase provided a deeper understanding (Crossman, 2019) of why phonological awareness instruction led to measurable improvements in decoding and reading skills. This approach offered both breadth and depth in understanding the phenomena and mitigated the weaknesses inherent in using a single method (Collins, 2018). The next section will discuss the study's adopted research design.

3.2.1 RESEARCH DESIGN

Sequential explanatory design sequentially blends quantitative and qualitative data collecting and analysis approaches (Cresswell, 2013). The design process is divided into two interactive phases: quantitative and qualitative (Cresswell & Plano Clark, 2018). Importantly, numerical data is generated during the initial quantitative phase using standardised tests/instruments and statistical procedures. To create quantitative data, learners in DD were given standardised pre-

and post-tests, to identify their capabilities before and after phonological awareness instruction intervention. According to Shorten and Smith (2017), the first phase's goal is to gain a comprehensive grasp of the study issue, uncover patterns, and create correlations between variables. This phase served as the foundation for the qualitative phase.

To go deeper into the analysis and interpretation of the quantitative results, the qualitative phase was carried out. The quantitative phase's findings served as the foundation for the construction of qualitative data gathering techniques. As evidence, Cresswell & Wisdom (2013) claim that this stage provides richer and more detailed explanations for the collection of quantitative data. This stage assisted the researcher in identifying the underlying causes, incentives, and environmental elements that influenced the patterns in the quantitative data that were observed (Cresswell & Plano Clark, 2018; Schoonenboom & Johson, 2017; Shorten & Smith, 2017; Wisdom & Cresswell, 2013; Dawidi et al., 2021). Therefore, more elucidation and a thorough explanation of the reasons behind certain patterns identified in the pre-and post-test results are required.

After completing both steps, the results will be merged to provide a comprehensive and sophisticated understanding of the study problem. The integration step is the process of combining quantitative and qualitative outcomes (Green, Caracelli, & Graham, 1989; Tashkkori & Teddlie, 1998; Creswell et al., 2003). Consistent with this, the integration enabled the researcher to establish and discover patterns in both the outcomes and the occurrences. According to Creswell and Creswell (2018), triangulation improves the credibility and dependability of study outcomes by complementing findings from both quantitative and qualitative data. The integration stage allowed the researcher to compare, contrast and synthesise (Skamagki et al., 2022); and this brought new insights that may have not been apparent when analysing each type of data independently.

3.3 THE SCOPE OF THE STUDY

Substantial research has been conducted on accommodating learners with disabilities in schools, particularly those with specific learning difficulties (Francis et al., 1996; Akyle & Ozek, 2010; American Psychiatric Association, 2013; Snowling, 2017; Stevani & Tarigan, 2022). However, effective solutions for supporting these learners remain insufficiently

understood, revealing a pedagogical gap in enhancing reading abilities among learners with developmental dyslexia (DD) in English as a Foreign Language (EFL) classrooms. This study employed phonological awareness training to improve reading skills among learners with DD, framed by Cognitive Load Theory (Sweller, 1980), Dual Code Theory (Paivio, 1977), and Multisensory Language Education Theory (Sparks & Miller, 2000). Furthermore, the Critical Realism paradigm guided the research, allowing for the exploration of multiple realities related to the learners and the intervention, including dyslexia-related comorbidities, English spelling difficulties, misconceptions about dyslexia, and the influence of gender and age on language development in learners with DD.

The research sought to demonstrate that, with appropriate intervention, dyslexic learners can succeed academically and develop reading skills (Snowling & Melby-Lervåg, 2016). The International Dyslexia Association (IDA, 2017) emphasises that early intervention in DD strongly correlates with improved reading outcomes for learners. Resultantly, the study was conducted at a special primary school in Maseru. Gay et al. (2011) highlight the importance of defining the study's scope, including variables such as location, time frame, and key issues to be addressed. The study involved dyslexic learners in Grade 3, aged 6 to 12, a special education teacher, and myself as the researcher. The mixed-method research project spanned ten weeks, with the first two weeks dedicated to introductory activities, including a preliminary study and pre-test administration.

As a special education professional, I administered standardised dyslexia assessments, including the Bangor Dyslexia Test and the Rapid Automatised Naming (RAN) Test, following the test manual guidelines (Miles, 1993), to generate quantitative data in the first phase of the study. The qualitative data was obtained through participatory observations and classroom observations conducted by the special education teacher. The study focused primarily on phonological awareness skills in reading, with an emphasis on phonological aspects of the language, rather than reading comprehension. According to Shu and Ho (2018), phonological abilities are a strong predictor of reading skills development, especially in the context of foreign language acquisition, such as English. Thus, this study contributed to a deeper understanding of how to address pedagogical disparities, foster an inclusive classroom environment, and reduce inequities in foreign language learning, thus helping to close the academic achievement gap.

3.3.1 SAMPLE AND SAMPLING TECHNIQUE

In this mixed-method research, the target population is defined as primary school learners in Lesotho, aged between 6 and 11, who have been diagnosed with dyslexia. The aim was to address the challenges these learners encounter in English as a Foreign Language (EFL) classrooms, particularly when reading. Lesotho has a number of special schools, and the accessible group for this study was drawn from one mainstream school in Maseru. According to Nworgu (1991), a subset of the population under study is referred to as the sample. Therefore, the sample in this study is representative of all dyslexic learners in Lesotho. The findings from 40 Grade 3 dyslexic learners were used to generalise to the wider population, as the selected learners exhibited characteristics that typify the broader population (Kruskal & Mosteller, 1979; Collins, 2017).

The study involved two groups: an experimental group and a control group. The experimental group consisted of 20 dyslexic learners (9 girls and 11 boys) who received phonological awareness (PA) instruction, while the control group, also consisting of 20 dyslexic learners (10 girls and 10 boys), received no specific intervention and continued with traditional methods of instruction. The selection of participants was based on their EFL reading difficulties and phonological deficiencies.

Furthermore, the research utilised a factorial matrix design to visually represent the variance in the variables under investigation. According to Creswell & Creswell (2018), a factorial matrix displays all possible combinations of the factors being examined. In this study, the matrix allowed for the identification and exploration of interactions (Field, 2018) between PA instruction, age, gender, and language orthography, and their effect on EFL reading skills. The table below presents the interactions of the variables involved in this study, illustrating that a dyslexic learner receiving PA instruction, aged between 6 and 12, may be either male or female, with a first language orthography of either English or Sesotho.

PHONOLOGICAL AWARENESS INSTRUCTION				
Age	Gender		L1 ORTHOGRAPHY	
	Male	Female	Sesotho	English
6-9	✓	✓	✓	✓
10-12	✓	✓	✓	✓

Table 1. Factorial Matrix Design

Furthermore, a purposive sampling technique was employed in this study. According to Creswell (2009), the most suitable sampling technique in a sequential explanatory mixed-method design is identical purposive sampling. He emphasised that in this technique, the selected sample, which possesses specific characteristics and attributes necessary to answer the research questions (Onwuegbuzie & Collins, 2007; Collins, 2017), should be used in both the first and second phases of data generation. Collins (2017) further clarified that, in sequential design, qualitative data serves to explain and address gaps identified in the quantitative data. Using the same sample in both phases was advantageous, as it ensured that all relevant demographic, cultural, and experiential characteristics were consistently represented throughout the study (Radhakrishnan, 2014).

Moreover, given that the study aimed to incorporate an intervention, the effectiveness and limitations of this intervention were identified through coherent and consistent links between data from the same sample. This approach enhanced the integration of data from both phases (Cohen et al., 2018), revealing nuanced relationships and discrepancies that might not have been apparent had different samples been used. The tools for data generation used in the study are discussed in the next section.

3.4 DATA GENERATION TOOLS

Creswell (2009) proposes using several data production technologies to improve the dependability and trustworthiness of data interpretation in mixed-method research. He goes on to say that varied methods of data collection complement one another and improve data validity (Creswell, 2007). For the quantitative portion of the research, which is the first phase in this case, the Bangor Dyslexia Test (BDT) (Miles, 1983) and the RAN test were used for pre- and post-testing. The qualitative phase involved classroom observations, which were participatory

and also administered by the special education teacher during the intervention. The adopted tests gave statistical rigor and generalisability, while the observations explored the learners' relationships and behaviour in their normal classroom setting (Cohen et al., 2018). A detailed description of the tools follows.

3.4.1 BANGOR DYSLEXIA TEST (BDT)

One of the first dyslexia screening tests was the BDT, created in 1983 by Tim R. Miles to provide practical methods for identifying and evaluating learners with developmental dyslexia. According to Miles (2006), Miles (1993), Payne et al. (2007), and Miles (2006), DD is a condition characterised by a particular pattern of issues mostly caused by lexical or verbal labelling loss, which he thought showed an underlying phonological impairment. It can be challenging to identify dyslexia in classrooms, and many children may go undiagnosed (Altani et al., 2018). Miles created a simple test as a consequence, which qualified caregivers, psychologists, speech therapists, and special education teachers may all administer (Gieben & Siegel, 2012).

In essence, the BDT is designed to identify individuals with DD and offer an accurate measure of their reading, spelling, and language skills (Miles, 1997; Outon & Suárez, 2010; Outon & Ferraces, 2021). It is also said that the test is based on a comprehensive evaluation of a person's cognitive and linguistic ability (Miles 1993). The BDT consists of skill-based and anecdotal questions about chronic misunderstanding between the letters b and d, as well as accounts of other family members experiencing similar issues (Miles, 1983). The subgroups include, phonological awareness tasks, pseudo- and word reading, verbal and nonverbal working memory, and oral text comprehension.

Instead of taking a stance on the causal processes that the BDT subsets may or may not assess, my goal in this study was to examine how phonological awareness instruction, used as an intervention, affects reading in EFL classrooms. The BDT exam is thought to be pertinent to this investigation as its subsets match the activities required in phonological awareness instruction (Stein & Snowling, 2015). Both the control and experimental group were given this test, as a pre-test and a post-test.

3.4.2 RAPID AUTOMATISED NAMING TEST (RAN)

RAN tests are designed to examine a person's ability to quickly name a list of familiar items aloud (IDA, 2018). The items can be letters, numbers, colours, or objects, and they should be familiar. Importantly, Norton (2022) emphasises that RAN assessments are used to measure reading abilities and detect reading issues in students. He further emphasised that RAN tests measure fluency rather than word knowledge. Thus, it seeks to assess how quickly a person can name known items.

In this study, a sequence of objects was exhibited on charts, computer slides projected on a projector, and flash cards. The items used in this test animals, letters of the alphabets and simple words, names of familiar random objects, and items from the outside world. Learners were graded according to their pace, and hesitations were noted as incorrect. Furthermore, repetitions were awarded a half grade because they demonstrated inconsistency and difficulties with short-term memory. According to Sandra and Soetikno (2022), RAN test scores have been shown to predict future reading abilities. Children with reading challenges, particularly those with dyslexia, perform slower on RAN exams, indicating that the test is valid for evaluating learners' reading abilities.

To corroborate this, Shannahan (2020, p.341) maintains that "the speed with which learners can analyse letters and retrieve sounds, and combine this information short term memory matters, but so does the timing of these varied processes." As a result, the stop timer was utilised to record learners' performance in both pre-and post-tests.

3.4.3 OBSERVATIONS

The researcher captures data by observing learners in the classroom and recording their behaviour and activities (Creswell, 2007). According to Burns (1999, p.80), "the researcher observes the classroom interactions and events as they occur". Furthermore, according to Flick (2006), observations allow the researcher to note every frequent event that occurs in the classroom, making it easier to gain a firsthand understanding of the pupils. Merium (1998) described the observational methodology used in this study as incorporating both reflective and descriptive notes. In the opinion of Flick (2006), descriptive notes may include naturally occurring behaviours, interactions, and how learners respond to the intervention, whereas

reflective notes may incorporate "speculations of feelings, problems, idea hunches, impressions, and prejudices" (Bogdan & Bikle, 1992, p.121).

In the present investigation, data was generated using two different sorts of observations. Classroom observations and participation observations are two methods for generating data on teaching and learning in educational settings. Classroom observations usually involve an outside observer, such as a researcher or administrator, who examines the classroom environment, teacher-student interactions, and instructional procedures (Bielefeldt 2012). A special education instructor observed the researcher during an intervention. A guideline was provided to help with the key points to be observed. The observer focused primarily on how learners responded to the intervention.

In contrast, participatory observations encompass the researcher actively participating in classroom activities as a participant observer. Merium (1998) highlights that participation observation involves the observer entering the classroom and interacting directly with the students (Creswell, 2009). Burn (1999) contends that "the researcher becomes a member of the context and participant in its culture and activities" (p. 82). As a result, observations were pertinent to this study since the researcher closely examined and comprehended emerging patterns in dyslexic learners while teaching phonological awareness. Meriam (1998), on the other hand, criticises interactive observations, claiming that the researcher is prone to losing track of the learners and their actions. This appears to be what would happen if the researcher grew overly engaged in classroom procedures and lost sight of targeted individual behaviours and activities.

What to observe is the most significant component in maintaining attention to detail (Merriam, 1998). A generic observation is unlikely to be effective, thus the researcher chooses what to notice at any given time. As a result, the researcher paid special attention to detail in order to accurately and objectively report what was observed. Although some researchers maintain that classroom observations are invasive (Cohen et al., 2018), they are appropriate for this study because the participants are primary school learners who may be less forthcoming when using other instruments such as interviews. Classroom observations were used to produce nuanced data since they allow for the objective documentation of classroom dynamics and teaching approaches without directly influencing participant conduct (Anwar & Menekşe, 2020). This

can provide useful insights into the natural flow of the classroom and help researchers capture details that participant observers may overlook (Biddle, 1967).

Additionally, classroom observations can be less intrusive because the observer's presence is typically less disruptive to the learning environment than that of a participant observer. Finally, classroom observations were used in this study, allowing the researcher to measure the advancement of learners and knowledge of phonological awareness training (Creswell et al., 2003), as well as identify gaps and tailor instruction to their cognitive load.

3.5 DATA GENERATION PROCEDURE

There are logical steps that a well-generated dataset for research should follow (Creswell, 2003). This study aimed to examine the impact of phonological awareness teaching on dyslexic primary school learners' reading abilities. As a result, this mixed-method sequential explanatory design prioritised the quantitative part of the investigation. Thus, the quantitative phase, which is the first phase, received higher weight throughout the study's data generation and analysis (Morgan, 1998; Creswell, 2003). This phase provided a basic grasp of the hypotheses examined (Creswell et al. 2003), which demonstrated the relationship between phonological awareness education, reading skill, language orthography, age, and gender. Thus, it highlighted the generalised information about the research problem. The qualitative phase, on the other hand, refined and explained the statistical quantitative results, by observing the implication of the intervention through observations, to get more robust data from the learners (Rossman & Wilson, 1985; Tashkkoric& Teddlie, 1998; Creswell, 2003; Creswell, 2007).

The protocol is also significant in research. Hesse-Bieber and Leavy (2006) believe that some ethical principles should be considered before the 'actual' data generation process. As a result, the researcher went to the research location to examine participants and approached management for permission to conduct the study. Parents also received consent forms, because the learners are minors who cannot make decisions to partake in the study. In addition, parents will be contacted to obtain consent to examine the learners' medical records to better understand the characteristics of the participants, including any co-occurring conditions or other problems.

3.5.1 Pilot Study

To obtain high-quality results, a good research study with an appropriate experimental design and precise execution is required. During a pilot study, determining the viability of the research prior to undertaking the main study was beneficial. Crossman (2019) defines a pilot study as "a preliminary, small-scale rehearsal conducted before starting a full-scale research project" (p.54). The primary goal is to determine the viability of the research design (Anesthesiol, 2017). This study's pilot study was conducted at a local primary school using EFL learners with dyslexia as participants. The pilot research sample met the requirements for representing the target study population. The participants were ten learners with dyslexia and one special education instructor.

Furthermore, the study examined the assessment methods (Thabane et al., 2010), which included the Bangor Dyslexia Test and Rapid Automated Naming Test for the quantitative phase and classroom observations for the qualitative phase. Instrument testing indicated that the tools evaluated what they were supposed to measure. Furthermore, piloting allowed the researcher to amend the study's aims (Lewis et al., 2021), assess whether the explanatory design was suitable for the subject matter, and estimate the time and resources needed for large-scale research.

More specifically, the piloting allowed the researcher to become accustomed to the intricate details of phonological awareness instruction (Sim, 2019), an innovative approach, and it aided in the refinement of emergent problems during the intervention's implementation. Comparably Eldridge et al. (2016) admit that in a pilot study, the researcher can develop her skills through hands-on experience, including detecting potential issues such as the ambiguity of research hypotheses. As a result, the stages of the intervention and the notion of dyslexia were reframed, giving the researcher a greater understanding of the intervention's most important areas. Finally, the preliminary data obtained from the pilot study provided the researcher with an idea of the potential outcomes of phonological awareness instruction (Anesthesiol, 2017), and the results guided the researcher on how to improve and shape the sequential explanatory design in a way that addressed the phenomenon.

3.5.2 Large-scale data generation process

The table below specifically shows how the research was conducted. It should be noted that the classroom setting and interactions were based on three adopted theories in this study (Sweller, 1980; Piavio, 1977; Sparks & Miller, 2000), while every procedure reflect a critical realism stance (Fletcher, 2017; Hu, 2018; Scott, 2005; Tikly, 2015).

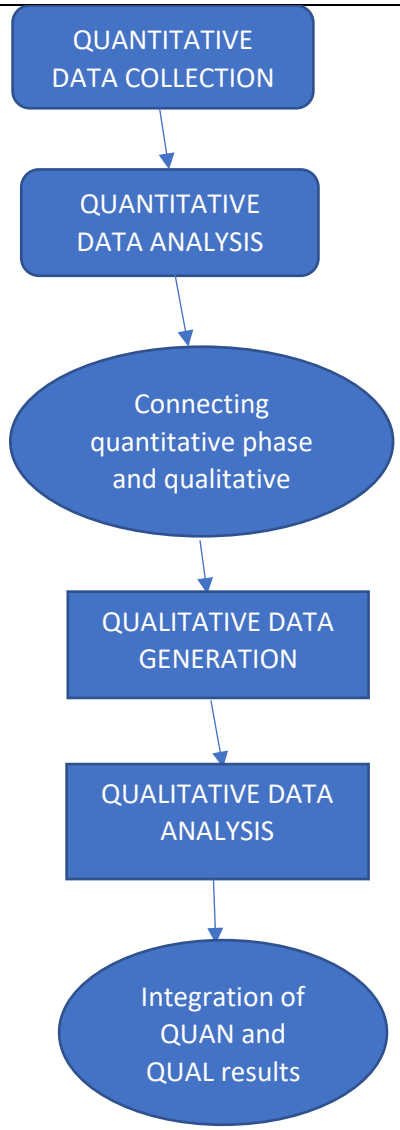
Visual Model for Mixed-Method Sequential Explanatory Design Procedure		
PHASE	PROCEDURE	PRODUCT
	• Bangor Dyslexia Test (n=40) • RAN Test • Pre-test and Post Test • Analysis of covariance (ANCOVA) • SPSS Quan. software v.26 • Participants from the first phase are in the second phase (Identical purposive sampling) • Developing classroom observation protocol • Participatory observations (one detail observed at a point in time) • Atlas.ti qual. Software ✓ Coding and creation of themes ✓ Visual networks creation • Interpretation and explanation of quantitative and qualitative results	• Numeric Data (Pre-test and Post-test Scores) for control and experimental group. • Inferential statistics • Descriptive statistics • Same participants from Quan. (n=40) • Classroom observation protocol (Participatory and Special Education teacher) • Text data (observation transcripts) • Image data (Photographs) • Themes • Visual Networks (elaboration of themes) • Discussion • Implications • Future Research

Table 2. Visual Model for Mixed-Method Sequential Explanatory Design Procedure

Creswell (2003)

3.5.3 INTERVENTION PROCEDURE: Phonological Awareness Instruction

The researcher used the complexity continuum from (fig. 1 in chapter 2) to teach phonological awareness. The intervention was divided into three stages: word awareness, syllable instruction, and phonemic awareness. The content taught refers to things that will help learners who are dyslexic grasp and manipulate sounds so that they can create and read sentences. Table 2 will illustrate word awareness, Table 3 syllabic instruction, and Table 4 phonemic instruction. Notably, each classroom activity adhered to Cognitive Load Theory by taking into account

each learner's phonological memory; Dual Code Theory and Multisensory Language Education theory focused on each learner's learning preferences.

Table 3 Word Awareness Instruction			
Aspect	**Aim**	**Material**	**Teaching Procedure**
Word segmenting (sentence)	To separate the sounds of a word in a sentence	• A ball falls • A ball falls from the tree	The teacher says a statement while stopping for each sound of the word, and learners are instructed to count how many times the word appears in the sentence.
Word blending (compound nouns) Segmenting word Deleting	To combine the sounds of words into new words To separate the sounds of words in phrases with new meanings To eliminate one word in a phrase	• Cupcake • Football • Wheelchair • Toothbrush • Sunflower • Ice cream	The teacher introduces the sounds of two words, and pupils are taught how to mix the sounds to create a new meaning. Separate the sound of words in phrases with new meanings. Learners are taught how to count the number of words in the previously described phrase. The teacher repeats the sentence and removes one of the word's sounds before asking the student to show a picture that represents the sound of the remaining word.
Word deleting (word)	To eliminate one syllable in a word so that it forms a new meaning	• Play • Can • Sleep	The teacher mentions the word, removes one of the syllables, and then asks the learner to display an image that represents the remaining word's sound.

Table 3. Word Awareness Instruction

Table 4 Syllabic Instruction			
Aspect	Aim	Material	Teaching Procedure
Syllable blending	To combine two sounds of syllables into a word	• Cat • fire • book	The teacher mentions syllables and learners are taught to merge the sound into a word.
Syllable segmenting	To separate the sound of the word into parts of the syllable	• paper • pan	Learners are taught to count the number of sounds they heard in the word spoken.
Syllable deleting	To eliminate some syllables in a word	• pencil • broom	The teacher mentions the sound of a word then removes one of the syllables on the word and learners mention the sound of the remaining syllables.
Syllable substitution	To replace the sound of syllables to form new word meanings	• book • block • balloon	The teacher mentions the sound of a word and then replaces one of the syllables in the word with the other syllables, and learners are asked to mention the sound of the new word.

Table 4. Syllabic Instruction

Table 5. Phonemic Instruction			
Aspect	**Aim**	**Material**	**Teaching Procedure**
Phonemic isolation	To separate one phoneme sound from a word	• Cat • Boy • Pen	The teacher says one word, and then learners distinguish the vocal phonemes at the beginning or end of the word by describing the sound of each letter.
Phonemic blending	To combine separate phoneme sounds into one word	• Banana • make	The teacher mentions phonemes, and learners combine the sounds into meaningful word sounds.
Phonemic segmenting	To dived a word into sounds	• Cake • Dog	The teacher instructs learners to count the amount of phonemes in words by segmenting the sounds.
Phonemic deleting	To delete one phoneme in a word	• Meat • wink	The teacher mentions the phonemes in the word, then removes one of them and educates learners about the remaining sounds.
Phonemic addition	To add one phoneme to a word that forms a new word but has no meaning	• fruit • sheep	The teacher adds one phoneme to the word and instructs the learners to state what the word sound has added to the sound of another phoneme.
Phonemic substitution	To change phonemes in words so that new words can be formed	• school • paper • water	The teacher replaces one of the phonemes in the word and instructs learners on how to pronounce the replacement sound.

Table 5. Phonemic Instruction

3.6 DATA ANALYSIS

Table 1 (Visual Model for Mixed-Method Sequential Explanatory Design Procedure) shows that this mixed-method study had two separate data analyses at each stage. Creswell and Plano Clark (2007, 2010) (p. 128) state that "data analysis in mixed-method research consists of analysing quantitative data using quantitative methods and qualitative data using qualitative methods." Onwuegbuzie and Teddlie (2003) classified this research as a sequential quantitative-qualitative analysis since it used a sequential explanatory mixed-method design with a stronger emphasis on the quantitative phase. Furthermore, they highlight that the quantitative analysis comes first and provides essential information for the later qualitative

analysis. Similarly, Onwuegbuzie and Combs (2011) state that mixed analyses with a quantitative preponderance can be used.

3.6.1 Inferential Statistics

Inferential statistics employs sample data to conclude a larger population (Asriral, 2022). Using the tools, researchers can make predictions, test hypotheses, and generalise results based on observable data. It offers advantages in hypothesis testing since it helps validate or refine initial ideas, hence boosting the credibility of conclusions (Shamout et al., 2022).

The Statistical Package for the Social Sciences (SPSS) version 26, through inferential statistics was used to conduct the quantitative analysis. In addition to bivariate and multivariate analysis, this quantitative analysis software provides hypothesis testing and descriptive statistics (Datatab, 2022). Covariance analysis (ANCOVA) was used in this study. Jamieson (2004) emphasises the use of ANCOVA to compare group averages while accounting for the impact of one or more covariates, which are continuous variables. Newsom (2015) claims that it reduces the error of variance. The analysis compared the results from the experimental group and control group, establishing whether there is an effect of the intervention on learners' reading skills. For the pre-and post-tests, ANCOVA was used to see if the means differed significantly while controlling for moderating factors (Newsom, 2015).

Moreover, using ANCOVA in this analysis had the potential to reveal changes in the dependent variable (reading skill) from pre-test to post-test, as well as how they relate to the intervention (phonological awareness instruction), rather than being altered solely by initial differences in test scores (Tabachrick & Fidell, 2013). This suggests that it was utilised to control for the impacts of age, gender, and language orthography to provide a more accurate understanding of the relationship between test scores and phonological awareness education. In the words of Newsom (2015), ANCOVA reduces the error of variance by treating factors as if they are the same, resulting in the same age, gender, and L1 orthography.

3.6.2 Thematic Analysis

Rigour in qualitative data analysis requires systematic and transparent techniques (Anwar and Merekse, 2020). This is because qualitative research methodologies necessitate meticulous data coding, as well as the constant and credible identification and documentation of themes. As a consequence, qualitative data was thematically evaluated using the Atlas.ti software. Kiger and

Varpio (2020) define thematic analysis as the process of examining non-numerical data to identify, examine, and disclose repeated patterns or meanings that answer research questions. This method comprises familiarising the researcher with the data, establishing initial codes, recognising themes, reviewing these themes, labelling them, and finally reporting participants' shared experiences or meanings. This qualitative analysis software allowed researchers to develop codes, create themes, and manage and analyse text-based data (NYU Libraries, 2020).

The qualitative phase provided a thorough description of the impact of PA training on dyslexic the reading abilities of learners based on classroom observations. Notes were recorded, transcribed, and then transferred to software. The codes were then generated and automatically organised into themes to be discussed. The data was evaluated deductively, considering the researcher's use of the observation template from IDA (2018) for things to observe during language learning. Deductive coding, according to Guest et al. (2012), is a top-down strategy in which the researcher begins with established codes and then selects excerpts that meet the codes. The codes were developed based on each of the three theories (Creswell & Creswell, 2018) employed in this study, as well as how the conceptual framework depicts the interaction between variables. The software also provides visual networks or matrices, which include the codes from each theme (Onwenegbuzie & Combs, 2011). The themes were interpreted to explain the generated data.

Finally, during the interpretation stage, the results from both rounds were merged to give a nuanced judgement of the findings. Green, Caracell, and Graham (1989); Tashakkori & Teddlie (1998); Creswell et al. (2003) define the integration of the results stage in the research process as the synthesis of quantitative and qualitative findings to answer the study's aim. At this point, the observation data was used to provide a thorough explanation for the differences in pre-and post-test results, demonstrating the complex relationship between phonological awareness intervention and dyslexic learners' reading abilities as evidenced by their behaviour in natural settings.

Further, triangulation improves the credibility and dependability of a study by complementing the findings of different approaches (Biddle 1967). In support, Karwanto (2018) argues that "integrating results facilitates the interpretation of findings by allowing researchers to compare and contrast, and synthesise information from different sources" (p.35). The integration

procedure in this study allowed the researcher to discover fresh insights, which would not have been visible while evaluating each type of data independently (Anwar & Merekse, 2020).

3.7 VALIDITY AND RELIABILITY

3.7.1 Validity

Validation is a prerequisite for all studies. Validity is "the degree to which a concept, measure, or study accurately represents the intended meaning or reality it is intended to capture," according to Burns (1996, pp. 160–161). In support of this, Oweungbuzie and Johnson (2006) assert that it is an essential concept in research that assesses the validity and suitability of the conclusions, deductions, or interpretations made from the data. This suggests that data and equipment used in research must be evaluated, as validity guarantees the quality of the study.

Validation was guaranteed in this mixed method study, which uses the sequential explanatory design, by first clearly stating the research objectives and then selecting the proper research design to suit the research goals (De Winter, 2013). Furthermore, Biesta (2012) agrees that the convergence of evidence acquired using multiple methodologies is likely to improve the validity of study results. According to Creswell (2009), triangulation ensures that, even if several approaches yield identical findings, the observed outcomes are not the product of a single strategy, hence mitigating bias. This triangulated study looked at the phenomenon from several angles in an effort to assess how phonological awareness instruction affects dyslexic learners' reading abilities (Cohen et al. 2011). The study's validity was bolstered by the sequential explanatory design, the instruments used, the mixed method approach, and the data analysis from both the qualitative and quantitative stages. Moreover, incorporating ideas from other theories and adopting a critical realism perspective that explores reality in great detail corroborated this study.

Aside from that, using trustworthy references is critical for ensuring the legitimacy of the study (Collins, 2017). Quality research is achieved by compiling data with prior relevant evidence. According to Zohrabi (2013), prior evidence and authoritative references aided in supporting the selection of research methodologies, interpretations of findings, and conclusion creation. In addition, transparency in research ensures legitimacy. This includes properly outlining each component of research so that the language and logic are understandable to all readers (Brown, 2001). This also enables transferability. In general, it enables other researchers to further the

research from other angles while also making the work repeatable (Murrar & Brauer, 2018). Lastly, Creswell & Creswell (2014) accentuates that, “research needs to be defensible to the research communities for whom research is produced and used” (p.135). This implies that it should be justifiable, through supporting evidence from previous studies.

3.7.2 Reliability

One of the prerequisites for any research process is the reliability of data and findings. Reliability in mixed-method research refers to the stability and consistency of the quantitative and qualitative phase's findings (Creswell & Creswell, 2014). The claim that "reliability deals with the consistency, dependability, and replicability of the results obtained from a piece of research" is substantiated by Nunan (1999, p. 14). The selection of the sample strategy is one factor that guarantees the study's reliability (Abowits, 2010). As the significance of identical-purposive sampling is outlined in the sample section, it suits the study's design and yielded accurate findings.

Furthermore, Kroll & Morris (2009) contend that using standardised data collecting tools for both the quantitative and qualitative stages also ensures dependability. The pre- and post-tests in this study were administered using the standardised Bangor Dyslexia Test (Miles, 1993) in the quantitative phase. The test's reliability was evaluated using the Cronbach Alpha method (Alpha, 1952) to demonstrate that it evaluates the topics covered by the study questions. This approach is said to guarantee the test's internal consistency, and it is quantified using SPSS with a range of.00 to 1.0 (Tabachrick & Fidell, 2013). If the test results fall between 0.7 and 1.0, it is considered trustworthy. Additionally, data analysis software was employed in the study rather than human analysis. The SPSS and ATlas.ti softwares have been identified as commendable software to assure the research’s reliability.

3.8 RESEARCH TRUSTWORTHINESS

Researchers should clarify the techniques and processes necessary for readers to consider each study (Riazi, 2023). Because this study employed both qualitative and quantitative methods, the researcher tried to incorporate the research's credibility. The qualitative phase of this study is considered trustworthy, whilst the quantitative phase's data and findings are considered genuine and reliable. Thus, trustworthiness is essential for establishing the credibility and reliability of qualitative findings (Stahl & King, 2024). Rawhani (2023) describes a study's

trustworthiness or rigour as the degree of confidence in the data, interpretation, and methodologies used to ensure its quality.

Four key criteria ensure the reliability of qualitative data and findings: credibility, transferability, dependability, and confirmability (Ahmed, 2024; Lincoln and Guba, 1985). According to Ahmed (2024), credibility is achieved when the data collected accurately depicts the subject of investigation. To clarify, it is the same as the quantitative method's concept of internal validity (Jonhson et al., 2020). Long-term engagement was observed to increase trustworthiness in this study. For example, the researcher spent enough time in the field to build relationships with the students. This improved the effectiveness of participant observations since learners were more comfortable and adaptive during the intervention.

In the same vein, the researcher ensured that the observations were trustworthy by having a special education teacher perform classroom observations during the intervention. This technique has been referred to as "member checking" in previous studies, where ‘member’ refers to various individuals with multiple functions (Eryilmaz, 2022). The special education teacher assisted the researcher in closing observation gaps that had been missed during participant observation. Besides that, methodological and theoretical triangulations (Ahmed, 2024) emphasised the legitimacy of the data findings during the qualitative phase of the study. Multiple theories and both qualitative and quantitative methodologies provided insights that confirmed the study's conclusions.

Transferability, on the other hand, refers to how well the findings can be applied to other contexts. In support, Lincoln and Guba (1985) state that it addresses the findings' application to similar circumstances. The researcher ensured transferability by explicitly describing the results of both classroom and participant observations. Stahl and King (2020, p.27) emphasise that, "Just as it is valid and important to create new knowledge from emergent discovery-oriented qualitative research, it is also productive to seek understanding from other's systematic qualitative inquiry". Riazi (2023) went on to say that with such aims, an analogy to both external validity and generalisability in quantitative research could be useful. As a result, each element of this study was thoroughly described.

A detailed description of the study techniques and analysis is required so that the study can be adapted (Johnson et al, 2020). This makes for dependable research. The researcher focused on

extensive methodological documentation (Ahmed, 2024) so that other researchers may duplicate the work. Importantly, Eryilmaz (2023) states that thoroughly documenting each part of the research process fosters transparency and allows other researchers to assess the dependability of the findings by adhering to the same rules and understanding the logic behind the decisions.

Finally, a research work must be confirmable. Confirmability indicates that the researcher's prejudices and preferences should not influence the study's conclusions (Stahl & King, 2020). In this study, the supervisor examined data collected through observations, extensively searching for evidence of emotions and prejudices in the data. Furthermore, the special education teacher's classroom observations demonstrated confirmability by providing a different perspective than that of a researcher.

3.8.1 ETHICAL CONSIDERATION

Engaging in ethical practices and anticipating potential ethical difficulties are crucial throughout the study process (Hesse-Bieber & Leavey, 2006). The literature provides evidence in support of this idea, suggesting that ethical conundrums that can occur should be recognised and resolved prior to starting the study (Berg, 2001; Punch, 2005; Seiber, 1998). Furthermore, ethical issues are regarded as crucial because they safeguard human rights, uphold scientific integrity, and advance the wellbeing of people engaged in the research process (Isreal & Hay, 2006).

3.8.1.2 Access and Permission

It was recommended by Cohen et al., (2011), Creswell (2014), and Mutch (2005), to have permission granted to gain access to the research site by a person of authority. The introductory letter was obtained from the faculty, to seek permission from the school principal to carry out research at the target school. Note that the intricacies of the research were explained, how it will be carried out, and the duration of the data generation process (Marusic et al., 2016). After confirming with the school, parents will be given consent forms to allow learners to take part in the research. Mutch (2005) stated that, “participants in your research should be fully informed about the purposes, conduct, and possible dissemination of your research and should give their consent to be involved” (p.78). In the same vein, participants needed to understand that their participation in the study was entirely voluntary, as well as what was involved.

Participants were also required to be informed that they might withdraw from the study at any time after agreeing to participate, up to a certain date.

3.8.1.3 Confidentiality and Anonymity

The anonymity of participants was assured, as well as confidentiality. Confidentiality is described as keeping persons from being identified in order to protect their privacy (Bryman, 2012), whereas anonymity means that no one, even the researcher, can identify the participant. In this research, full anonymity could not be achieved because the researcher was dealing with learners, who needed individualised attention, but confidentiality was assured and achieved. The assurance makes participants freely take part in the research, displaying all the behaviours that may add more rigor to the data (Yip et al. 2016). Importantly, Creswell (2007) asserts that, information gathered during a study has to be kept confidential. He further adds that confidentiality helps protect the privacy of research participants. In agreement, Tabachrick & Fidell (2013) clarify that confidentiality ensures that information gained during research is not disclosed to unauthorised individuals.

3.8.1.4 Conflicts of interest and bias

As a researcher and special education instructor, there was a possible conflict of interest about how learners with dyslexia were treated before the intervention, as well as the likelihood that my perspective was prejudiced. Gedus et al. (2022) stated that "personal beliefs and emotions can't always be kept aside when interacting with participants" (p.12). To limit this risk, the researcher's supervisor reviewed the data for potential bias and provided recommendations on how to avoid bias. In addition, the statistics may reflect on my previous experiences with accommodating dyslexic learners, as opposed to the scenario at the research site.

3.8.1.5 Research Misconduct

Research misconduct as defined by Bos (2020) refers to making up or falsifying data, manipulating data analyses, or misinterpreting results in research reports. This type of ethical issue, if violated, undermines academic integrity and institutional credibility (British Educational Research Association, 2018). In this research, the researcher familiarised herself with raw data, working with the supervisor to ensure honesty and transparency. The data was then analysed using systematically recognised software and interpreted precisely according to the results.

3.8.1.6 Results Communication

The way one communicates the research results has a potential of being an ethical issue. According to Mirza et al. (2023), good results communication is honest, reliable, and credible. The study was carried out actively avoiding plagiarism. All the work that is not of the researcher has been cited accordingly. Violating plagiarism issue can skew research findings if taken as original data (Bhandari, 2024). Therefore, this work is plagiarism-free.

3.9 Chapter Summary

The chapter covered the methodological procedures adopted for the generation of data when addressing the proposed hypotheses and research question posed in Chapter 1. The chosen research paradigm, approach, and research design were thoroughly explained and conceptualised, justifying why they were the best choice for this study. Further, the sample and sampling technique was highlighted, as well as the instruments used for both phases of the data generation process. The data generation process was also highlighted with tables that show the steps to be followed when administering phonological awareness instruction. In addition, the chapter also gave insights into how data from both phases will be analysed and integrated, as well as the validity, reliability, and trustworthiness of the research. Ethical issues of the research were also addressed in this chapter. Chapter 4 will burrow into data presentation and interpretation of quantitative and qualitative findings.

CHAPTER 4 RESULTS AND INTERPRETATIONS

4.0 INTRODUCTION

The previous chapter gave insights into the theories used in this study, conventional literature on developmental dyslexia, its core symptoms, the correlation between reading skills and phonological awareness, phonological awareness instruction, the conceptual framework, and empirical studies on the effectiveness of PA instruction in improving reading among EFL contexts. This study aimed to incorporate phonological awareness instruction as an intervention to improve reading skills among 40 dyslexic EFL learners. Through this study, data was generated and collected in both qualitative and quantitative methods of data generation. In the quantitative phase, the Bangor Dyslexia Test and the Rapid Automatized Naming Test were utilised to collect data to answer the research hypotheses and demonstrate the influence of PA instruction on dyslexic learners' reading skills. The qualitative phase employed unstructured classroom observation and participant observation to support and explain the quantitative phase's findings. The special education teacher conducted the classroom observations, whereas the researcher observed the learners during the intervention.

4.1 INTERNAL CONSISTENCY

The first section of this chapter focuses on quantitative data analysis, including the interpretation of BDT and RAN test findings. The BDT results are provided first, and then the RAN test results. The tests were both analysed using SPSS V.29. A one-way analysis of covariance (ANCOVA) was conducted to determine whether phonological awareness instruction was effective in improving reading skills among dyslexic learners while controlling for covariates (age, gender, and language orthography) on the dependent variable (reading skills in EFL) (Verma, 2020). The use of ANCOVA in this investigation improved the statistical power and precision (Cohen et al., 2013) of the results by accounting for some of the within-group heterogeneity. Because it eliminates confounder bias (Field, 2018) by controlling for pre-existing variations between groups, it was appropriate for this investigation because three covariates needed to be adjusted.

Furthermore, the researcher employed a.05 p-value to interpret the results of the tested hypotheses. According to Bevans (2023), the p-value, also known as the probability value, is "a number calculated from a statistical test, that describes how likely one is to have a particular set of observations if the null hypothesis were true" (p.34). This suggests that it indicates if the outcomes occurred as a result of the stated hypothesis. Importantly, Verma (2020) explains

how the p-value influences whether to reject or accept the null hypothesis. He goes on to say that the significant value in ANCOVA is a p-value of less than 0.05. This shows that there is a statistically significant difference between the groups being compared after accounting for the covariate (Cohen et al, 2013).

According to Maxwell (2018) and Howell (2010), the null hypothesis is accepted when the significance level is high ($p>.05$) and rejected when $p \leq .05$. As a result, the results were interpreted in accordance with the test significance level and the means of each group. A significance level greater than .05 indicates that the intervention did not work, whereas a significance level of less than .05 indicates that it did. Below are the Demographic Characteristics of the participants.

4.1.2 DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

The demographic characteristics of the dyslexic learners are shown in Table 1, below. Besides the learners, the Special Education teacher's characteristics included a Bachelor's Degree in English Language and Special Education, which made her suitable for conducting the observations.

Between-Subjects Factors

		Value Label	N
GENDER	1	MALE	23
	2	FEMALE	17
AGE	6		3
	7		7
	8		7
	9		9
	10		6
	11		4
	12		4
ORTHOGRAPHY	1	SESOTHO	35
	2	ENGLISH	5
TREATMENT	1	EXPERIMENTAL GROUP	20
	2	CONTROL GROUP	20

Table 6. Demographic characteristics of Participants

The above table (Table 1) highlights the demographic characteristics of the participants. The table indicates that, the study was comprised of 23 male (boys), and 17 female (girls), and the

age ranged between 6 years and 12 years. Participants aged six (n = 3); seven (n = 7); eight (n = 7); nine (n = 9); ten (n = 6); eleven (n = 4); and twelve (n = 4). Furthermore, the table also indicates that 35 learners' L1 orthography is Sesotho, while only 5 participants have English as their mother tongue. The experimental group, which received the intervention had 20 participants, as well as the control group (did not receive intervention). Following is the first test (The Bangor Dyslexia Test) results presentation and interpretation.

4.2 THE BANGOR DYSLEXIA TEST RESULTS

Prior to doing the ANCOVA, preparatory checks were performed to assess the assumptions of normality, linearity, regression slope homogeneity, and variance homogeneity. It is considered necessary to evaluate the assumptions since they ensure that the statistical tool (ANCOVA) is acceptable for the data (Maxwell, 2018) and that the results produced from the analysis are correct. Below are the results of the assumptions:

1. The first test was the normality test, which assumes that the dependent variable is normally distributed within each subpopulation defined by the levels of the independent variable. All participants in both the experimental and control groups should have a reading difficulty in EFL. As shown in the Normality Test Table 1 below, the Shapiro-Wilk test revealed that the post-intervention scores were normally distributed in the experimental group, $W(20)=0.14$, $p=0.32$, and the control group, $W(20)=0.11$, $p=0.65$. The W is shown in the statistics column, whereas the number 20, shows the number of participants in each group. It can also be seen that the *p*. value is above .*05* in both groups, indicating a non-significant value*;* therefore, the assumption of normality is met.

Tests of Normality

	TREATMENT	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
PRE-TEST	EXPERIMENTAL GROUP	.135	20	.200*	.947	20	.318
	CONTROL GROUP	.109	20	.200*	.965	20	.653

Table 7. Normality assumption

2.The scatter plots were created to check the linear relationship between the dependent and covariate within each group and the homogeneity of regression (refer to Graph 1). Seltman (2018) clarifies this assumption by indicating that the covariate should be linearly related to the dependent variable at each level of the independent variable. This means that the effect of the covariate on the dependent variable should be consistent across all levels of the independent variables. The linearity rule indicates that the data points should be represented in straight parallel lines. Based on the scatter plot below, it can be seen that the lines are parallel, meeting the assumptions of linearity. This means that, as the values of the covariates (age, gender & L1orthography) increases or decreases, the values of the dependent variable should change in a straight-line fashion.

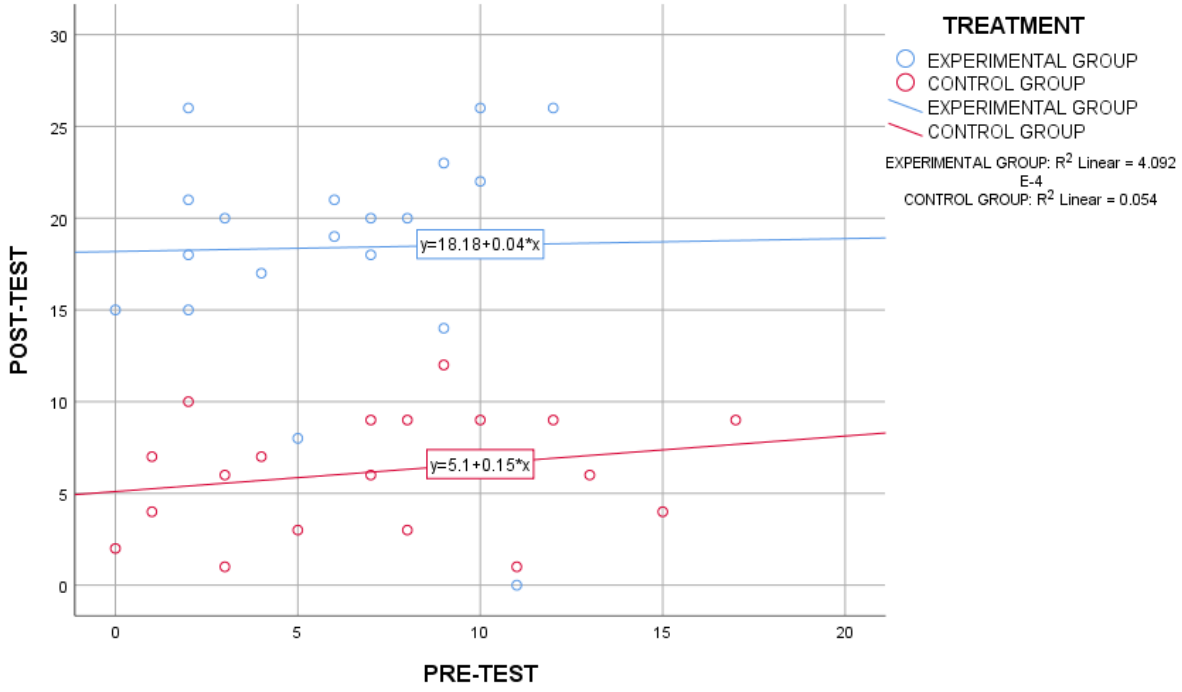


Figure 4. Linearity assumption

Consistent with the above assumptions, the homogeneity of regression was also checked. Although the preceding scatter plot shows no interaction at any level, the table below also demonstrates regression homogeneity. Seltman (2018) defines regression homogeneity as the interaction between the treatment and the variables. The assumption implies that there will be no interaction between the independent variables and covariates (Field, 2018). Looking at the table below, the interaction between age, gender, L1 orthography, and treatment shows a significant level of *p=.73;* which is insignificant. Again, when looking at the scatter plots above, it is clear that there is no substantial difference in angles between the lines from the scatter plot, indicating that this assumption is met.

Tests of Between-Subjects Effects

Dependent Variable: PRE-TEST

Source		Type III Sum of Squares	Df	Mean Square	F	Sig.
Intercept	Hypothesis	52.688	1	52.688	2.582	.141
	Error	193.772	9.497	20.404[a]		
Treatment	Hypothesis	154.089	1	154.089	10.360	.003
	Error	475.969	32	14.874[b]		
Postest	Hypothesis	115.600	1	115.600	7.772	.009
	Error	475.969	32	14.874[b]		
Gender	Hypothesis	3.257	1	3.257	.219	.643
	Error	475.969	32	14.874[b]		
Age	Hypothesis	15.089	1	15.089	1.014	.321
	Error	475.969	32	14.874[b]		
l1orthography	Hypothesis	153.555	1	153.555	10.324	.063
	Error	475.969	32	14.874[b]		
treatment * postest * gender * age * l1orthography * l1orthography	Hypothesis	126.908	2	63.454	4.266	.073
	Error	475.969	32	14.874[b]		

Table 8. Homogeneity of Regression

Finally, the ANCOVA assumptions discussed above justify the data acquired from the Bangor Dyslexia Test. Extensive statistical research has shown that verifying ANCOVA assumptions considerably improves model performance, which is likely to lead to greater performance (Maxwell, 2018; Field, 2018). Following that, Seltman (2018) aligns with the literature by highlighting that when the assumptions are met, potential covariate concerns are resolved, resulting in more reliable estimates of treatment effects. The following section presents the results from the tested hypothesis of the Bangor Dyslexia test.

The study investigated the impact of phonological awareness instruction on dyslexic learners' reading skills, where the covariates were age, gender, and L1 orthography. The phonological awareness instruction was treated as a fixed factor, the post-test as a dependent variable, and the pre-test as a covariate. The following Null Hypotheses were proposed:

H1: There is no significant main effect of treatment (Phonological Awareness Instruction) on dyslexic learners' reading skills in EFL.

H2: There is no significant main effect of age on dyslexic learners' reading skills in EFL.

H3: There is no significant main effect of gender on dyslexic learners' reading skills in EFL.

H4: There is no significant main effect of English language orthography on dyslexic learners' reading skills in EFL.

4.2.1 DETAILED DATA PRESENTATION

H1: There is no significant main effect of treatment (Phonological Awareness Instruction) on dyslexic learners' reading skills in EFL.

Descriptive Statistics

Dependent Variable: POSTTEST

TREATMENT	Mean	Std. Deviation	N
EXPERIMENTAL	18.40	6.159	20
CONTROL	6.20	3.172	20
Total	12.30	7.845	40

Table 9. Mean scores

Tests of Between-Subjects Effects

Dependent Variable: POSTTEST

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1496.872[a]	2	748.436	30.649	.000	.624
Intercept	1472.796	1	1472.796	60.312	.000	.620
PRETEST	8.472	1	8.472	.347	.559	.009
TREATMENT	1493.054	1	1493.054	61.141	.000	.623
Error	903.528	37	24.420			
Total	8452.000	40				
Corrected Total	2400.400	39				

Table 10. Significance levels

The two tables above (Table 9 and 10) deliver convincing proof that phonological awareness instruction treatment has a strong primary impact on dyslexic learners ' reading skills. Statistical analysis ($F(1,37) = 61.14$, $p < 0.05 = 0.00$, $\eta 2 = 0.62$). The treatment's high partial eta square value (0.62) highlights the importance of its effect on the dependent variable.

Besides that, the table shows that the p-value is less than 0.05, with a high level of significance (p = 0.00). This suggests that the experimental group's results, which included 20 learners who got PA instruction treatment, outperformed the learners from the control group (20), who did not get treatment. Thus, the intervention enhanced the dyslexic learners ' reading abilities. As a consequence, the hypothesis that intervention had no significant effect on dyslexic learners' reading abilities was rejected. To back up this finding, the computed marginal means demonstrate that learners with dyslexia in the experimental group scored the highest (M = 18.4, SD = 6.16) compared to those in the control group (M = 6.2, SD = 3.17). These findings demonstrate that phonological awareness instruction is substantially more successful than traditional reading tactics for improving dyslexic learners ' reading skills in EFL. To substantiate the conclusion of this finding, the graph below demonstrates the means more clearly, showing how the experimental group outperformed the control group.

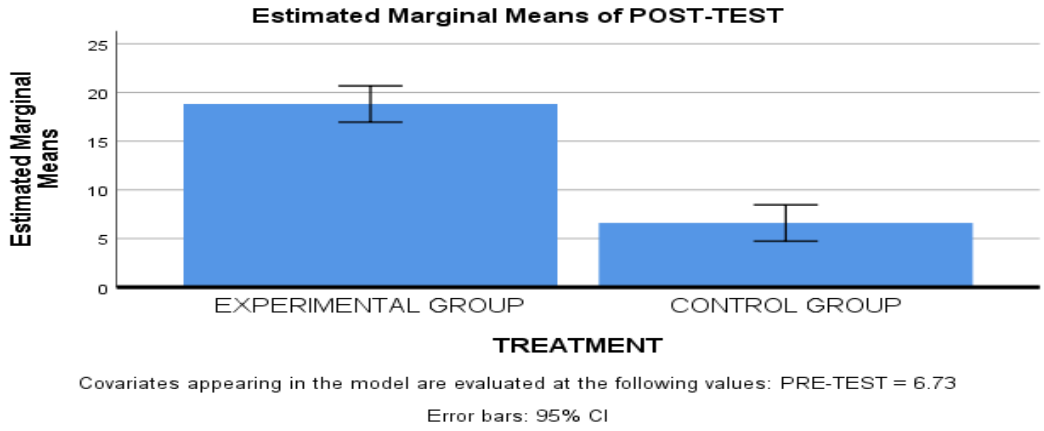


Figure 5. Scores from the Experimental and Control groups

H2: There is no significant main effect of age on dyslexic learners' reading skills in EFL.

Table 11 below shows that there is no significant effect of age on dyslexic students' reading skills in EFL, (F (1, 12) = 1.29, P> 0.05= 0.33, ŋ2 = 0.39). Consequently, the null hypothesis is accepted. This finding means that, age has no impact on the reading skills of dyslexic learners. The presence of a significant partial eta square value (0.39) suggests that phonological awareness instruction through ANCOVA; had the potential to control the effect of age on learners' reading abilities in EFL. Although learners were between the ages of 6-12, the non-significant p-value = 0.33 reveals that age as a covariate, was controlled so that each learner was considered to be reading at the same age level.

Tests of Between-Subjects Effects

Dependent Variable: POSTTEST

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	283.292[a]	7	40.470	1.110	.416	.393
Intercept	1181.779	1	1181.779	32.414	.000	.730
PRETEST	4.776	1	4.776	.131	.724	.011
AGE	282.997	6	47.166	1.294	.331	.393
Error	437.508	12	36.459			
Total	7492.000	20				
Corrected Total	720.800	19				

Table 11. Significance level of Age

H3: There is no significant main effect of gender on dyslexic learners' reading skills in EFL.

Tests of Between-Subjects Effects

Dependent Variable: POSTTEST

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	105.018[a]	2	52.509	1.450	.262	.146
Intercept	1673.679	1	1673.679	46.206	.000	.731
PRETEST	3.653	1	3.653	.101	.755	.006
GENDER	104.723	1	104.723	2.891	.107	.145
Error	615.782	17	36.222			
Total	7492.000	20				
Corrected Total	720.800	19				

Table 12. Significance Level of Gender

The covariate gender; did not have a significant effect on the learners' reading skills in EFL (see Table 12 above) (F (1,17 = 2.89, P > 0.05 = 0.11, ɲ2 = 0.16. This is because the ANCOVA controlled for its effect on reading, and learners were treated as of the same gender. Undoubtedly, the null hypothesis that gender has no significant main effect on dyslexic learners' reading skills is thereby accepted. Regardless of their gender, the learners were able to read at the same level and pace.

H4: There is no significant main effect of L1 orthography on dyslexic learners' reading skills in EFL.

The statistical analysis in Table 13 below reveals that; the incorporation of phonological awareness instruction to improve reading in EFL controls for an influence of the L1 orthography. Thus (F (1, 17 = 3.44, P > 0.05 = 0.81, ɲ2 = 0.17). This establishes that, where the learners' L1 orthography was Sesotho or English, it did not have an impact on the implementation of the intervention. Learners' reading skills were improved within the same range. Since the significance level is greater than 0.05, (0.81); the hypothesis is accepted.

Tests of Between-Subjects Effects

Dependent Variable: POSTTEST

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	121.575[a]	2	60.787	1.725	.208	.169
Intercept	414.252	1	414.252	11.752	.003	.409
PRETEST	30.971	1	30.971	.879	.362	.049
L1ORTHOGRAPHY	121.280	1	121.280	3.441	.081	.168
Error	599.225	17	35.249			
Total	7492.000	20				
Corrected Total	720.800	19				

Table 13. Significance level of L1 Orthography

In conclusion, the results from the Bangor Dyslexia test, which was used to identify learners with dyslexia and magnify their deficits; revealed that phonological awareness instruction improved reading skills among learners with dyslexia. Importantly, ANCOVA controlled for the effect of the confounding variables (age, gender, and L1 orthography), avoiding any issues that may hinder the effectiveness of the intervention. The next section presents data from the Rapid Automatized Naming Test.

4.3 RAPID AUTOMATIZED NAMING TEST DATA PRESENTATION

Upon The completion of the Bangor Dyslexia Test data interpretation, a one-way ANCOVA was run to analyse data from the RAN test. The assumptions of ANCOVA were run prior to the actual analysis to ensure the rigor of the data and its reliability. As mentioned in the above section, the assumptions of ANCOVA are linearity, normality, and homogeneity regression. The assumptions are represented below:

1. Normality test

Similar to the first set of data, the normality test, which assumes that the dependent variable is normally distributed within each subpopulation defined by the levels of the independent variable, was applied. Both experimental and control groups had significant dyslexia and reading difficulties in EFL. Due to the limited sample size of less than 50, the Shapiro-Wilk test was utilised to determine the distribution of the dependent variable, and both the control and experimental groups included 20 dyslexic EFL learners. According to the table below, the dependent variable had a normal distribution in both groups: experimental, W (20) = 0.16, p = 0.45; control, W (20) = 0.11, p = 0.72. The W appears in the statistics column, and the number 20 indicates the number of participants in each group. It can also be noted that the p-value is greater than 0.05 in both groups, suggesting a non-significant value; thus, the normalcy assumption is met. Failure to meet the normality test may impact hypotheses testing and confidence intervals (Bevas, 2023).

Tests of Normality

	TREATMENT	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
POSTTEST	TREATMENT	.157	20	.200*	.953	20	.419
	CONTROL	.108	20	.200*	.969	20	.724

Table 14. Normality Assumption

2. Linearity

To demonstrate the linearity assumption, a scatter plot was utilised to show the connection between the dependent variable and the confounding variables at each level of the dependent variable. It shows that data plots can be displayed effectively in a straight line. Verma (2020) states that when this assumption is met, the values of the covariates increase or decrease, while the values of the dependent variable move in a straight-line fashion. Bevans (2023) agrees that the condition ensures that changes in covariance correspond to proportional changes in the

dependent variable. The scatter plot below, which is somewhat accurate due to the small sample size, reveals that the covariates have a linear relationship with the dependent variable. The lines show no interaction at all, showing that the assumption was met.

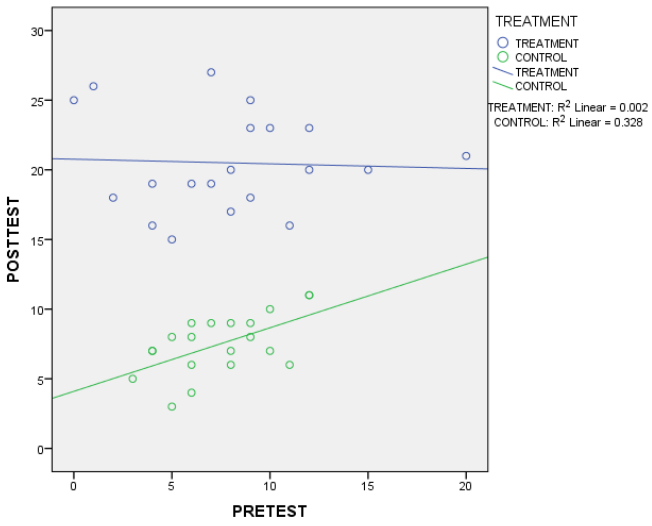


Figure 6. Linearity Assumption

3. Homogeneity of regression slopes

The homogeneity of regression slopes may also be visible on the scatter plot above; because it indicates that there should be no interaction between the independent variable and covariates. Thus, the lines are parallel, showing no interaction at all. This indicates that the effect of the independent variable on the dependent variable is consistent across different levels of covariates. A statistical representation of the assumption is indicated in the table below; where the interaction of the independent variable and the covariate show an insignificant p-value = 0.88. This shows that the assumption of regression is met, meaning phonological awareness does not interact with the covariate (age, gender, and L1 orthography).

Tests of Between-Subjects Effects

Dependent Variable: POSTTEST

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1719.004[a]	3	573.001	70.404	.000
Intercept	951.211	1	951.211	116.874	.000
TREATMENT	427.255	1	427.255	52.496	.000
PRETEST	18.673	1	18.673	2.294	.139
TREATMENT * PRETEST	24.990	1	24.990	3.070	.088
Error	292.996	36	8.139		
Total	9852.000	40			
Corrected Total	2012.000	39			

Table 15. Homogeneity Regression Slopes

Finally, the literature shows that adhering to the assumptions increases the legitimacy and trustworthiness of ANCOVA results (Cohen et al., 2013; Creswell and Creswell, 2018; Verma, 2020). Furthermore, Bevans (2023) acknowledges that statistical tests become valid and accurately portray relationships in data without bias or distortion. I felt confident in the conclusions because they were based on statistical principles and strong studies. Meeting the assumptions also facilitated the interpretation of the data. The next section reveals the interpretation of results from the RAN test, testing the same hypotheses that were tested in the Bangor Dyslexia Test from ANCOVA.

4.3.1 RAN TEST RESULTS

H1: There is no significant main effect of treatment (Phonological Awareness Instruction) on dyslexic learners' reading skills in EFL.

To test the first hypothesis, as the main hypothesis, three sets of analyses were run: the mean scores, significance levels, and the bar graph. These three statistical representations show the impact of phonological awareness instruction on the reading skills of EFL dyslexic learners. The descriptive statistics table below shows the means and standard deviations from the experimental and control group. Thus, it shows whether there is a visible change after the intervention. The results from Table 10 below reveal that; the experimental group, M = 20.50, SD = 3. 51; control group, M = 7.50, SD = 2.14. This shows a major difference from the means, indicating that learners from the experimental group outperformed those from the control group. This implies that; phonological awareness instruction did improve the reading skills of

dyslexic learners in EFL. Based on Table 16 below, it can be seen that those who did not receive treatment still show persistent difficulties in reading.

Descriptive Statistics

Dependent Variable: POSTETS

TREATMENT	Mean	Std. Deviation	N
EXPERIMENTAL	20.50	3.517	20
CONTROL	7.50	2.140	20
Total	14.00	7.183	40

Table 16. Mean Scores

To substantiate, results from ANCOVA in Table 17 below further prove that phonological awareness instruction did have an impact on the dyslexic learners' reading skills in EFL. Thus, ($F(1, 37 = 194.53, P < 0.05 = 0.00, \eta 2 = 0.84$). The results show a total significant $p = 0.00$, showing a major impact of the treatment without the interference of the confounding variables. This means that the ANCOVA was able to control the covariates, making sure that each learner's age, gender, and L1 orthography are considered the same, and have no effect on the independent variable. In addition, the positive effect size of 0.84 can be seen from the table, corresponding with a very significant p-value.

Tests of Between-Subjects Effects

Dependent Variable: POSTETS

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1694.015[a]	2	847.007	98.556	.000	.842
Intercept	1390.238	1	1390.238	161.765	.000	.814
PRETEST	4.015	1	4.015	.467	.499	.012
TREATMENT	1671.862	1	1671.862	194.534	.000	.840
Error	317.985	37	8.594			
Total	9852.000	40				
Corrected Total	2012.000	39				

Table 17. Significance level of groups

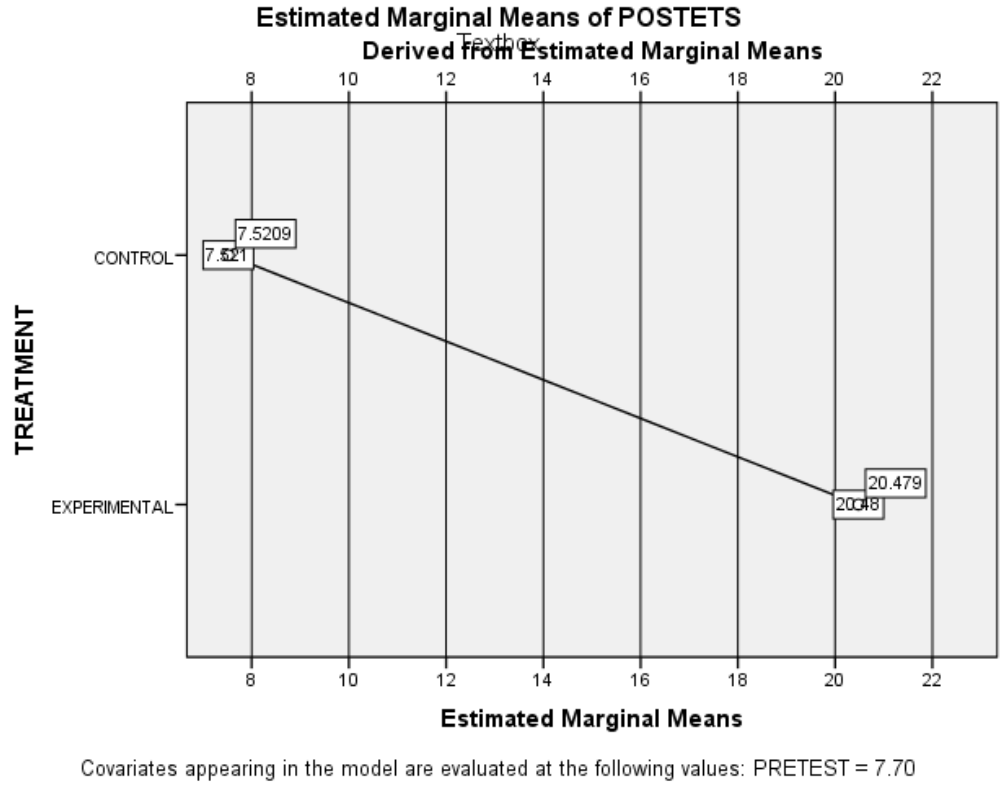


Figure 7. Mean Scores

Similarly, the graphical representation above further clarifies the notion that phonological awareness instruction does improve EFL dyslexic learners' reading skills. The null hypothesis is therefore rejected and the alternative accepted; there is a significant main effect of treatment on dyslexic learners' reading skills in EFL.

H2: There is no significant main effect of age on dyslexic learners' reading skills in EFL.

ANCOVA was used to determine whether age influenced the effectiveness of the intervention on dyslexic learners' reading skills in EFL. This is significant since age is likely to influence the treatment, resulting in erroneous findings. To overcome this issue, an ANCOVA was used to account for the effect of age on the dependent variable. Thus, ($F(6, 12) = 0.91$, $P > 0.05 = 0.52$, $\eta 2 = 0.31$). The findings show that age had no effect on the effectiveness of the intervention. This means that ANCOVA controlled for its effect. The insignificant p-value of 0.52 and the very small effect size of 0.31 indicate that the null hypothesis is accepted and the alternative rejected. The difficulties of dyslexic learners and their abilities to improve as a result of the intervention were considered as if they were the same age.

Dependent Variable: POSTETS

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	73.954[a]	7	10.565	.787	.611	.315
Intercept	1027.799	1	1027.799	76.584	.000	.865
PRETEST	3.238	1	3.238	.241	.632	.020
AGE	73.473	6	12.246	.912	.518	.313
Error	161.046	12	13.420			
Total	8640.000	20				
Corrected Total	235.000	19				

Table 18. Significance Level of Age

H3: There is no significant main effect of gender on dyslexic learners' reading skills in EFL.

Tests of Between-Subjects Effects

Dependent Variable: POSTETS

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	.506[a]	2	.253	.018	.982	.002
Intercept	2173.926	1	2173.926	157.602	.000	.903
PRETEST	.456	1	.456	.033	.858	.002
GENDER	.025	1	.025	.002	.966	.000
Error	234.494	17	13.794			
Total	8640.000	20				
Corrected Total	235.000	19				

a. R Squared = .002 (Adjusted R Squared = -.115)

Table 19. Significance Level of Gender

The table above (Table 19) shows the results of testing the hypothesis "There is no significant main effect of gender on dyslexic learners' reading skills in EFL". The data indicate that ($F(1,17 = 0.002$, $P > 0.05 = 0.97$, $\eta 2 = 0.00$). The partial Eta squared, with an effect size of 0.00, shows that gender had no effect on the treatment. The p-value of 0.92 is insignificant because it exceeds 0.05. This demonstrates that gender had no influence because ANCOVA adjusted for its effect on phonological awareness education. Thus, the null hypothesis is accepted. Consistently, learners' gender was not an impediment to giving the intervention; learners were

treated equally regardless of gender, and their reading skills were assumed to be at the same level.

H4: There is no significant main effect of English language orthography on dyslexic learners' reading skills in EFL.

The statistical analysis in Table 20 shows that including phonological awareness teaching to promote reading in EFL controls the influence of L1 orthography. Thus, (F (1, 17 = 0.56, P > 0.05 = 0.46, $\eta 2$ = 0.03). This demonstrates that the learners' L1 orthography, whether Sesotho or English, did not affect the implementation of the intervention. Learners' reading abilities developed within the same range. Since the significance threshold is greater than 0.05 (0.46), the hypothesis is accepted. Furthermore, the effect size = 0.03 indicates that the ANCOVA completely controlled for the influence of L1 orthography, assuming that all learners used the same L1 orthography.

Tests of Between-Subjects Effects

Dependent Variable: POSTETS

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	8.010[a]	2	4.005	.300	.745	.034
Intercept	1184.275	1	1184.275	88.694	.000	.839
PRETEST	.069	1	.069	.005	.944	.000
L1ORTHOGRAPHY	7.529	1	7.529	.564	.463	.032
Error	226.990	17	13.352			
Total	8640.000	20				
Corrected Total	235.000	19				

Table 20. Significance Level of Orthography

Finally, the findings show that dyslexic learners in EFL improved their reading skills following the intervention. Phonological awareness education proved effective in improving reading impairments while controlling for confounding characteristics such as age, gender, and L1 orthography. The following section will focus on the qualitative step of presenting the results. Because this study is designed as a sequential explanatory design, the qualitative phase results must provide a clear understanding of the quantitative phase outcomes.

SECTION 2

4.4 OBSERVATIONS DATA PRESENTATION

The second part of data generation, which is the qualitative phase of the research, was carried out through unstructured observations. As previously stated, this phase aims to highlight the effects of phonological awareness teaching on EFL dyslexic learners' reading abilities. Furthermore, this set of data aims to explain how and why learners' post-test scores increased following the intervention. The researcher made the observations while administering the intervention. In addition to participant observations, the special education instructor did her observations. These findings were significant since the special education teacher highlighted several of the crucial behaviours that the researcher overlooked due to her concentration on the intervention. The generated data was then analysed using the qualitative data analysis software Atlas.ti version 26.

Research Question: **What are the implications of Phonological Awareness Instruction on EFL dyslexic learners' reading skills?**

Three themes emerged in addressing this question, and they are presented in detail below.

4.4.1 EFFECTIVENESS OF THE INTERVENTION

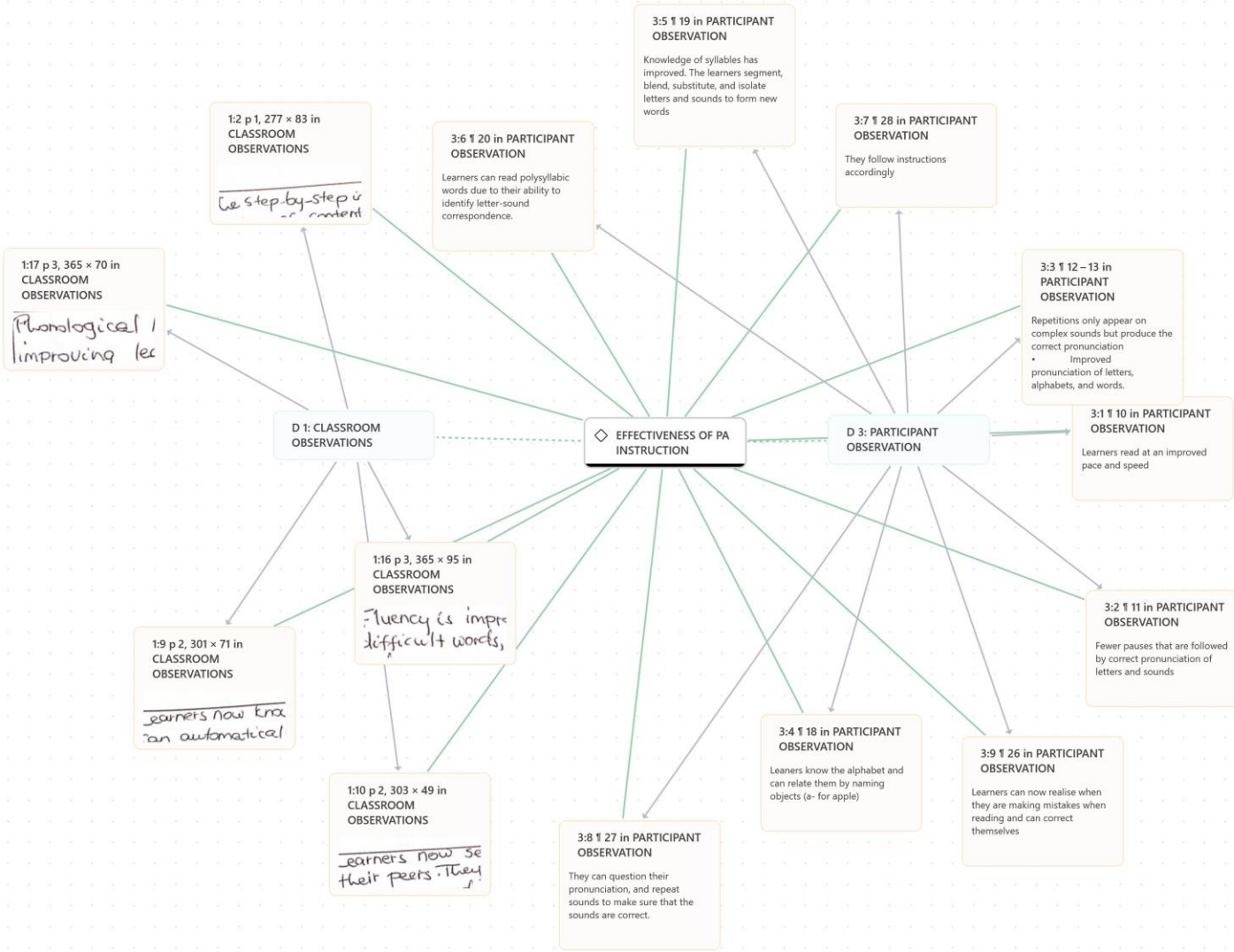


Figure 8. EFFECTIVENESS OF THE INTERVENTION

The network above displays the important observation areas that demonstrate how phonological awareness helped learners improve their reading skills. The replies come from both the participant observation form and classroom observations, as shown above (also see appendices B and C). The network above was used to create sub-themes that identify the enhanced main areas.

4.4.1.1 Fluency

The network shows that learners read faster than before the intervention ("*learners read at an improved pace and speed")*. The observations revealed that phonological awareness training reduced pauses and hesitations while reading. It has also been noted that mispronunciations of words, syllables, and characters have been reduced. For instance, words like philosophic, which

have more than one syllable are easily pronounced due to the segmentation of syllables. This has improved the pupils' ability to read fluently and smoothly. This means that the intervention increased learners' fluency when reading text in EFL.

4.4.1.2 Letter-Sound Knowledge

As indicated on the network above, learners have a solid understanding of the alphabet. As a result, learners can sing and play with alphabets, distinguish alphabets from words, and determine which words alphabets represent (for example, A-apple, U-umbrella). Furthermore, learners demonstrated significant improvements in syllable identification such as ou, pr, ch, g, p, b, q and g sounds, and how they are pronounced. The network underlines how they may divide, blend, isolate, and substitute syllables to create new words and sounds. This implies that learners have formed a knowledge that letters produce specific sounds in words. It has also been noted that learners can read polysyllabic words, demonstrating a thorough comprehension of letter-sound correlation. The special education instructor also stated that the learners' spelling has improved since they comprehend the sounds each alphabet produces when forming words.

4.4.1.3 Self-Regulation

For one to consider an intervention effective, indicators of autonomy must be visible. The network demonstrates that learners self-correct their pronunciation errors even before the facilitator probes or attempts to correct them. Repetitions can only be seen when students are reading big words. Learners also repeat sounds to ensure correct pronunciation, not because they find it difficult to read the words. It has also been noted that learners comply with directions based on word and sentence reading. Learners also participate in reading exercises, demonstrating curiosity and mastery of phoneme-grapheme links. Signs of self-talk were detected, as learners practiced words and sounds before reading. This demonstrates a comprehension of the sounds used to make words and phrases.

Finally, the special education teacher demonstrated that step-by-step phonological awareness instruction helped students understand the structure of the English language, how letters relate to one another to form sounds, and how sounds are pronounced, making it effective in improving reading.

4.4.2 CLASSROOM ENGAGEMENT

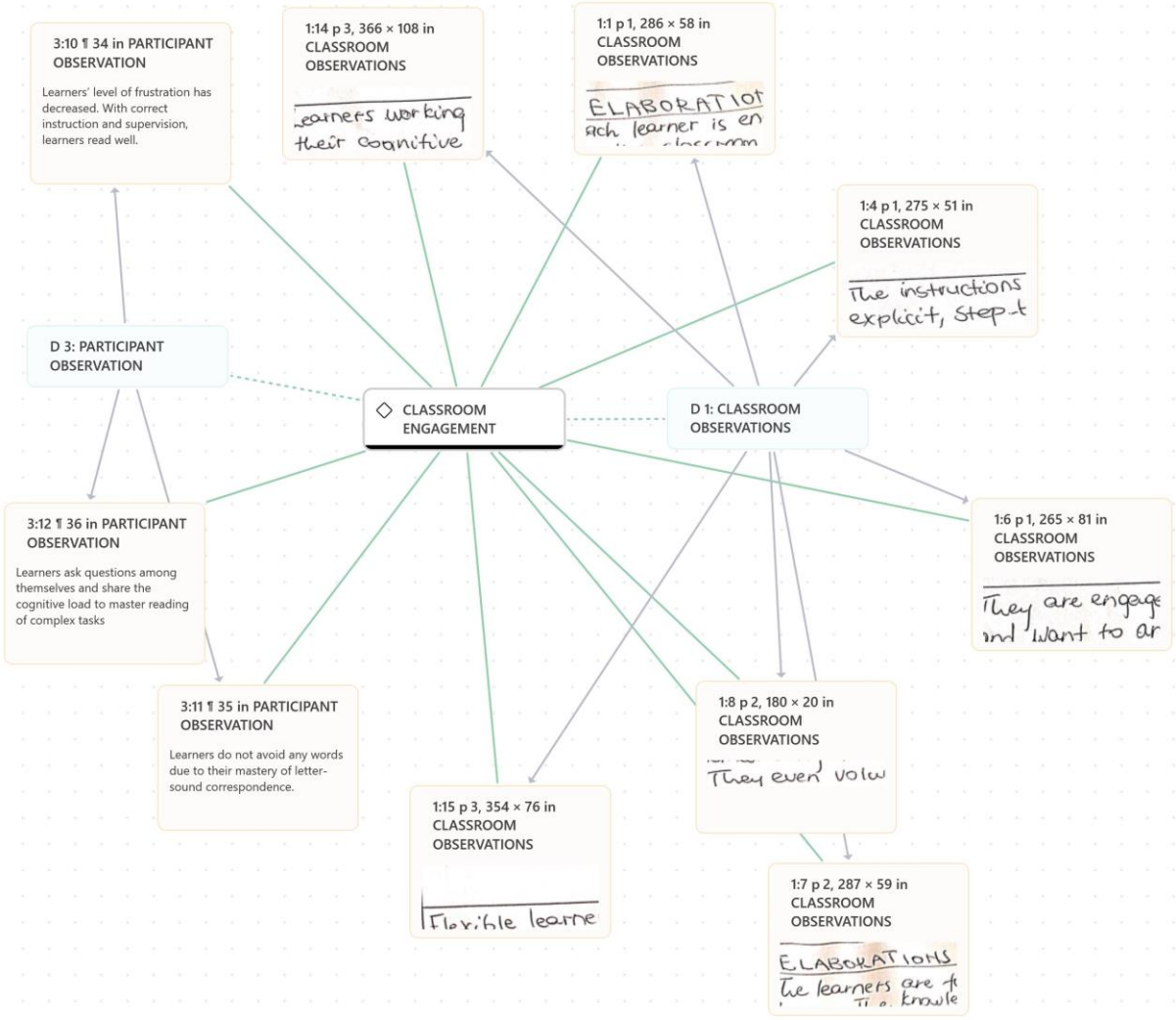


Figure 9. Classroom Engagement

The network above depicts the results of classroom engagement. The engagement was seen from the perspectives of the researcher and the learners, the learners themselves, and the learners with one another. The results show that the researcher's specific, step-by-step coaching to learners made subject understanding more accessible and easier. The findings demonstrated that learners asked the teacher and their peers who mastered the job at the time for clarification on questions they were unable to comprehend. The special education instructor also mentioned the learners volunteered to answer questions, demonstrating strong involvement with the content and the teacher. The study discovered that when instructed to read, learners do not show signals of frustration, but rather attempt to read while asking questions as needed. The researcher also discovered that learners do not skip classwork, but instead collaborate with their peers to read hard words, sharing their cognitive load.

Figure 10. Learners Engaged in classroom activities

Furthermore, the special education teacher stated that the researcher designed the intervention so that each learner learns using their preferred learning style. The learners engage successfully with resources that match their learning styles, making it easier for them to retain the information being taught. Good involvement with the topic resulted in a fluid classroom in which students can learn freely and comfortably. Furthermore, the researcher developed a routine with learners that they followed when engaged in learning activities.

4.4.3 CLASSROOM ENVIRONMENT

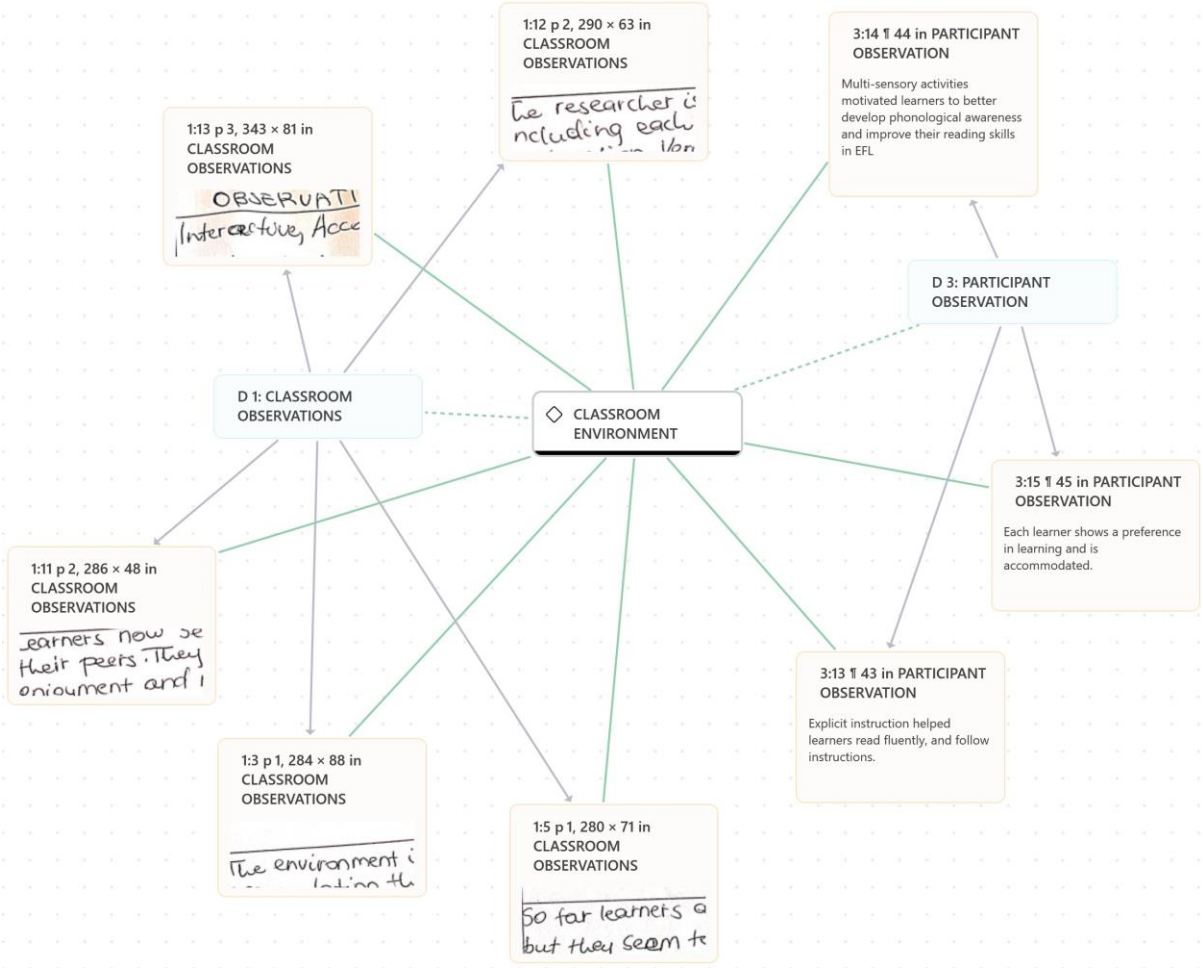


Figure 11. Classroom Environment

When implementing an intervention, the learning environment is critical. The network above demonstrates that the learning environment was interactive, with the teacher and learners working together to enhance their reading skills. Learners were free to collaborate while simultaneously seeking guidance from the teacher. The special education teacher also stated that the setting was inclusive. This is because each learner's learning patterns were considered, allowing for more epistemological access (see appendix B). Aside from that, the atmosphere was seen to be accommodating, and the researcher ensured that learners engaged with information that suited their chosen learning approaches. Where more time was required, the researcher ensured that learners received it.

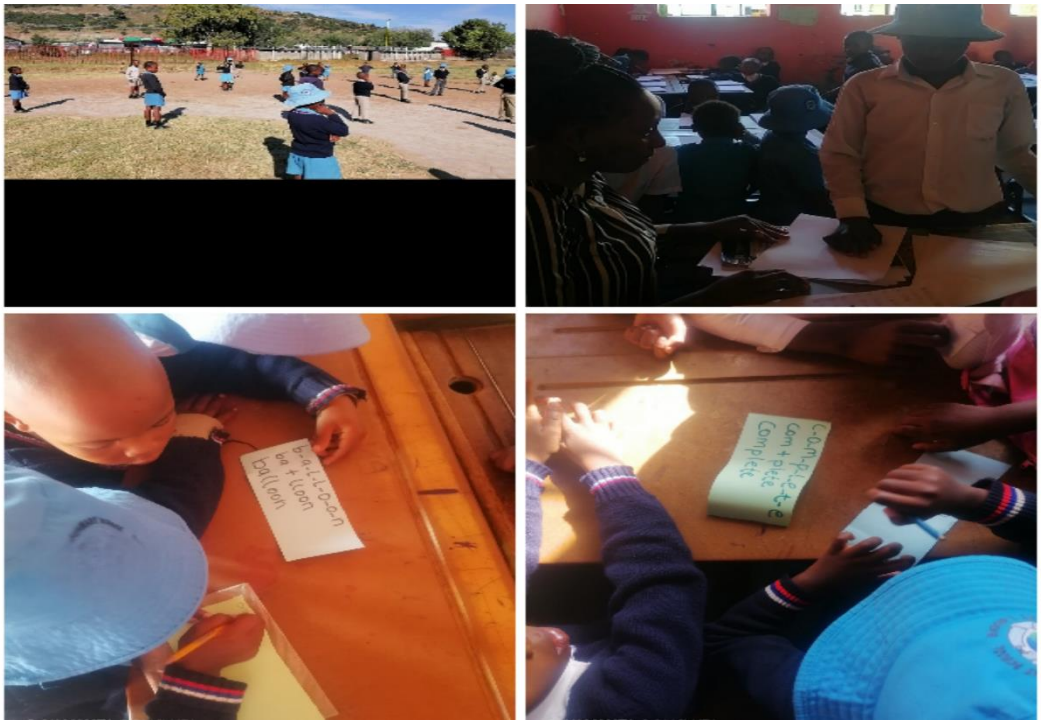


Figure 12 Learners in accommodative instructions

In addition, the special education teacher noted that the researcher gave specific instructions to avoid confusion. Consistently, the researcher stated that specific training helped learners read fluently and follow instructions efficiently. The researcher also discovered that multi-sensory exercises encouraged students to actively engage in learning tasks and collaborate in pairs. In summary, both classroom and participant observations provide light on the consequences of phonological awareness education, helping to explain why the students performed well on the post-test.

4.4.5 Chapter Summary

This chapter presented the findings from the quantitative and qualitative phases of the study. The quantitative data consisted of two data sets from The Bangor Dyslexia Test and Rapid Automatized Naming test; was analysed with inferential statistics through the analysis of covariance. The qualitative data from both the participant classroom observations was analysed thematically, and presented with networks from the Atlas.ti software. The next chapter discusses the findings from this chapter.

CHAPTER 5: DISCUSSIONS OF FINDINGS

5.0 Introduction

Chapter 4 outlined data presentation from the quantitative and qualitative phases of the study, highlighting findings from the tested hypotheses and addressing the research question. The findings are discussed in this section of the study.

This study was sequential explanatory mixed-method research. The study looked into the effect of phonological awareness instruction on EFL dyslexic learners' reading abilities. The Bangor Dyslexia Test, the Rapid Automated Naming Test, classroom observation, and participant observations were all used to collect data in two phases. Four core hypotheses and one research question were developed to lead the investigation. Furthermore, quantitative data was evaluated using inferential statistics and the Statistical Package for Social Sciences software, while qualitative data was analysed using Atlas.ti. This study was based on three theories: Cognitive Load Theory, Dual Code Theory, and Multi-Sensory Language Education Theory. The researcher also used the philosophical lenses of the critical realism paradigm.

This chapter discusses the findings of the two quantitative phase tests, as well as qualitative classroom and participant observations. The first segment focusses on the quantitative phase discussions, in which both test results are reviewed concurrently, followed by the qualitative phase discussions.

5.1 QUANTITATIVE DISCUSSIONS (THE BANGOR DYSLEXIA TEST AND RAPID AUTOMATIZED NAMING TEST)

In this section, the tested hypothesis results are discussed.

5.1.1 H1: There is no significant main effect of treatment (Phonological Awareness Instruction) on dyslexic learners' reading skills in EFL.

The primary aim of this study was to incorporate phonological awareness instruction to improve reading among EFL dyslexic learners in one mainstream school in Maseru. This hypothesis was tested by comparing the scores from the pre-test and post-test of the RAN test and the Bangor Dyslexia Test. The aim was to see how learners who received intervention, and those who did not receive the intervention performed on the tests, and to see if the intervention overcomes the existing challenges to those who received intervention.

The findings of both tests provide persuasive evidence that phonological awareness instruction has a significant primary impact on dyslexic learners' reading skills. Tables 4 and 5 show that

the experimental group outperformed the control group after receiving the intervention. Thus, the intervention improved dyslexic learners' reading ability. These data show that phonological awareness teaching is significantly more effective than traditional reading strategies for improving the reading abilities of dyslexic learners in EFL. In line with the findings, previous research indicates that dyslexic learners have a severe impairment in the phonological components of a language (Snowling, 2019). For clarity, the IDA (2017) highlights that poor reading abilities, difficulties with accurate and fluent word recognition, decoding, and proper spelling and speech sound production characterise their deficits.

Consistently, to be a skilled reader, one must be able to extract the phonological representations of words from their corresponding letter sequences, and comprehend the written text. As a result, the findings support phonological awareness education, which is reading instruction that focuses on decoding written words and places a greater emphasis on the sound structure of the English language (Wanger et al, 2019). The implication is that the experimental group outperformed the control group because promoting EFL dyslexic learners' PA skills through PA instruction helped them become aware of important sound characters such as phonemes, syllables, and tone to distinguish meaning across words (Kormos, 2016). Thus, learners were able to understand the structure of English language system, by understanding how each letter relates to another letter to form a certain sound; and later word how sounds combine to form words.

According to Kormos & Nijakowska's (2017) findings, learning a foreign language, particularly English, is a daunting barrier for dyslexic learners. As a result, the IDA (2022) concluded that "dyslexic learners require a different approach to language instruction than that used in most conventional schools. "They need to be taught slowly the basic elements of the language (English), the sounds and letters that represent them, and how to put these together and apart..." (p.26). Thus, phonological awareness teaching improved the reading skills of dyslexic EFL learners by strategically breaking down the intricacies of phonological awareness steps such as segmentation, deletion, blending, isolation, and substitution to form new words and sounds. Similarly, The Cognitive Load Theory aligns with the five levels of phonological awareness education for improving reading abilities (see Figure 1). This is because, the intervention follows the complexity continuum, which aligns with the steps needed for dyslexic learners to reach their semantic threshold in reading.

The Cognitive Load Theory (Clark & Paivio, 1999) supports the IDA (2017) argument on how to teach dyslexic learners in EFL by arguing that learning is more effective when instructional approaches regulate and optimise the cognitive load imposed on learners. To clarify, IDA (2018) argues that, there are limits to the amount of information that can be processed at one time, especially when administering an intervention to learners who already have pronounced challenges when learning a foreign language. To adhere to the principles of this theory. the researcher had to monitor the amount of content to be retained at every given task during an intervention. The study's findings are not entirely unexpected considering that the intervention's complexity continuum allowed the researcher to deliver the learning processes and material load in manageable phases that did not disrupt the participants' cognitive load.

On the other hand, Bowers & Bowers (2017) argue that the alphabetic principle of a language does not provide a meaningful description of the words that learners encounter initially, even in age-appropriate materials. They also stress teaching morphological awareness alongside phonological awareness to understand the meaning of words. The outcomes of this study, however, refute these arguments, stressing the importance of readers understanding the phonological structure of English to use the alphabet principle. Consistent with the study findings, Mataka et al. (2021) present evidence that letter recognition is the most important component in learning to read.

The findings are also in alignment with Treiman & Kessler's (2014) ideas, which emphasise that for reading acquisition, education should focus on phoneme-grapheme correlation, with morphological knowledge provided after the basic correspondences are understood. Importantly, theoretical models of literacy acquisition support this view, emphasising the case of dyslexic EFL learners (Castles, Ratles, & Nation, 2018; Ehri, 2000; Frith, 1985; Jackson & Coltheart, 2013; Sprenger-Charalles, Siegel, & Bonnet, 1998), as do a large number of empirical findings (Catles et al., 2018; Moll Ramus et al., 2014; Taylor, Davis, & Ratle, 2017).

In essence, insights from the RAN test results revealed a significant difference in mean scores between the experimental and control groups. In this study, the RAN exam was used to assess and evaluate dyslexic learners' reading skills and deficits in EFL, both before and after intervention. This supports Sandra & Soetikno's (2022) research that RAN test results have been demonstrated to predict reading abilities. As a result, the experimental group scored better

because phonological awareness education assisted EFL learners in relating letters to sounds and sounds to the words they represent, making it easier for them to create fluent speech while reading.

According to Hietland et al. (2017), RAN performance aids reading learning by linking an object with its corresponding phonological label. It is pertinent to note that to acquire the RAN abilities, learners must first master the letter-sound correlation. Thus, phonological awareness teaching had a strong main effect on EFL dyslexic learners. Finally, research has shown that the hallmarks of symptoms of dyslexia are deficits in phonological awareness, RAN, and difficulty in reading words at grade level (British Dyslexia Association, 2023). Ergo, the results showed an improvement in those areas, indicating a successful intervention.

5.1.2 H2: There is no significant main effect of age on dyslexic learners' reading skills in EFL.

In this study, age was considered as a confounding variable, that would likely impact the effectiveness of the intervention. The participants were between the ages of 6-12; but received the same instruction, intending to find out whether learners of different ages would benefit from phonological awareness instruction. The results however indicated that age did not have an impact on the intervention, and therefore reading skills were improved across all ages. In alignment with the findings of the study, the British Dyslexia Association (2023) accentuates that, dyslexia is a persistent and unique learning impairment that lasts throughout a person's life; therefore, it cannot be outgrown, but rather accommodated. Though the ANCOVA controlled for age's effect on phonological awareness instruction in this study, its impact on the intervention would still be insignificant, as highlighted by the study's findings.

To validate the findings of the study, Van Setten et al. (2017) conducted a study examining the reading abilities of dyslexic teenage learners in their L1 and L2 (English). The results indicated that learners with dyslexia exhibited greater impairments in their L2 learning as a result of their inability to acquire phonological structures of English. They additionally contended that dyslexics continue to experience persistent phonological deficiency despite their age. The professional literature aligns with the findings of the study because age was controlled in a way that learners were considered to be of the same age. Certainly, the findings of the current study are consistent with those of Dandache, Wonter, & Gheswquire (2014), who conducted a study to assess the degree of phonological skills in dyslexic learners ranging from

elementary school to Grade 7. Dyslexic learners were found to have poor phonological awareness skills across all grade levels.

The previous research findings are in harmony with the findings of this study and that of BDA (2023), which indicated that regardless of age, dyslexic learners with dyslexia still benefit from intensive instruction in phonological analysis of words and letter-sound correspondence to enhance reading skills in EFL. One aspect of this study is that EFL dyslexic learners require direct and explicit instruction in phonology, regardless of their age.

5.1.3 H3: There is no significant main effect of gender on dyslexic learners' reading skills in EFL.

The impact of gender on reading interventions tailored for dyslexic learners has been widely researched, causing a lot of confusion about its impact on learning. This stemmed from the previous literature, which previously revealed that the majority of dyslexic learners were male; further indicating that males are more likely to be diagnosed with dyslexia than girls (Fletcher et al., 2019). In this study, however, gender was standardised to avoid any impact on the intervention. The findings robustly indicated that both boys and girls read and benefited from the intervention without any negative impact. To substantiate, IDA (2018) highlighted that dyslexia affects all genders and they can both have minor to severe impact.

In agreement with the study's findings, Hulme (2015) argues that the cognitive predictors of reading ability are equally weighted for boys and girls across languages. It is further propounded that the gender gap in reading skills could be related to cultural differences, inadequate diagnosis in schools (IDA, 2021), and ineffective ways of teaching and learning English as a foreign language. This study diagnosed (… boys and …girls), showing a higher number of boys than girls. A possible explanation for this diagnosis is aligned with Fletcher et al., (2019) views, which demonstrate that; even though boys are thought to have a higher prevalence of dyslexia; evidence suggests that girls with dyslexia may have different symptom profiles or coping mechanisms. Inevitably, girls with dyslexia may acquire compensatory methods (Wanger, 2018), such as depending on context clues, which can disguise their challenges and complicate diagnosis. To overcome diagnosis bias, the two tests conducted complemented one another, and the findings validated that gender had no impact on phonological awareness instruction in the current study.

5.1.4 H4: There is no significant main effect of L1 orthography on dyslexic learners' reading skills in EFL.

Essential cultural elements that affect the development of literacy, as well as the potential for DD to occur, include language and spelling. Literature has indicated that the complexity of a language's orthography is directly related to the difficulty of learning to read in the target language (English). The study consisted of 5 English natives and 15 Sesotho natives in the experimental group. Results from the tested hypothesis indicated that, after controlling for the impact of L1 orthography, learners performed at the same rate on both tests despite their L1 orthography.

In line with the foregoing, professional literature aligns with the findings by suggesting that all dyslexic learners have the same reading difficulties despite the difference in L1 orthography (Diamanti et al., 2018). The findings therefore insinuate that orthographic differences do not significantly impact the main difficulties faced by dyslexic learners, as well as the effectiveness of the intervention used to overcome those reading challenges. This was evident from their test scores, showing the effectiveness of PA instruction, despite their L1 orthographies. A possible explanation for these results emanates from Kormos's (2017) assertion, which demonstrated that providing explicit instruction about the differences between the L1 orthography and that of English may help dyslexic learners develop phonological awareness and RAN, ultimately reading skills in EFL.

Furthermore, L1 orthography did not have an impact on PA instruction because, research indicates that, engaging learners in activities that enhance phonological aspects of a language can strengthen their ability to decode unfamiliar words in English (Wanger et al., 2019). It is also worth noting that, promoting phonological awareness skills in EFL, through PA instruction helped learners to be aware of important sound characters (Kormos, 2016), such as phonemes, syllables, and pronunciation of words to distinguish meaning across words. Hence it follows that the dyslexics' reading skills were improved in EFL. The next section discusses the findings from the qualitative phase of the study.

5.2 QUALITATIVE PHASE DISCUSSION

To determine the success of an intervention, you need trustworthy data generation methods, strong data, and clear and precise data interpretation. This mixed-method study has two data generation phases: quantitative and qualitative. The nature of the study necessitates this qualitative phase to explain why dyslexic students performed the way they did post-intervention. The data for this phase was gathered through participant and classroom observations.

The section addressed the research question: **What are the implications of Phonological Awareness Instruction on EFL dyslexic learners' reading skills?**

5.2.1 EFFECTIVENESS OF THE INTERVENTION

5.2.2 FLUENCY

The findings showed that phonological awareness enhanced learners' reading fluency. This was obvious in the enhanced pronunciation of words and sounds that had previously been difficult to pronounce. The researcher also noted fewer pauses, no repeating of sounds, and hesitations when reading. The study findings are consistent with those of Hauk (2021), who used extra phonics and phonemic awareness intervention (sub-stages of phonological awareness training) to help second-grade struggling readers. The study's findings demonstrated greater accuracy rates and improved oral reading fluency for correct words. Hauk (2021) observed that the intervention improved participants' foundational skills, particularly phonetic decoding and oral reading fluency.

Furthermore, Hauk (2021) proposed that reading interventions for EFL dyslexics should centre on increasing awareness and competency in phonemic awareness, phoneme-grapheme correspondence, and phonological processing. Another possible explanation for the increase in reading fluency and pronunciation is the use of the dual code theory and the MSLE theories when designing the intervention instructions. The theory's ideas helped learners retain information. According to Brish and Ghassemi (2010), learners should use VAKT modalities to make brain connections that will advance reading teaching towards mastery. In support, Trahorshc (2018) stated that auditory instruction enhances sound pronunciation and aids dyslexic learners in identifying intonation in EFL contexts.

5.2.3 Letter-sound knowledge

Another finding that demonstrates the intervention's success is that learners can identify letters and sounds in words. Learners can also associate the letters with the sounds they create in words. For instance, learners can sing the alphabet song, identifying each sound with the object it represents ('a' for apple, 'u' for umbrella). The contrast between the sounds indicates an improvement in letter-sound correspondence. This finding is consistent with the ideas of Wagner et al., (2023), who suggested that competent reading is dependent on both the ability

to extract the phonological representations of a word from its matching sequence of letters and a grasp of the written text.

Furthermore, the results show that learners can divide, blend, isolate, and substitute syllables to form new words and sounds. This implies that learners understand how letters make distinct sounds in words. In accordance with the aforementioned, the English language is made up of 44 separate phonemes, each represented by 1120 different graphemes. In English, the relationship between graphemes and phonemes, known as Grapheme-Phoneme-Correspondence (GPC) or Phoneme-Grapheme-Correspondence (PGC), is one-to-many and inconsistent (Dimitra, 2023; Nyikos, 1988). As a result, to use the alphabet principle effectively, learners must have a solid comprehension of English phonological structures.
In support, Kuppen and Bourke (2017) found that the English language has a complex relationship between written letters and spoken sounds, necessitating a solid grasp of phonological awareness, particularly among learners with reading challenges.

In essence, the findings show that learners' spelling has improved. Given that letters are the fundamental building blocks of written language, Mataka et al. (2021) give data to back up the notion that letter recognition is the most important aspect of learning to read. Due to this, "learners with DD should receive instructional approaches that are effective, use direct, explicit teaching of letter-sound relationships, syllable patterns, and meaningful word parts, and provide a great deal of successful practice of skills that have been taught" (IDA, 2017; pp. 236-247). According to the literature, being aware of spoken language sounds is necessary for learning letter-sound correspondences, combining sounds to decipher words, and mapping words into long-term visual vocabulary (Kilpatrick, 2016).

5.2.4 Self-regulation

The data from this sub-theme demonstrated learners' autonomy when reading. As a result, learners are aware of their reading errors and can repair them on their own. This means that they recall how sounds are uttered, in what order, and how letters connect to sounds. However, research has shown that dyslexic learners exhibit a deficit of phonological working memory (Alkhadim, 2022; Daloiso, 2017; McGrath & Stoodyl, 2019). To clarify, Smith-Spark (2020, p.36) defines phonological working memory as "mnemonic structures capable of briefly storing

and maintaining linguistic knowledge". This means that dyslexics have difficulty remembering a word or the order of its letters after reading it.

The study's findings following phonological awareness education, however, reveal that learners' phonological working has improved. These findings are consistent with Ben-Zion et al.'s (2023) findings, which show that "EFL dyslexic learners can overcome the phonological working memory deficit and improve reading skills by learning the phonological structures of a language through concrete instructions that may help them retain information in short-term memory" (p.90). Arguably, phonological awareness education, as viewed through the lens of The Multisensory Language Education Theory, improved learners' working memory, allowing them to read more independently. The theory advocates for educators to understand and adapt different learning styles (Alsobhi & Ayloubi, 2020), so dyslexic learners benefit from hands-on experiences and activities that help them retain the phonological structure of learnt words, sounds, and how letters link to sounds. Fernaudez and He (2019) demonstrated that there is a strong link between physical movement, hands-on activities, and language learning, particularly reading.

5.3 CLASSROOM ENGAGEMENT

Learners' involvement with content, materials, peers, and educators is critical to guaranteeing the intervention's effectiveness. This theme developed as the findings demonstrated that the researcher's particular, step-by-step tutoring of learners improved subject comprehension. It is vital to remember that studying a foreign language exacerbates the difficulties that dyslexic students confront (Wagner et al., 2022). As a result, detailed instructions are required. Given dyslexic learners' difficulties with verbal memory (BDA, 2017), a lack of verbal memory makes it more difficult for them to follow longer, more complex instructions. This causes failure to learn new sounds and words (Lu et al., 2023). As a result of the cognitive load theory's insights, learners were able to develop their phonological awareness skills, as the number of tasks and load given to learners should match their capacity, moving at their pace so they can effectively remember what they learned (Lu Huang & Wu, 2023).

The findings also demonstrated that learners collaborated with their peers and were observed asking questions throughout lessons. When the intervention allows learners to participate freely, content mastery is simple. To support this, Alkhadim (2022) highlights the fact that

learners with dyslexia are usually overwhelmed when confronted with decoding activities. As a result, positive reinforcement helps children persevere in their learning despite the challenges they face. Though learning a foreign language adds to their difficulties (Wagner et al., 2022), an engaging classroom creates a supportive environment that encourages learners to participate. The findings also suggested that learners collaborated, with experts assisting the novice. The interactive cognitive load (Clark & Paivio, 1991) consistently demonstrated that when learners collaborate, they have access to one another's memory, making learning easier. In support, Berent and Platt (2021) add that, peer interaction allows learners to benefit by sharing content in the short-term memory.

5.4 CLASSROOM ENVIRONMENT

The International Dyslexia Association (2017) has stated that a learning environment for all learners must be inclusive and accommodating, particularly for dyslexic learners in an EFL classroom where their obstacles are more evident. This assertion is consistent with the study's findings, which showed that the classroom was inclusive and accommodating. One finding revealed that the researcher followed a routine for each phase of the intervention. This made the situation less stressful for learners as they faced their obstacles. According to IDA (2021), when EFL dyslexic learners understand what to expect and how to complete daily tasks, they become more self-sufficient learners.

Furthermore, the observations demonstrated that different senses were incorporated into the training, as well as accommodations for preferred learning styles. According to IDA President Rawson (2018), dyslexic individuals require a unique approach to language acquisition. They must practice coordinating their writing hands, eyes, ears, and voices to organise and retain their learning. This means that their scores and skills improved since each learner's strength was recognised, creating space for new information. Another possible reason for the adoption of diverse learning styles stems from critical realism, which views reality as an iceberg, with the majority of it hidden from view (Fletcher, 2017). To address this, Hu (2018) claims that "casual mechanisms exist below the surface and are invisible, but they give rise to experiences and events" (p.130). This indicates that dyslexic learners' struggles may extend beyond what the educator perceives in the classroom, as dyslexia can occasionally be related to other specific learning difficulties (Dimitra, 2023).

While every learner may exhibit certain characteristics of DD, their learning may differ as a function of present comorbidities, resulting in diverse realities for learners. It is worth noting that providing individual learning experiences for dyslexic learners improved their reading outcomes. Consistent with the previous, Alsobhi and Alyoubi (2020) proved that if teaching approaches take into account different learning styles, an enhanced set of resources can be generated that improves the outcomes of learners' performances.

In conclusion, the qualitative data show that the intervention was beneficial in improving learners' reading skills. Phonological awareness education increased learners' decoding abilities, word pronunciation and recognition, letter-sound correspondence, fluency, and phonological memory. The intervention's success was attributed to its successful execution through explicit instruction, multimodal language education concepts, repetition and practice activities, and learner cognitive load monitoring.

5.5 CHAPTER SUMMARY

This chapter discussed the results of both the quantitative and qualitative phases. The quantitative phase investigated four hypotheses using data from the Bangor Dyslexia Test and the RAN Test. The qualitative findings were examined in order to better understand the test scores obtained during the quantitative phase. The next chapter will highlight conclusion of the study, recommendations, limitations, and reflections.

CHAPTER 6: CONCLUSIONS, RECOMMENDATIONS, LIMITATION, AND REFLECTIONS

6.0 INTRODUCTION

The preceding chapter encompassed discussions of findings about the phases of data generation. This chapter focuses on the aim of the study, the conclusions of this study, which are based on the findings from this study, the recommendations, limitations, and reflections.

6.1 The aim of the study

The goal of this study was to use phonological awareness instruction to help EFL dyslexic learners improve their reading skills. The study sought to determine the intervention's capacity to alleviate the difficulties that dyslexic learners confront in EFL settings. The study was conducted using the philosophical lenses of Cognitive Load Theory, Dual Code Theory, and Multisensory Language Education Theory. This study's ontology and epistemology were guided by the Critical Realism paradigm and the Intervention Mixed-Methods technique. This study investigated four null hypotheses from the quantitative phase and addressed one research question from the qualitative phase.

6.2 CONCLUSION

The study underlined the importance of phonological awareness in reading development, particularly among English as a Foreign Language (EFL) learners with dyslexia. Phonological awareness is the ability to identify and manipulate sounds in spoken language, which is required to decode written words (Wagner et al., 2022). The successful implementation of phonological awareness education revealed that developing this skill can lead to considerable gains in reading ability. The findings showed that specific teaching practices based on phonological awareness effectively address the unique challenges that dyslexic learners face. Rhyming, sound segmentation, sound merging, and phoneme manipulation are all possible strategies. Further, customising these approaches to fit the needs of EFL dyslexic learners, instructors can provide a more supportive learning environment that supports literacy development.

Furthermore, the study discovered that learners who got phonological awareness instruction showed significant improvements in their reading skills compared to those who did not get the

intervention. This enhancement influenced numerous aspects of reading, including word recognition, fluency, and comprehension. Given the study's focus on EFL learners, the findings have cross-linguistic implications for phonological awareness education. While English has its own set of phonetic laws and complexities, resulting in an opaque orthography, the concepts of phonological awareness apply to all languages. This finding calls for greater investigation into how similar educational practices might help dyslexic learners in a variety of linguistic settings.

Finally, the study found that the success of the intervention depends on how the lesson is presented. Dyslexic learners require detailed instruction that is appropriate for their cognitive load, pace, and preferred learning style. The study also demonstrated the value of a learning environment for these learners. It has been concluded that the environment must be inclusive, accommodating, and adaptable. EFL dyslexic learners can overcome reading issues with a positive learning environment, a good instructional technique, and an accommodating learning style.

6.3 RECOMMENDATIONS

Based on the findings of this study, the following recommendations have been proposed:

- The Ministry of Education and Training should implement the proposed Inclusive Education Policy (2018) in schools. The policy should not be limited to special schools, but rather also serve learners who have Specific Learning Disorders (SpDs) such as dyslexia, dysgraphia, dyscalculia, and attention hyperactivity disorder, that are mostly in regular schools.
- Teachers' training institutions should highlight the importance of accommodating learners with learning disabilities, learning about their challenges, and developing innovative techniques to help them reach their English as a Foreign Language competency
- Early identification and intervention for reading challenges should be addressed in elementary schools since it helps learners perform better in language classes.
- Curriculum developers and special education professionals should provide in-service training for instructors to acquire new teaching practices for learners with dyslexia and other learning impairments in EFL settings.

6.4 SUGGESTION FOR FURTHER RESEARCH

In this study, it has been established that, learners with dyslexia experience more challenges when learning English as a Foreign language. The study focused on the foundation of reading skills, ergo; further research should focus more on advanced reading skills. The research should however begin from word level (morphological awareness), sentence level (syntactic rules), semantic level (reading comprehension), and then focus on communicative competence.

6.5 LIMITATIONS

The study was also faced with some drawbacks. The major challenge was finding a suitable research site where the school management allowed me to conduct my study. Furthermore, working with teachers at the research site posed some problems because they have to finish the quarterly scheme of work. This study's findings are derived from a sample of dyslexic EFL learners, which made randomisation impossible due to a small sample size. Further, this affected the generalisability of the results to a broader dyslexic EFL population. Apart from that, there were financial constraints for needed materials and easy access to the research site, however, materials were improvised with available resources.

Another limitation was the lack of understanding of dyslexia in a mainstream classroom by teachers and other learners. This had an impact on the confidence of learners with dyslexia and regaining it took some time, thereby affecting intervention progress. The effectiveness of the intervention was also limited by a short period of 3 months, therefore, each step of the intervention could not be fully exhausted to mastery.

6.6 REFLECTIONS

Embarking on the journey of conducting my thesis has been a challenging, yet transformative experience, which aligns with my philosophy of accommodating learners with special needs. This was a very intriguing experience, despite the huge academic, emotional, and financial hurdles I had throughout the program's first year. Research indicates that all learners can benefit from explicit instruction and PA training in improving their reading skills. For learners of EFL, who might already be dealing with extra difficulties in their language learning process, this is especially pertinent.

Moreover, this research has taught me to avoid being emotionally invested in my teaching of dyslexic learners, as it could almost completely prevent them from learning well. By implementing targeted strategies that address language barriers and specific learning requirements, I established an inclusive learning environment that facilitated the success of dyslexic learners in their reading endeavors. As a quantitative budding scholar, this experience deepened my understanding of designing assessment measures and dealing with quantitative measures.

6.7 Chapter Summary

The chapter discussed the purpose of this study, the research conclusions, the recommendations, areas for further research, the study's limitations, and reflections. The above context was derived from the current study's results and findings.

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APPENDICES

Appendix 1

THE BANGOR DYSLEXIA TEST (Miles 1993)

Duration: 1 hour Marks (30)

The adopted dyslexia test has been contextualised to fit the background of learners, and their daily experiences. It focused on Phonological Awareness skills and Verbal Working Memory. Therefore, it is a written and oral test.

1. Phonological Awareness subset (WRITTEN TEST)
   i) BLENDING (pseudowords)
      - S + ap =
      - R + ad =

ii)BLENDING (Words)

- C + at =
- P + lay =
- B + oy =

2. DELETION

- Snap – S =
- Pin - P =
- Lamp – L =

3. ADDITION

- Cat + s =
- Box + es =
- Girl + s =

4. SUBSTITUTION OF SOUNDS: Rearrange the following words to form new words

- God =
- Pat =
- Tea =

5. VERBAL WORKING MEMORY (ORAL TEST)

- Left-right awareness using movement and body parts.
- Follow instructions: - short and long instructions.

Repeat polysyllabic words:

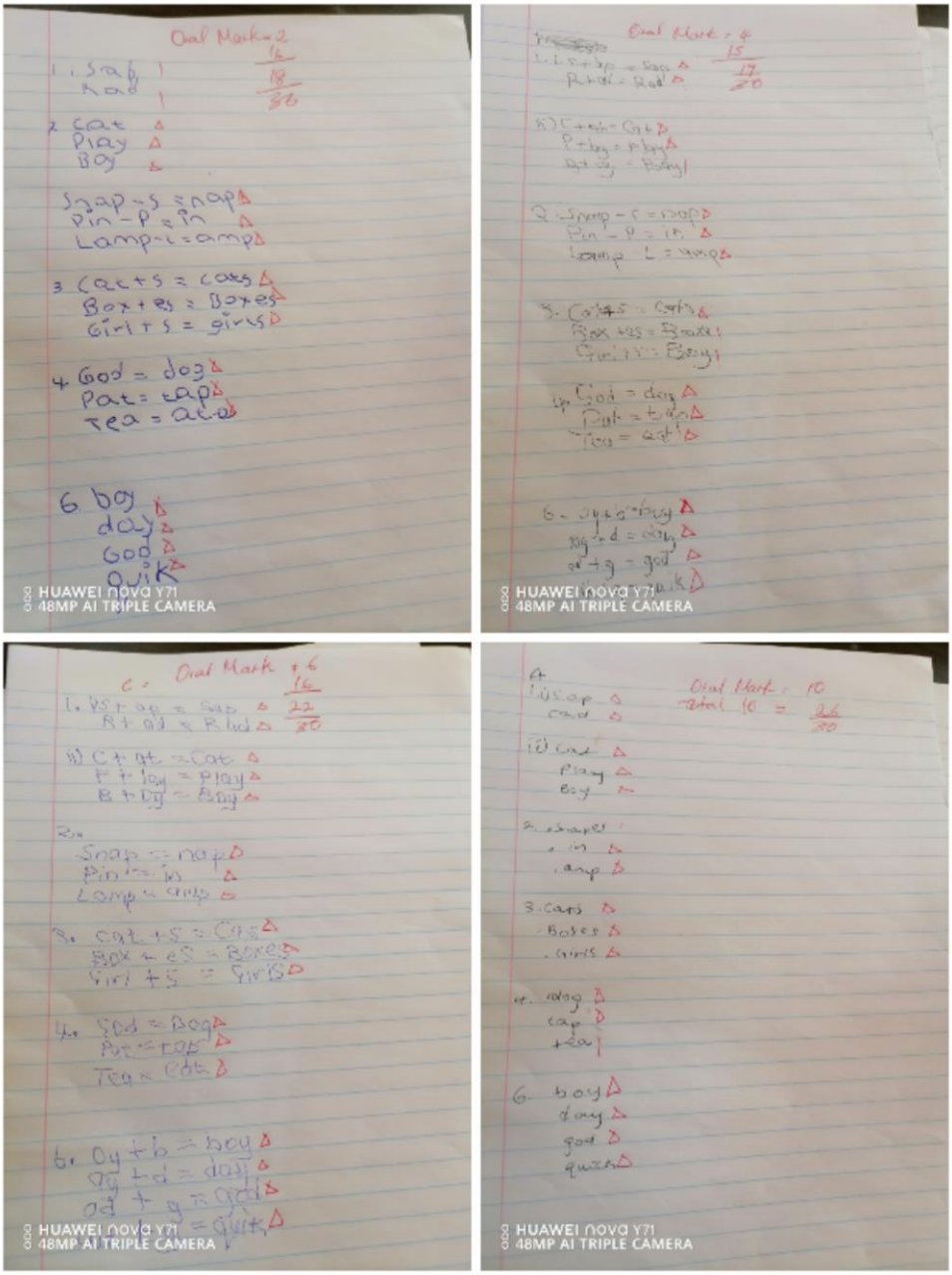
- Preliminary
- Philosophical
- Understanding
- consequence

6. Add b,d,g, and q to form new words.

- oy + b =
- ay + d =
- od + g =
- uik + q =

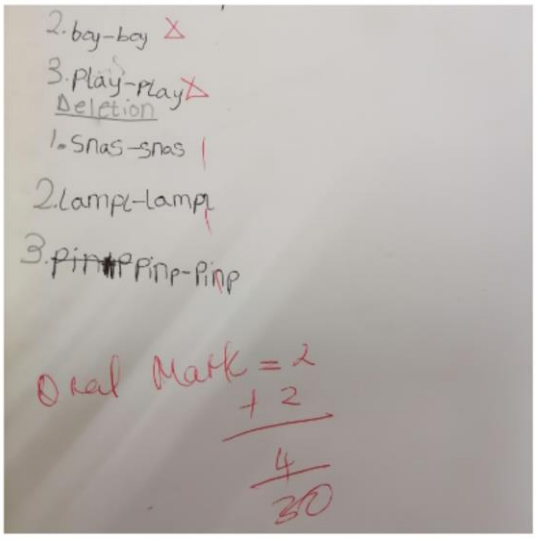
Appendix 2

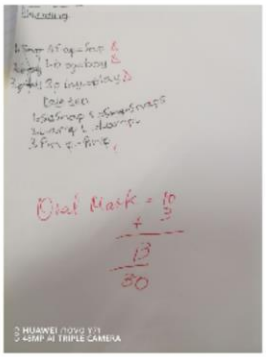
THE POST-TEST SAMPLES

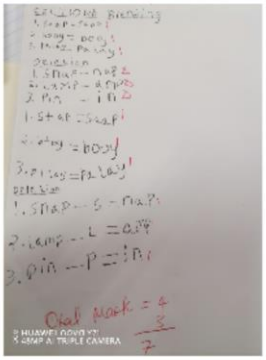


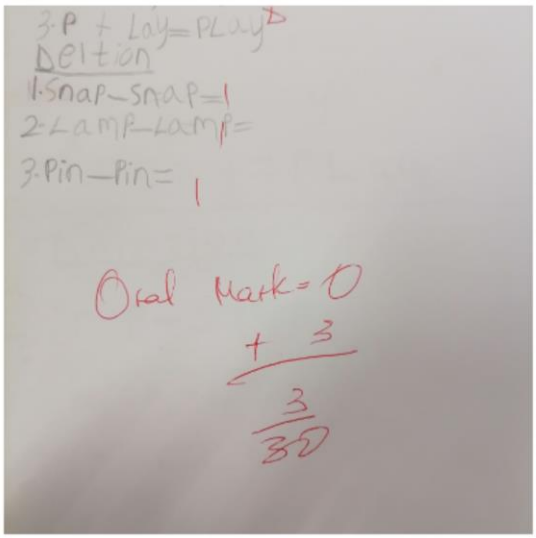
APPENDIX 3

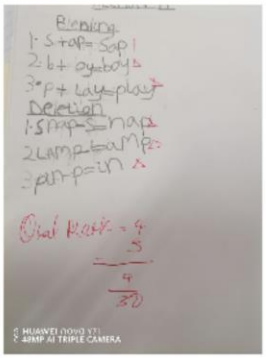
PRE-TEST SAMPLES











APPENDIX 4

Phonological Awareness Instruction Activities

APPENDIX 5

RAPID AUTOMATIZED NAMING TEST ACTIVITIES

RAPID AUTOMATIZED NAMING TEST (Marks:30)

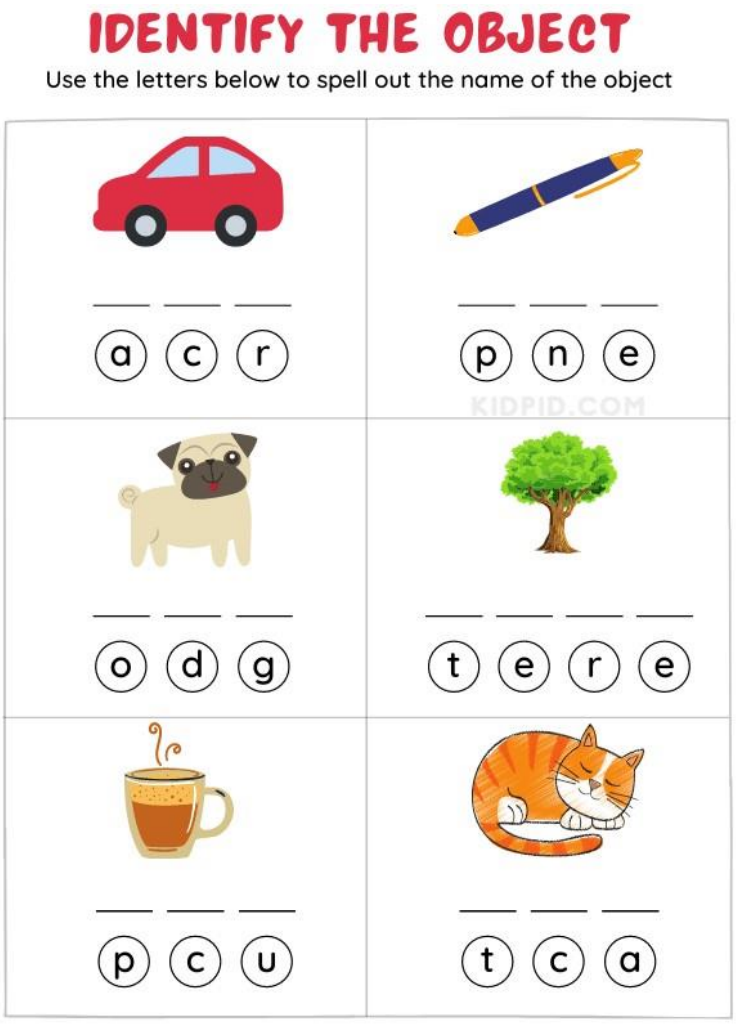
Duration: 5 minutes for each individual

This test is oral, and learners are expected to name a series of objects, letters, and colours within 3 seconds. It is an individual test and marks are allocated depending on the time a learner spends in trying to rapidly name each item.

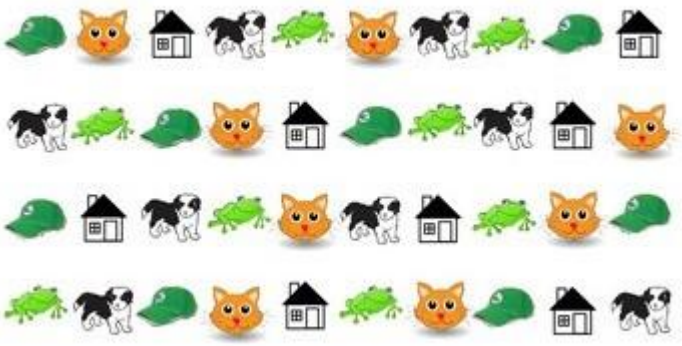
SECTION 1

OBJECT NAMING

1. Name the following objects from the grid below. Each object should be named within 3 seconds.



2. Name the objects on the grid below:



SECTION 2

LETTER NAMING

3. Name the alphabets identified on the picture below:

A T S P B

B S A T B

P A S T B

B T T A P

A P S T B

4.

a	b	c	d	a
d	b	a	c	b
a	c	d	a	b
c	d	a	a	b
a	d	b	d	b

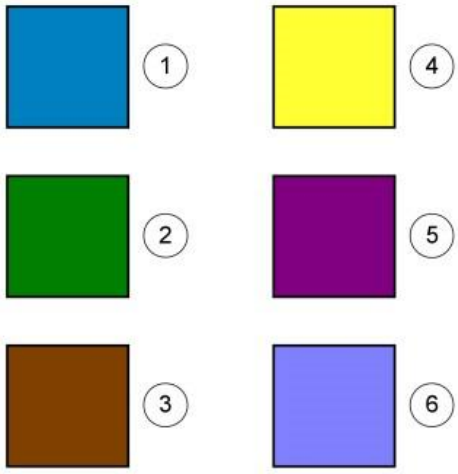
5. Name the words from the grid below:

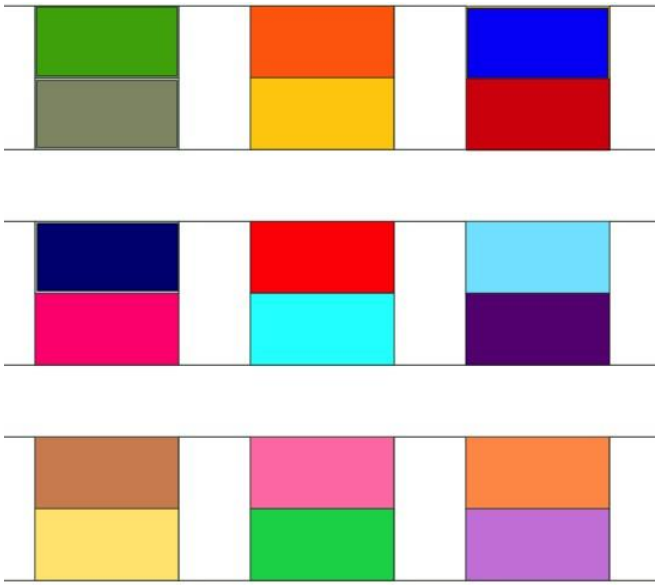
cat	mat	bat	sat	fat
pat	cat	hat	that	bat
sat	fat	pat	cat	hat
that	bat	sat	fat	pat
mat	bat	sat	pat	cat

SECTION 3

COLOUR NAMING

6. Name colours from the grid below:



7. 

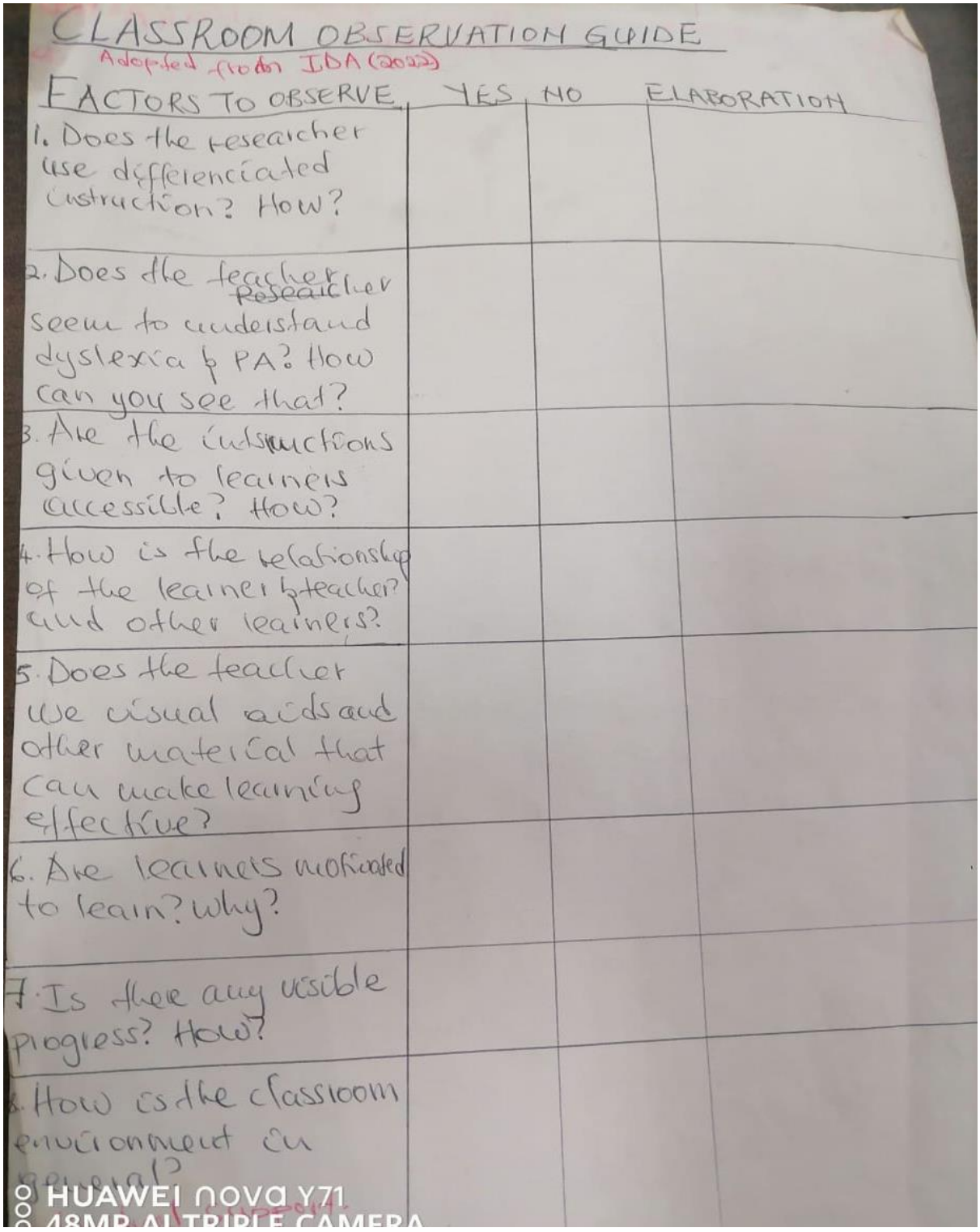
APPENDIX 6

PARTICIPANT CLASSROOM OBSERVATIONS (By researcher)

Adopted from IDA (2018) and contextualised.

KEY AREAS	OBSERVATIONS
Reading Fluency • Pauses • Hesitations • Repetitions • mispronunciations	•
Letter-sound Knowledge • Alphabets • Monosyllabic words • Polysyllabic words	
Self-regulation • Self-talk • Self-correction • Self-question	•
Engagement • Level of motivation • Signs of frustration • Avoidance	•
Accommodations • Extra-time • Explicit instructions • Additional aids • Established routine	

APPENDIX 7



CLASSROOM OBSERVATION GUIDE

Adopted from IDA (2022)

FACTORS TO OBSERVE	YES	NO	ELABORATION
1. Does the researcher use differenciated instruction? How?			
2. Does the teacher ~~Researcher~~ seem to understand dyslexia & PA? How can you see that?			
3. Are the instructions given to learners accessible? How?			
4. How is the relationship of the learner & teacher? and other learners?			
5. Does the teacher use visual aids and other material that can make learning effective?			
6. Are learners motivated to learn? why?			
7. Is there any visible progress? How?			
8. How is the classroom environment (in general)			