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Needs analysis for developing an Orton-Gillingham reading diphthong and digraph innovation kit in Malay for primary school pupils with dyslexia

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ABSTRACT

The Orton-Gillingham (O-G) approach is a widely recognized, structured, multisensory, and evidence-based instructional method designed to enhance reading abilities among pupils with dyslexia. However, its application remains limited in Malaysian primary schools, and a gap exists in the development of a dedicated module tailored to the phonological aspects of the Malay language. This study addresses this gap by conducting a needs analysis to evaluate the necessity of a specialized O-G–based module for teaching diphthongs and digraphs to primary school pupils with dyslexia. Using a qualitative research design, semi-structured interviews were conducted with five special education experts from the government sector. The findings reveal a strong demand for a practical and user-friendly instructional module that incorporates O-G principles into Malay language reading instruction. Key challenges identified include the absence of structured guidelines for implementing O-G techniques, limited professional training opportunities, and the lack of dyslexia-specific teaching resources. The results strongly support the development of an O-G–based innovation kit that can address these challenges and improve the effectiveness of teaching and learning diphthongs and digraphs in the Malay language. This module promises to be a valuable tool for educators, facilitating an evidence-based approach to literacy instruction for pupils with dyslexia in Malaysia.

Contribution/ Originality: This study is original in developing the DiDi Innovation Kit based on the Orton-Gillingham approach, specifically for teaching diphthongs and digraphs in Malay to primary school pupils with dyslexia. It addresses a research gap by adapting multisensory, phonologically driven methods for Malay, which have not been widely implemented or studied in Malaysia.

1. INTRODUCTION

Pupils with dyslexia and their deficiency in phonological awareness can be detected early on when they attend pre-schools through first grade, but only if guided by adequate assessments. As of 2024, over 763 million adults and hundreds of millions of children worldwide are illiterate, putting them at danger of lifelong social exclusion and economic deprivation (UNESCO, 2023). Dyslexia occurs in at least one out of 10 people, putting more than 700 million children and adults worldwide at risk of lifelong illiteracy and social exclusion (Dyslexia International, 2014). In alignment with the International Dyslexia Association (2019), dyslexia and related language-based learning disabilities are estimated to affect about 15 to 20 percent of the population, a figure that is still commonly acknowledged as of 2025. In Malaysia, the number of students affected by dyslexia is estimated to be 4 to 8 percent of school-aged children approximately 200, 000-400,000 students. A report noted that around 17 percent were

classified as dyslexic under special education provisions (Ministry of Education Malaysia, 2013). According to reports, 10 to 15 percent of Malaysian primary school pupils are dyslexic (Ministry of Education, 2021).

Scientist first discovered that damages of the occipital-temporal area of the brain can result in a condition called alexia. This condition involves blindness to letters and words (Milne, 2014). Dys-constellation is a term that was used to explain a family of learning disorders. Some children have problems with reading (Dyslexia), some have problems with coordination (Dyspraxia), some have problems with writing (Dysgraphia), some have problems with oral language (Specific language impairment), some have problems with spelling (Dysorthographia), and some have problems with mathematics (Dyscalculia) (Milne, 2014). Dyslexia is a disorder that continues throughout one's life span, and it influences one's ability to read and spell. According to the new diagnostic manual of the American Psychiatric Association, DSM-5 (American Psychiatric Association, 2013), dyslexia is classified as a *'Specific Learning Disorder'*. Dyslexia is a kind of neurobiological condition that makes it difficult for a person to learn and apply certain academic skills, such as reading and writing (International Dyslexia Association, 2019; Lyon et al., 2003).

Unlike most normal people, the brains of those suffering from dyslexia process information differently because of the way they visualise things. This issue is compounded by the fact that too often, many people suffering from dyslexia remain undiagnosed throughout their school careers. Instead, they become labelled as lazy or disruptive. As a result, they tend to be viewed as low school achievers, hence they become failures early in their lives. This is not healthy nor encouraging for the families of these children, as well as the country's human capital development and economy (Dyslexia International, 2014). From an educational perspective, pupils with dyslexia have more potential if their condition could be detected early, so that more programmes can be utilised to improve and support their condition. Possibility of at least although it may be the lesser of the evils among learning disabilities, dyslexia is a condition that should not be ignored because reading and writing are the basic needs for anyone.

Past studies Astutik and Minarsih (2024); Bautista (2019); Brown, Roediger, and McDaniel (2014); Kilpatrick (2015), and Rahma and Boediman (2023), have indicated that direct and explicit instruction that is accompanied by the multisensory method could be used to support pupils with dyslexia. This is referred to as the Orton-Gillingham approach. The Multisensory Structured Language Program was developed for teaching reading, spelling, and writing to pupils with dyslexia. The method was created in the 1930s by Samuel Torrey Orton, a neuropsychiatrist at Columbia University, and Anna Gillingham, an educator and psychologist at Teachers College, Columbia University. Together, they developed the Orton-Gillingham (O-G) approach, which was further enhanced in the 1940s by Anna and her colleague, Bessie Stillman. This was documented in the first of their four manual publications called Remedial Training for Children with Specific Learning Disabilities in Reading, Spelling, and Penmanship (Campbell, Helf, & Cooke, 2008). Orton was considered a pioneer in uncovering the first principles of reading remediation. He focused mainly on reading failures and language processing difficulties. He believed pupils must be taught the correlation between phonetics and their graphic counterparts using their existing auditory competence (Ritchey & Goeke, 2006).

Undoubtedly, pupils with dyslexia need support from home and school, while the teachers and parents need to understand the condition better so that they can contribute to helping the child with dyslexia overcome the condition (Dyslexia International, 2014; Yunus & Ahmad, 2022). The emotional climate of the child with dyslexia can be very disturbing and uncontrollable if not duly addressed. If further ignored, these children are not only overlooked and neglected but also pushed towards mental depression since they themselves do not know how to deal with their own conditions (Ryan, 2004; Sako, 2016). With a world population of more than seven billion, this learning deficiency can impact a huge number of children and adults, thereby leading to many unforeseeable consequences throughout their lives, unless intercepted with a good programme (Dyslexia International, 2014; Yunus & Ahmad, 2022).

As a result of this prevalence, the current study aims to focus on the Orton-Gillingham approach as an assessment plan to see how Malay language reading skills in diphthongs and digraphs of primary school pupils with dyslexia could be enhanced. The Orton-Gillingham approach serves as the larger umbrella term that encompasses various direct and explicit, systematic and structured, sequential, incremental, and cumulative, cognitive approaches and

emotionally sound means of the multisensory branches used for teaching phonetics and reading to pupils with dyslexia (Asri et al., 2025; Bautista, 2019; Mitak, Fitriah, & Chesoh, 2023).

1.1. Statement of the Problem

The disorganisation of the left brain filled with grey matter has been correlated to the reading impairment among pupils with dyslexia (Milne, 2014). They are said to suffer from various difficulties, such as word recognition, hence poor decoding and poor spelling incidents. They also have difficulties in processing phonology (Kavenia & Vijayaletchumy, 2019; Milne, 2014; Shaywitz & Shaywitz, 2007; Walda et al., 2022). The processing skills of the pupils with dyslexia are unique; many have different variations of strengths and weaknesses, hence they all learn to read in slightly different ways. As a consequence, their language and cognitive development need to be strengthened. This is because both served as the foundation for reading. Without the ability to read, these pupils would experience more discrimination and challenges in the future, thereby adding to the nation's human resource deficits.

Studies Lee and Lee (2021) have shown that blending letter sounds of three vowel diphthongs (ai, au, oi) and five consonant digraphs (gh, kh, ng, ny, sy) to form words is the major difficulty of pupils with dyslexia. They also get confused with the vowels ['e' and 'i'] because the vowel 'i' has a similar sound to the letter 'e' (Yusoh et al., 2008). Some have difficulty with word endings, others have confusions between letters, and others still cannot detect vowels or have poor grasp with words containing double vowels such as /limau/ means lemon as /limu/ or /pulau/ means island as /pula/ and double consonants such as /Khamis/ means Thursday as /hamis/ or /nyala/ means light up as /nala/ (Subramaniam & Kunasegran, 2022). Since instructions in the Malay language include the teaching of twenty-seven basic syllable types, the reader needs to resolve the sound of the vowels and consonants in the syllable by understanding the syllables. This is an important organizing idea for the pupils to grasp so that they can read the words correctly and precisely. Thus, the Orton-Gillingham approach enables teachers to integrate phonological manipulation skills by creating explicit instructions for educating pupils with dyslexia, which applies multi-letter grapheme-phoneme knowledge.

Dyslexia is a condition that has only been recently acknowledged by the Malaysian government, schools, teachers, and society. As a result, it is better understood today (Ministry of Education Malaysia, 2013). According to the Ministry of Education Malaysia's Special Education Division, students with dyslexia have intellectual capacities comparable to or higher than their classmates, but they struggle with spelling, reading, and writing skills (Asri et al., 2025). Clearly, dyslexia is a learning disability, but it may not be as severe as other learning disabilities caused by physical and mental conditions; it still requires attention because it affects the country's human capital development and economy in the long run. Therefore, this study is important to help primary school pupils with dyslexia improve their phonological processing and their ability to read diphthongs and digraphs in the Malay language by using the Orton-Gillingham multisensory approach as a teaching methodology.

Several strategies have been verified to be successful for teaching pupils with dyslexia. Methods found helpful have been used in segmenting in highly geared-up ways, as adequately designed reading practices emphasizing phonics and word building. Pupils with dyslexia, as expected, have a struggle with the fundamentals of learning language skills, so the techniques used by teachers to educate these pupils need to be done in isolation so that the fundamentals are actually constructed just for these pupils' use. The Orton-Gillingham approach and its implementation are mostly for the English language. In fact, in the context of Malaysia, research on the Orton-Gillingham approach, which is used to promote reading abilities in Malay among pupils with dyslexia, is quite limited (Lee & Lee, 2021; Pressreader, 2019; Yuzaidey et al., 2018).

Besides that, the lack of studies using the Orton-Gillingham approach to improve reading skills in diphthongs and digraphs in the Malay language among pupils with dyslexia extends beyond the pioneering MyBaca design by Lee (2019). This indicates that teachers should plan instruction for pupils with dyslexia using multisensory methods

that consider sensory stimulation factors. Given these issues, there is a research gap and a need for researchers to identify the need for an innovation kit in reading diphthongs and digraphs among primary school pupils with dyslexia.

1.2. Objectives of the Study

Identify the need for an innovation kit in the aspect of reading diphthongs and digraphs among pupils with dyslexia in primary school.

1.3. Significance of the Study

The findings of this study could contribute to the policymaking of the Malaysian education system, for instance, by involving the Malaysia Dyslexia Association and other non-governmental organizations of dyslexia. A collaboration of this nature can improve the education design to become more effective, especially for teaching Malay language reading skills to pupils with dyslexia. Furthermore, this study will provide insights to Malaysian teachers by highlighting that there are three pathways to enable primary school pupils with dyslexia to learn how to read, rather than focusing on the traditional method. By integrating a multisensory approach, which includes visual (what we see), auditory (what we hear), kinaesthetic, and tactile (what we feel) aspects of learning into the reading process for pupils with dyslexia, more can be achieved in terms of acquisition and learning.

In addition, the Orton-Gillingham approach can help pupils with dyslexia to overcome their depression, anxiety, low self-esteem, and anger, which lead to stress on their families and society at large. The new approach in pedagogy will indirectly encourage pupils with dyslexia to learn with enthusiasm and cheerfulness, thus motivating them to learn better, transform their lives, and help them step into adulthood. Apart from that, this study will offer information to parents that their child needs special attention and educational support to start reading. Thus, parents can play an important role in the early identification and response to dyslexia. Parents can observe their child's language development and don't have to wait until they start failing at reading at school. Parents need to recognize and acknowledge the child's feelings of frustration and disappointment. Herewith, the Orton-Gillingham approach would build on the interest of parents and pupils in the teaching and learning process. They can help their child with evidence-based reading instruction. This approach would engage the child to read and be involved in learning with fun. Early excellent habits increase learning and lay the groundwork for future reading.

2. LITERATURE REVIEW

2.1. The Orton-Gillingham Approach to Improving Reading Skills

The use of the Orton-Gillingham approach for enhancing reading skills in the classroom has produced some positive results. This can be traced to some past studies (Asri et al., 2025; Bautista, 2019; Lim & Lee, 2021). This research examined the effectiveness of the Orton-Gillingham approach in improving the reading skills of students who had difficulties in reading.

Bautista (2019) focused on looking at the effectiveness of the Orton-Gillingham approach for improving the English reading ability of grade 1 pupils. The study used a quasi-experimental pre- and post-test design. The categorization of the respondents was decided by the pre-test scores, paired with 24 respondents in each group. The early grade reading assessment toolbox was used to collect data. These were given to two groups of people: those who had been exposed to the Orton-Gillingham approach and those who had been exposed to the conventional approach (Marungko). According to the findings, twelve (50%) of those exposed to the Orton-Gillingham approach fared exceptionally well, while eight (33.33%) of those exposed to the Marungko approach performed exceptionally well. The research showed that the Orton-Gillingham approach improved the grade one pupils' reading skills in terms of phonological awareness, spelling, retention, and reading comprehension.

In spite of that, Lee and Lee (2021) focused on how the phonics intervention in 'MyBaca' affected older students with dyslexia's decoding skills and self-regulated learning (SRL) techniques. The researcher developed a Malay

language intervention program, 'MyBaca,' to teach Malay phonics knowledge and decoding skills for students with dyslexia. It was designed based on the pedagogical fundamentals of the Orton-Gillingham approach. Three students with dyslexia, aged 11, were selected. The intervention consisted of 36 individual sessions. The study used a *single-subject* research design at the baseline, treatment, and maintenance phases. The quantitative results show that after the intervention, decoding skills of students with dyslexia improved, especially for phonics knowledge, including digraphs. The findings support the notion that teaching grapheme-phoneme knowledge, as well as phonological manipulation skills, in an explicit and systematic manner, is critical for older students with dyslexia to develop decoding skills. Finally, the findings are relevant because the researchers suggest that the typical syllable-spell technique of teaching word reading is unsuitable for students with dyslexia, who require more structured training in Malay phonics, such as that provided by the 'MyBaca' program.

Another point linked to the Orton-Gillingham approach was highlighted by Asri et al. (2025) provide the development of mobile application for dyslexic-friendly learning materials. The authors created a Malay-language mobile app that combines Orton-Gillingham and Structured Literacy techniques, focusing on systematic, sequential, and cumulative learning. Learning is divided into three modules: phonology, syllable knowledge, and meaning association. Interactive games serve as diagnostic tools, monitoring reading fluency and correctness using Rapid Automated Naming (RAN). Although this study covers phonology, syllable knowledge and the meaning association, it does not expressly target complex orthographic features such as diphthongs and digraph.

As the Orton-Gillingham approach is still at the initial stage of implementation in Malaysia, there is a limited number of studies available on teaching phonics to enhance reading skills in the Malay language in the country. The Orton-Gillingham approach and its applications are mostly derived from tests conducted with native English populations. It has been widely used in the United States, Australia, the United Kingdom, and other Western nations. In fact, research involving the Orton-Gillingham approach for developing reading skills in Malay among pupils with dyslexia is quite limited within Malaysia. Moreover, the general understanding of the Orton-Gillingham approach is also relatively low in this country. All these limitations pose challenges for teachers to provide adequate support for individuals with dyslexia.

There is a need to address a significant gap in the literature on the impact of this methodology in Malay language teaching in Malaysia. Therefore, the current study focuses on the impact of the Orton-Gillingham approach and the need for an innovation kit in the aspects of reading diphthongs and digraphs in Malay language among pupils with dyslexia in primary schools.

3. METHODOLOGY

3.1. Design and Development Research, DDR Approach

The application of design and development research (DDR) methodology is a technique for creating development studies that begins with a needs analysis phase (Richey & Klein, 2014). It is also used to design and create interventions such as teaching and learning methods and aids as well as educational gaming tools and leadership models, with the goal of solving complex educational issues (Kragt & Day, 2020). This phase 1 focuses solely on Needs Analysis, which forms the basis for the development of the DiDi Innovation Kit – Diphthongs and Digraphs, based on the Orton-Gillingham approach. This study employed a qualitative research design through semi-structured individual interviews with five experts in special education and dyslexia specialists in the government sector in Selangor. The respondents were chosen based on their experience and expertise in teaching pupils with dyslexia. The interviews were developed based on the study objectives.

This phase aims to identify the main difficulties faced by pupils with dyslexia in mastering diphthongs and digraphs in the Malay language. It also seeks to identify the needs of special education teachers for appropriate teaching aids and to determine the justification for using the Orton-Gillingham approach in teaching Malay phonology.

3.2. Data Collection Methods

Data were analyzed thematically to identify common patterns related to teacher readiness, challenges, and perceived needs for an Orton-Gillingham innovation kit. Interviews were conducted individually with special education teachers using a set of prepared questions. The topics discussed included.

- Challenges faced by students in reading diphthongs and digraphs.
- Existing teaching strategies.
- Limitations of teaching aids.
- Justification for Orton-Gillingham in Dyslexia Intervention.

4. RESULTS AND DISCUSSION

This chapter addresses the important results drawn from interviews with dyslexia professionals about the necessity for the development of the Innovation Kit focusing on diphthongs and digraphs based on the Orton-Gillingham (O-G) approach for primary school pupils with dyslexia. The discussion is organized following the themes identified upon analysis, interpreted through the lens of the study's aims, and supported by relevant literature. From the perception of dyslexia specialists, it provides crucial confirmation of current instructional practice gaps and highlights the importance of establishing structure, explicit instruction, and multisensory-based reading intervention to address the phonological issues faced by pupils with dyslexia.

4.1. Challenges Faced by Students in Reading Diphthongs and Digraphs

The respondents revealed that one of the most prominent issues identified is the difficulty in recognizing and producing the sounds associated with diphthongs and digraphs, which are challenges faced by pupils with dyslexia. Pupils with dyslexia often encounter significant challenges when attempting to pronounce complex vowel combinations, such as the diphthongs "ai", "au", and "oi". These sounds often do not correspond to their existing phonetic framework, leading to frequent mispronunciations and reading errors. Additionally, letter reversal, letter elimination, letter insertion, guessing words, and transferring the letter are common issues, especially with diphthongs and digraphs, where pupils with dyslexia may misread or confuse words. According to the Theory of Dyslexia Syndrome by Levinson (1994), pupils with dyslexia tend to make these mistakes during reading. This situation affects the reading skills in diphthongs and digraphs among pupils with dyslexia (Nasir & Subramaniam, 2024).

Spelling becomes problematic as well, as many pupils with dyslexia rely heavily on phonetic approximations, resulting in spelling errors that do not reflect the accurate representation of diphthongs and digraphs.

As stated by the respondents, pupils with dyslexia often like to eliminate, add, or replace any letters or syllables in words. Pupils with dyslexia frequently misread or omit vowels in diphthongs, such as (ai, au, and oi), due to working memory limitations and difficulty segmenting and blending multi-letter units. The provided data in Table 1, illustrates a variety of reading errors among pupils with dyslexia, specifically targeting complex phonological structures such as diphthongs, paired vowels, and digraphs.

Table 1. Reading errors in Malay phonology.

Syllable structure	Words	Reading errors	Types of errors
Diphthongs (ai, au, oi)	misai (Moustache)	misa	Elimination
	limau (Lemon)	liman	Reversal
Paired Vowel (aa,ua, ia, iu, io)	taat (Obedient)	tata	Transfer
	piano (Piano)	pinano	Insertion
Digraphs (kh, gh, ng, ny, sy)	Khamis (Thursday)	Kamis	Elimination
	Syukur (Gratitude)	kurkur	Guessing

1. Complexity in Opaque Structures

While Malay is largely considered a transparent orthography with high grapheme-phoneme correspondence, specific structures like diphthongs and digraphs introduce opaque elements that challenge early readers. Recent studies indicate that pupils struggle most with syllable structures involving combined consonants (digraphs) and complex vowel combinations (diphthongs and paired vowels). The error in *misai* (moustache) (read as *misa*) demonstrates a common elimination pattern where the final phoneme of a diphthong is dropped, likely due to insufficient phonemic blending skills.

2. Phonological Representation and Decoding

The error types categorized as reversal (e.g., *limau* (lemon) to *liman*) and insertion (e.g., *piano* (piano) to *pinano*) suggest a breakdown in pupils' ability to maintain accurate phonological representations. Insertion errors often occur when learners attempt to regularize unfamiliar vowel pairs into more common CV (consonant-vowel) patterns they are more comfortable with. This aligns with findings that pupils rely on coarser syllable awareness when they lack precise grapheme-phoneme decoding strategies.

3. Orthographic Interference and Guessing

The use of guessing for digraphs (e.g., *syukur* (gratitude) read as *kurkur*) highlights a significant hurdle in Malay literacy. Digraphs like /sy/ or /ng/ require the reader to recognize two letters as a single phoneme. When pupils fail to decode these units, they often resort to logographic reading or guessing based on visual cues or familiar word fragments. Furthermore, elimination in digraphs (e.g., *khamis* (Thursday) to *Kamis*) reflects a failure to process the specific phonetic value of the /kh/ digraph, reverting instead to the simpler /k/ sound.

4. Pedagogical Implications

The prevalence of these errors underscores the necessity for systematic phonics instruction that emphasizes the relationship between consonants and vowels in complex clusters. Effective intervention should focus on spaced retrieval practice and multisensory learning experiences to reinforce phoneme retention and decoding accuracy for these challenging Malay structures. According to respondents, pupils with dyslexia make errors in reading words and tend to develop new words with no meaning. These findings align with the literature indicating five types of reading errors: removal, reversal, replacement, insertion, and wild guesses made by pupils with dyslexia (Subramaniam & Kunasegran, 2022; Vijayaletchumy, Kumar, & Singh, 2022).

4.2. Existing Teaching Strategies

Interviews with experts, including special education teachers and lecturers, revealed that current pedagogical strategies for pupils with dyslexia primarily focus on phonics-based methods to help students understand letter-sound relationships. However, phonics is a beneficial starting point, and it is often not enough for pupils with dyslexia. They require multisensory engagement to truly grasp complex phonological concepts. A common approach involves repetition, with pupils practicing words through flashcards, word lists, and repetitive reading exercises to reinforce learning. Additionally, individualized instruction is integral to supporting pupils with varying levels of learning difficulties. By providing one-on-one or small group sessions, teachers are better able to focus on specific challenges, such as those associated with diphthongs and digraphs, ensuring a more targeted approach to addressing each pupil's needs.

According to Respondent 1, literacy programs designed for pupils with dyslexia frequently lack structure and are not clearly aligned. According to Respondent 2, special needs educators are employing multisensory techniques to teach phonics; however, the implementation of these methods lacks structure. Consequently, the effectiveness of these strategies has been diminished, particularly when applied inconsistently. Experts assert that many special needs educators rely on drilling and memorization; however, pupils with dyslexia require the integration of sounds, letters, and comprehension through many sensory modalities (Lee & Abu Bakar, 2022).

The findings of this study indicate that existing teaching strategies for pupils with dyslexia largely reflect traditional phonics-based and remedial instructional practices, consistent with recent literature emphasizing the importance of explicit phonics instruction in early literacy intervention (Snowling et al., 2020). However, while phonics instruction is necessary, the results suggest that it is insufficient when implemented in isolation, particularly for pupils with persistent phonological processing difficulties. The reliance on repetition and drill-based practices aligns with previous research indicating that repetition can support fluency development in struggling readers.

A critical finding of this study is the insufficient integration of multisensory instructional approaches in current teaching practices. Recent literature strongly supports the effectiveness of multisensory methods in enhancing phonological awareness and reading accuracy among dyslexic students (Dixon, 2023). The limited use of tactile and kinesthetic elements reported by respondents highlights a significant pedagogical gap and reinforces the need for structured multisensory frameworks.

4.3. Limitations of Teaching Aids

The experts revealed that the main limitation of the existing teaching tools available to dyslexic pupils is their predominant reliance on visual and auditory methods of learning. These approaches are valuable, but often neglect the kinesthetic and tactile methods that are essential to strengthening the learning of pupils with dyslexia. For example, flashcards and worksheets, although effective for some pupils, do not include enough multisensory elements to help fully engage dyslexic learners. Moreover, many existing materials do not specifically address the needs of pupils with dyslexia. Resources are often not formatted in a way that is dyslexia-friendly. For instance, using inappropriate fonts, colour coding, or providing more visual than tactile support will make them less effective for these pupils. As a result, teachers often find themselves developing their own resources, which may be appropriate to the needs of their pupils but may be time-consuming and lack the effectiveness of professional development.

The findings of this study highlight significant limitations in the existing teaching aids used for phonological instruction among dyslexic students, particularly in the teaching of diphthongs and digraphs. The predominance of worksheet-based and visually oriented materials reported by respondents aligns with recent research indicating that many instructional resources fail to incorporate multisensory elements essential for effective dyslexia intervention (Dixon, 2023). Without tactile and kinesthetic engagement, dyslexic learners may struggle to consolidate phonological representations, resulting in slow and inconsistent reading progress.

The lack of systematic and cumulative instructional design observed in current teaching aids is also consistent with findings from recent literacy intervention studies. Evidence suggests that dyslexic students benefit most from teaching aids that are structured, sequential, and diagnostic in nature, enabling learners to build phonological knowledge progressively (Snowling et al., 2020). Fragmented instructional materials, as reported by respondents, may therefore limit students' ability to transfer learned skills across different linguistic contexts.

Within the Malaysian context, several studies have highlighted similar challenges in the availability and effectiveness of dyslexia-friendly teaching materials. For instance, Lee and Lee (2021) reported that teaching aids used in Malaysian special education classrooms often lack adaptation to learners' specific cognitive and linguistic needs, particularly in reading instruction. Similarly, Lee and Lee (2021) found that many Malay language teaching materials are not designed with dyslexic learners in mind, resulting in increased cognitive load and reduced reading comprehension. Furthermore, Malaysian teachers frequently rely on self-developed instructional materials due to the limited availability of validated dyslexia-specific resources (Ishak & Wan Mohammad, 2020). While teacher-created materials demonstrate professional commitment, they may lack empirical grounding and consistency, potentially affecting instructional quality. The absence of locally grounded, evidence-based teaching aids that integrate Malay phonological features further underscores the need for innovation in this area.

4.4. Justification for Orton-Gillingham in Dyslexia Intervention

All respondents strongly agreed that the Orton-Gillingham approach has been shown to be very successful in meeting the special learning requirements of pupils with dyslexia. By utilizing visual, auditory, and kinesthetic senses, the Orton-Gillingham approach enables deeper reinforcement and a more thorough comprehension of intricate phonological components like diphthongs and digraphs. Through practical exercises like building words with manipulatives or tracing letters in sand, pupils with dyslexia improve their ability to recognize and recall sounds. The Orton-Gillingham method's structured, sequential design offers pupils with dyslexia a predictable and encouraging framework for learning as well as a clear and consistent learning path. According to Rohadi and Alias (2021), the multisensory method uses different learning methods, such as seeing, listening, and doing movements, which can help pupils to remember things better. Implementing a multisensory approach in teaching reading has a positive impact on reading speed among pupils with learning disabilities (Mitak et al., 2023).

However, respondents claimed that teachers must receive specialized training in order for this approach to be implemented successfully. The success of Orton-Gillingham methods in the classroom may be hampered by the fact that many teachers lack the skills required to implement them successfully. More professional development opportunities are desperately needed to guarantee that educators have the abilities and information to apply this approach successfully. Despite these obstacles, Orton-Gillingham is still a vital resource for pupils with dyslexia who struggle with reading and spelling, especially when it comes to digraphs and diphthongs.

Taken together, these findings reinforce the need for structured, multisensory, and language-specific teaching aids grounded in evidence-based approaches such as Orton-Gillingham. The development of the DiDi Innovation Kit directly addresses these limitations by providing a systematic, multisensory instructional framework tailored to the phonological structure of the Malay language and the learning profiles of dyslexic students.

5. CONCLUSION

In conclusion, this study provides clear empirical and contextual justification for the use of the Orton-Gillingham approach in supporting Malay language reading development among pupils with dyslexia. The findings demonstrate that structured, multisensory instruction grounded in O-G principles effectively enhances foundational literacy skills, particularly phonological awareness and decoding abilities essential for mastering diphthongs and digraphs. The needs analysis further reveals a significant gap in Malaysia's current literacy instruction, where the absence of validated, systematic, and dyslexia-specific teaching frameworks limits instructional effectiveness. Addressing this gap through the development of an Orton-Gillingham–based Malay reading module offers a practical and evidence-based solution that not only strengthens pupils' reading competence but also supports their emotional resilience and confidence. Overall, the novelty of this study lies in its emphasis on the critical role of structured multisensory approaches in improving literacy outcomes for pupils with dyslexia in primary school.

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Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Competing Interests: The authors declare that they have no competing interests.
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