Effectiveness of Quizizz in Improving Reading Skills among Dyslexic Students

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Abstract
Dyslexic students face challenges in the language domain. Language proficiency, that includes reading, writing and spelling among dyslexic students is generally very weak. According to *Persatuan Dyslexia Malaysia* (2023), dyslexic students have confusion in recognizing letters. Therefore, this research was conducted to study language mastery among dyslexic students through Quizzes. Quizizz is a platform for students to learn and answer questions according to the topics. Quizizz can be used as a short assessment in teaching and learning to find out the students' knowledge and abilities. Teachers can create gamified Quizizz for students to grab the students' attention. This research study sample consisted of 5 dyslexic students from the beginner grade level, who were selected from the TTDI Kuala Lumpur dyslexia center. The research instrument were 3 sets of reading tests that have been reviewed by dyslexia experts. The research data was then compiled through observation and testing. The researcher used test papers that were divided into 3 sets, such as letter recognition test, syllable test and reading test. Thus, the results of the study indicated that the language mastery among dyslexia students improved significantly through the application of Quizizz.
Keywords: Reading, Dyslexia, Technology, Quizizz, Malay Language

Background
Dyslexia is a specific learning disability that affects reading and writing abilities. It is not a serious illness, but a neurological disorder in the brain. According to International Dyslexia Association (2020), there is no cure for dyslexia and students need to learn the coping methods in learning. Dyslexic children find it difficult to read and write words. Children with dyslexia may be able to read, but the progress will be below the expected level for their age range due to their mental and cognitive development. Moreover, they always have letter confusion such as b, d, p, w and m. Although dyslexic students have the same IQ level as normal students, they cannot read fluently because of the letter confusion. The learning process of dyslexic students is different from that of normal students. According to the

International Dyslexia Association, there are significant differences between dyslexic children and normal children in terms of brain structure. Therefore, it has been proven that dyslexic students have less brain development in terms of language.

According to Vijayaletchumy & Kavenia & (2021), however, dyslexic students can show challenges in the learning process, and also in terms of aspects in speech, behavior, emotions, psychology and so on. Therefore, dyslexic students need guidance from teachers in their learning process. Dyslexic children are less skilled in the pronunciation of letter sounds. Distinctive features of dyslexia are stuttering and slow speech. On the other hand, some dyslexic children have good speech but have problems in reading and writing. This is better known as "3M" in Malaysia which is reading (membaca), writing (menulis) and calculating (mengira). Also, dyslexic students may not be able to follow instructions and act spontaneously. Generally, dyslexic students face confusion in recognizing some letters causing them to read letters in reverse. For example, confusion of the letters b, d, p, and q. The confusion of these letters in reading disrupts their learning process. According to Irawati (2017), dyslexic students will write letters upside down. Letters such as b,d,p,q,k,h,e,r and s are dominant letters. Next, dyslexic students experience the problem of missing letters, adding letters and replacing letters in writing.

In the context of 21st century learning, the current generation is more advanced due to the widespread development of technology. Therefore, learning in the 21st century can create a fun learning environment. Quizzes is a sophisticated technology that is used as a learning platform by educators by adopting game-based activities for students (MacNamara and Murphy, 2017). Thus, students will show excitement to do the assessments via Quizizz. Dyslexic students will be more focused in learning a new language by using Quizizz. Moreover, Quizzes can help teachers to teach and give enforcement training in ensuring their students master the language. The application of technology, namely Quizizz, in the learning process of dyslexic students is more fun and prevents them from feeling bored in classrooms.

Problem Statement
Dyslexia is quite difficult to identify from young because physically, dyslexic students look the same as normal students. As dyslexia is a learning disorder, the most significant problem in the reading aspect of dyslexic students is the ability to identify letters with sounds (Rajendra & Prasad, 2022). Therefore, the researcher focused this study on the field of dyslexia, specifically on the reading aspects. Learning phonemic, phonetic and phonological aspects is important to master a language well.

Furthermore, most parents or guardians are unable to identify that dyslexic children have problems in mastering language. Parents and teachers need to give attention in reading for dyslexic students rather than using physical materials such as only books and notes. Technology will be helpful in learning languages for dyslexic students as it creates a fun learning environment for the students. Previous studies prove that there are dominant reading problems among dyslexics. For example, word reading and text reading among dyslexics. The studies conducted by Subramaniam & Kunasegran (2022); Reis et.al (2020); Sheryl et. al (2020) proved dyslexic students require phonological awareness. Dyslexic students need more time to read comprehension text in speed.

To further prove the problem statement, a pilot study was conducted at the TTDI dyslexia center. This pilot study involved five dyslexic students from the beginner class. Researchers tested language mastery from the aspects of identifying letters, phonology and reading. The results showed that dyslexic students are weak in recognizing letters such as b, d, p and q. Moreover, they showed difficulty in reading words with two or more syllables.

Methodology

This study applies a qualitative approach to obtain data. The qualitative approach allows the researcher to describe the study in a more detail-based on the acquisition of information from the teachers who are teaching at the TTDI Dyslexia Centre. Therefore, an interview session was conducted to complete this study. The researcher interviewed several teachers from the beginner class. Furthermore, the researcher did a pre- and post-test according to the activity set in a descriptive manner. By using this approach, the researcher can obtain the language mastery of dyslexic students and the methods used by teachers for language mastery. Qualitative research is a research method that emphasizes words and text rather than computational involvement. The weakness of this study is the absence of quality criteria for the data collected to be evaluated (Hammersley, 2007).

The researcher surveyed the TTDI Kuala Lumpur dyslexia centre if it is suitable for the research to be conducted. Prior to the original study, the researcher also visited TTDI a few times to conduct a pilot study in gauging the general picture of dyslexic students. As a result of this survey, the researcher made a descriptive analysis and found that the level of dyslexic students in the aspect of reading in terms of identifying letters, syllables and word sounds are weak and require specific interventions suited to the different reading challenges.Interview methods can be divided into several types, namely structured interviews, semi-structured interviews and unstructured interviews. In this study, the researcher conducted few unstructured interview sessions with the teachers at the dyslexia centre. The researcher also interviewed Puan Sariah Amirin, a very well-renown dyslexia expert in Malaysia. She shared her 40 years of working experience with dyslexic children and the many learning problems of dyslexic children. She also explained the methods to overcome learning problems among dyslexic children. This interview took place verbally and casually.

The researcher prepared a set of pre- and post-reading test questions. The test was reviewed by a dyslexic expert at the study site before being used with dyslexic students. Test A tested uppercase and lowercase letter identification, test B tested syllable reading and test C was on reading words in a text. Each test set contained 10 questions. The reading test was done by distributing each pre and post-set. The researcher selected 5 dyslexic students from the beginner class to complete the reading test accordingly.

Data Triangulation

According to Denzin (1978), four types of triangulations can be used in research. Examples of triangulation in research are data triangulation, researcher triangulation, theoretical triangulation and methodological technique triangulation. In short, triangulation is a source of data, researcher expertise, theory, and methodological techniques in research. Therefore, triangulation is very important because it increases the accuracy of research findings.
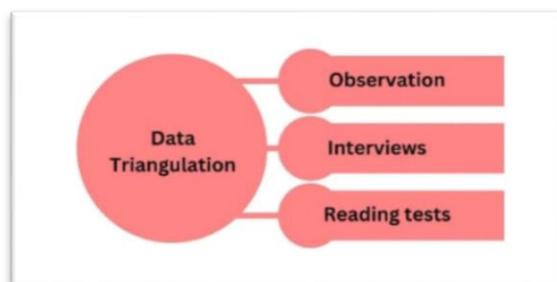
Figure 1: Data Triangulation

Findings and Discussion
Identification of reading difficulties among dyslexic students
To identify the specific reading difficulties of dyslexic students, the researcher conducted reading tests according to the 3 different reading skills, which are reading, spelling and sound. The researcher explained the problems encountered among dyslexic students, which is letter recognition and the overall effect on the students' reading skills. Dyslexic students have problems with letter recognition, sound blending and phonological differentiation (Vijayaletchumy & Kavenia, 2022).

i.   Reading
Students with dyslexia have the same IQ level as normal students but they cannot read fluently. Dyslexic children face reading problems daily (International Dyslexia Association, 2020). The learning process of dyslexic students is different from that of normal students. According to the International Dyslexia Association, there are differences between dyslexic children and normal children in terms of brain structure. Example, "batu- tuba" dan "gula-lagu". They also often reverse sentences like "*saya sudah makan – saya makan sudah*".;. This confusion occurs when they master two languages, Malay and English. For example, words like "*jam – jem*". The sound is the same for both words but different spelling but this difference often causes confusion among dyslexic children as they confuse the English phonics system with Malay languages' sound pronunciation.

ii.   Spelling
In Kamal's (2020) study, dyslexic students made phonological errors, especially in phonemes and syllables. Through this study, it was found that dyslexic students cannot spell a long word consisting of more than three syllables. It is difficult for them to spell the word as spelling a word with various syllables requires them to blend sounds. Generally, weak spelling affects reading in any language. This problem stems from the challenge of recognizing and differentiating letters such as m-w, n-u, p-q, b-d and y-g.

iii.   Sound
Based on a previous study by Vijayaletchumy & Shuhada (2020), dyslexic students write letters upside down. Letters such as b,d,p,q,k,h,e,r and s are dominant letters that are usually mistaken by dyslexic students. Due to their phonological awareness deficit, dyslexic students experience weak sound discriminating skills. Therefore, they usually require guidance and help from audio or teachers to pronounce the letters. For example, the letters b, d, p and q.

The sound of each letter needs to be given an example of a word so that dyslexic students can sound the letter individually.

Effectiveness of Quizizz application activities in improving reading skills of dyslexic students

The researchers examined the effectiveness of Quizizz application exercises in helping dyslexic students improve their reading. The activities used on the Quizizz platform focused on the 3 main reading skills as identified above, namely spelling, sound and reading. The intervention involved the researcher using a computer and the sessions were conducted individually with the students. After the intervention, the researcher conducted a post- test with the reading text papers that had been previously used by the researchers. The researcher analyzed the effectiveness of Quizizz application exercises in helping dyslexic students improve their reading from the pre-and post-test results. The data collected was then interpreted into graphs to analyze each pre- and post-test result.

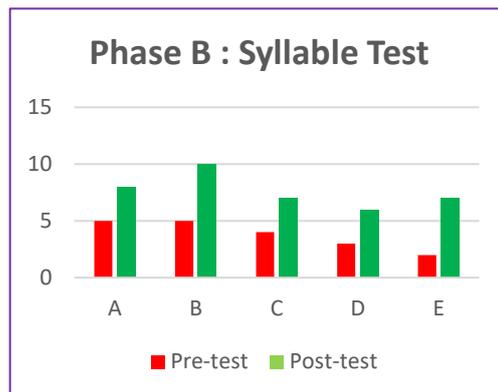| Subject	Score	
	Pre	Post
A	7	9
B	5	7
C	6	9
D	4	8
E	5	10

Table 1

Uppercase and Lowercase Letter Identification Activity
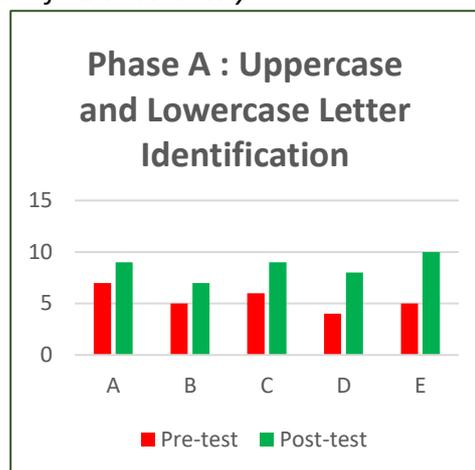
Based on the diagram above, the scores show an increase in the letter's identification test among dyslexic students after the Quizizz intervention was applied in language learning. The data showed Subject E scored the highest in the capital and small letter recognition test. In the pre-test for letter identification, subject E faced letter confusion such as the letters p, b and f. Subject E could not choose the correct answer for capital letters p, b and f. After subject E used the Quizizz application on capital and small letters, Subject E was able to differentiate between upper and lowercase letters. Thus, subject E has shown the biggest improvement in the post-test. Apart from subject E, the 4 other subjects also show an improvement in score. The researcher was able to conclude that the use of Quizizz in the language mastery aspect of capital and small letter recognition enables dyslexic students to remember capital and small letters.

Table 2
Syllable Activities

Subject	Score	
	Pre	Post
A	5	8
B	5	10
C	4	7
D	3	6
E	2	7

Phase B : Syllable Test

Based on the diagram above, the scores show an increase in syllable test among dyslexic students after the Quizizz intervention was applied in language learning. Subject B got the highest score in the syllable test. At the pre-syllable test, subject B found it hard in segmenting syllables for each word. For example, the word "kopi" with "koko". Subject B experienced misunderstandings of the syllables, even though the word was made up of only two syllables. Subject B was unable to determine the right response from the image. After subject B used the Quizizz application about syllables, Subject B could spell the syllable correctly according to the pronunciation. Thus, subject B has shown an increase in post-test like all the other subjects too. Researchers can conclude that the use of Quizizz in language proficiency aspects of syllables has led students to remember how to segmentize syllables.

Table 3
Word Reading Test

Phase C : Reading Test
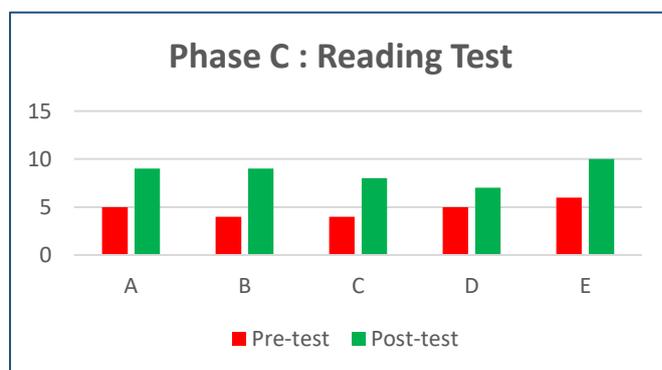
Subject	Score	
	Pre	Post
A	5	9
B	4	9
C	4	8
D	5	7
E	6	10

Based on the diagram above, the scores show an increase in the reading test among dyslexic students after the Quizizz intervention was applied in language learning. Again, Subject E scored the highest in the word reading test. In the pre-test of the word reading activity, subject E faced problems in reading words. Subject E could not choose the correct answer for the word based on the picture. For example, the pictures and words of sharks, bears and bees. Subject E had trouble determining the answer due to inability to pronounce the letter of each word. After subject E used the Quizizz application for word reading activities, subject E was able to pronounce every word with the correct syllable. To sum up, all subjects showed improvement in the post-test. The researcher can conclude that the use of Quizizz in the language mastery of the word reading aspect enables dyslexic students to enjoy reading.

Conclusion

In conclusion, this study has achieved both of the research objectives that have been determined, namely to identify the reading problems in the language mastery of dyslexic students and to analyze the effectiveness of Quizizz application activities in language mastery of dyslexic students. Researchers applied technology-assisted activities in the learning process among dyslexia students by using Quizizz. In terms of this scope of study, the researcher only focused on dyslexic children's language mastery, specifically on the reading skills. These dyslexic students were chosen because they have difficulty mastering language. Advanced studies in the field of dyslexia can be conducted for adults who have difficulty in speaking, writing or psychomotor skills.

Acknowledgement

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