EFFECTS OF USING TTSREADER IN IMPROVING ENGLISH READING SKILLS OF STUDENTS WITH LEARNING DIFFICULTIES

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ABSTRACT

According to the report on the Education Dropout Documents of Malaysia 2023, a total of 175,304 school-aged children at primary schools in Malaysia are still not proficient in reading, while 1.01 million Malaysians still lack literacy skills. Some children in the statistics are students with learning difficulties who have readiness and learning abilities that do not align with typical children, requiring more time to understand a particular subject. This study aims to identify whether the use of assistive technology, specifically TTSReader, can enhance reading skills of students with learning difficulties in English language. The study takes an experimental form, and a mixed-method approach has been used to gather data. Quantitative data were collected through pre and post-tests, while qualitative data were collected through structured interviews and observations: running records to further validate the findings. The study was conducted at primary school in Tatau, Sebauh. Eight special needs students will be randomly selected as study samples, with each group of four special needs students classified separately into treatment and control groups. The study findings indicate a significant difference in the improvement of reading skills between the two groups (t=-3.421, P(0.011 < 0.05) in the post-test. Interview data also show that 75%, or 3 out of 4 respondents in the treatment group, fully embraced the use of assistive technology: TTSReader. Observational results also demonstrate a substantial reduction in errors and an improvement in accuracy and self-correction rates in the treatment group during the reading process. With appropriate assistive technology, educators are able to create a learning environment capable of assisting individuals with special needs to learn like typical students. In conclusion, the application of assistive technology, specifically TTSReader, can have a positive impact on improving English reading skills.

Keywords: Reading skills; students with learning difficulties; technology assistance; TTSReader; English; Running Record

1. INTRODUCTION

According to the Malaysian Education Dropout Document Report 2023, there are 60,800 of dropout aboriginal children and 175,304 (13%) children at the end of primary school age in Malaysia are reported to be unable to read. Some of the children from these statistics are those who have learning difficulties where they have difficulty understanding, using language, speech, writing or hearing . These difficulties significantly affect their ability to think, speak, and read.

(Rahim, 2023)(Fuad & Tahar 2021). This is because they are facing delays in the development of maturity and certain intellectual functions that are necessary in the learning process at school. Their willingness to learn and their ability to learn is out of sync with typical children and they need more time to understand a learning (Natasya Amira Ab Razak & Mohd Mokhtar Tahar 2022). Therefore, this should be given due attention by diversifying techniques and materials as well as implementing creative changes in the way of knowledge, delivery to attract and stimulate the thinking of students with learning problems. (Zulkifli1, 2022).

With the rapid development of technology in modern times, assistive technology has been a great help in classroom teaching and learning. (Kamaluddin & Husnin 2022). Assistive technology refers to devices or materials that can be used to help individuals with special needs and increase their functionality levels in the classroom. With the appropriate use of assistive technology, it can enhanced the effectiveness of the teaching, learning process, students' well-being, as well as creating the same opportunities and access to learning in a normal classroom (Yulian et al. 2022). Therefore, in order to assist students with learning difficulties and to improve their reading skills in English subjects, teachers play an important role in determining the effective usage of technological materials. (Haiza Hayati Baharudin et al. 2021). Thus, the teacher needs to adapt and determine the use of assistive technology according to the situation of pupils.

In the context of education, assistive technology plays an important role in supporting pupils with special needs to learn like typical pupils (Education Bitara Upsi ; Adnan & Zaharudin 2021). Pupils' achievement will increase when they are able to complete tasks effectively and independently without the need of help from others (Samsudin & Adnan 2021). To ensure full support for pupils with special needs in schools, teachers need to be aware of the functions and limitations of the material (Fernández-Batanero et al. 2022) in order to improve the achievement of students, determining the concept format of assistive technology used as well as documenting the effective usage of assistive technology. With the use of appropriate assistive technology materials in special-needs classrooms, the effectiveness of assistive technology can be assessed through work results and feedback from pupils, teachers, and parents. Therefore, every criterion in the selection and use of assistive technology with special needs pupils is essential so as to help the students maximize their learning output (Viner et al. 2020).

Next, learning-impaired pupils are children who have been identified and diagnosed by clinical professionals as individuals whose maximal ability in all areas is lacking compared to normal children and their level of functionality varies depending on the type of disability they faced (Fuad & Tahar, 2021). They faced learning difficulties while trying to master 3M skills such as reading, writing, and counting (Natasya Amira Ab Razak & Mohd Mokhtar Tahar, 2022). They often have problems in reading words because they do not recognize letters with sounds (Vijayaletchumy Subramaniam & Kavenia Kunasegran, 2022) and it can hinder their ability to read words correctly (Sylvester Lau Yueh Wei et al., 2020). Furthermore, learning-impaired students also faced difficulties in connecting sound with writing. According to the study of Gutasan et al., 2021, he stated that they need additional help to use sound-to-letter strategies or the application of assistive technologies to read words accurately.

Not only that, learning-impaired pupils with limited vocabulary will cause their reading skills to be relatively poor. They often have difficulty recognizing and understanding new words and it can affect their ability to read smoothly and understand better (Elias 2020). Therefore, to help students with learning difficulties in mastering reading skills, various appropriate ways and strategies can be applied to them. However, the existing ways and strategies will not necessarily help pupils with full reading learning. Therefore, the application of appropriate assistive technologies can help them in mastering reading skills and overcoming learning difficulties (McNicholl et al., 2021).

A range of assistive technologies that can be used to help students with learning difficulties to develop reading skills. However, problems in reading need to be identified in advance so that the selection of appropriate assistive technologies can help them to master the skills better. As per Haiza Hayati Baharudin et al. study, 2021, with the early introduction of IWB-assisted technology to children, it can open opportunities to help children master reading skills while teachers can improve their teaching and learning quality. It is clear that appropriate exposure and assistive technology can indeed help pupils to master reading skills perfectly. Therefore, this study would like to identify the effective usage of assistive technology: TTSReader by improving English reading skills of students with learning difficulties.

2. LITERATURE REVIEW

Assistive technology is a life-changer as it can improve the functionality of individuals with special needs by helping them in living healthy, productive, independent lives and having the opportunity to participate in education, (Adnan & Zaharudin, 2021) or enter the job market as well as civic life. In addition, assistive technologies are categorized into 5 groups, namely cognitive and academic, communication adaptation, physical, social, and emotions. Each category plays an important role as every individual have different disability. Therefore, individuals with special needs require appropriate assistive technology to enhance their capabilities (Samsudin & Adnan, 2021) so that they can learn to be independent. In these cases, they will feel that they have autonomy in life and their self-esteem will also increase (Kunka & Wahome 2021).

It is undeniable that various challenges will be faced by pupils with special needs as they require appropriate instruction and specific teaching during their time at school. By applying assistive technology in class, it will help teachers in teaching and learning process with more effective and efficient results (Haiza Hayati Baharudin et al., 2021). Not only that, the effectiveness of using assistive technology can also be assessed based on the increased learning power of students with special needs. This is because assistive technology can have a positive impact on cognitive aspects and promote collaborative learning (Fatimah Salah & Harun, 2020). Thus, assistive technologies such as text to audio (TTS) were selected and studied in this research to help students with learning difficulties in mastering reading skills in English.

As mentioned in this study, the existing and free text-to-audio-assisted technology that can be applied in this study is TTSReader. TTSReader is a free online application by converting written text to speech audio (Jayawardhana et al. 2019). Users only need to copy and paste any text into the app, and it will read aloud using voice generated by a computer, phone, or tablet (Mohammad khaja kutubuddin & N. Lokeswari 2020). However, most pupils have learning difficulties with

reading because their reading readiness is significantly different from typical pupils. In this regard, TTSReader has played a role and is particularly useful for those who have difficulty in reading or who prefer to hear written text than read it themselves (Pratama 2020). Not only that, the app can also be used to translate text from pdf or web page to voice instantly and easily. Finally, TTSReader has the features such as voice selection and speed, which can read text in multiple languages. Thus, students with problems can insert digital textbooks into this system and choose the right type of voice and language to learn reading with the right tone and rhythm.

As we know, students with learning difficulties are categorized as children with cognitive impairment (intellectually slow) (Natasya Amira Ab Razak et al., 2022). They are also children who have been identified and confirmed by clinical professionals as having a disability that interferes the learning process (Gutasan et al (2021). This disability can be categorized based on the child's level of functionality in various skills such as cognitive, social behavior, speech, reading, development, and mathematics. Their maximum ability in all areas is significantly lower than typical children and their behaviour is dependent on the type of disability, but it doesn't mean that they are not able to learn.

In addition, currently pupils with learning difficulties are also considered teachable and can benefit from formal education. They are qualified to pursue education in schools that promote Integration Special Education Program (PPKI). This program is established and fully managed by the State of Education Department, Ministry of Education Malaysia (Aina Nurfasya Ramli & Rosadah Abd Majid, 2021). The program is carried out in schools that have classes for pupils of special education or special children. Special education refers to teaching that has been specifically designed to meet the needs of children with special needs and provide learning facilities with opportunities that are not available in the normal curriculum or regular school services (Wahab & Mohd Yassin, 2022). For example, teaching and learning, particularly in mastering 3m skills for students with learning difficulties, especially reading skills.

It is undeniable that reading skills are dynamic but a complex process (Sylvester Lau Yueh Wei et al (2020). These skills include the speed of reading, understanding facts, remembering information as well as making thoughtful and thorough interpretations. When a person reads, they can communicate directly and consciously with the material read (Intan Syuhada & Zamri Mahamod, 2021). They will strive to understand and engage with the thoughts and ideas presented by the author (Vijayaletchumy Subramaniam & Kavenia Kunasegran, 2022). However, mastering reading skills is not easy as it can only be mastered through formal teaching and learning process (Rosyati Manaf & Kamariah Abu Bakar, 2022).

Reading skills are also one of the four important language skills in the process of teaching and learning a language, it is a continuation of basic skills such as listening and speaking. Through reading, one can access and gain knowledge that cannot be gained through other common experiences (Jie, 2020). According to Balanadam (2021), reading skills refer to a pupil's ability to read with proper pronunciation, intonation, pause and fluency. Emphasis should also be placed on the critical understanding and reasoning aspects of various reading materials using various reading techniques. Thus, pupils can enjoy reading the text.

Furthermore, reading involves several complex processes which are the process of observing, remembering, hearing and distinguishing sounds accurately and clearly (Rani, 2021). In addition, reading also involves the ability to pronounce letters that represent a particular sound, combining them to form words and transferring the symbols into the cognitive system to be translated and understood (Intan Syuhada et al., 2021). Reading is also an act of communication which involves a thought process involving ideas, facts and feelings shifted by the author to the reader through the intermediary of language symbols (Zamri Mahamod et al., 2021). By understanding the process, it can be directed more effectively to help students master their reading skills well.

In this regard, reading is also a skill that needs to be trained and applied to students so that they become competent readers (Asminar et al., 2021). A competent reader can concentrate on important words only and concentrate fully on his ability to process meaning by using analytical strategies and synthesis in reading (Balanadam, 2021). According to Rani's research, (2021), a competent reader will get information from the text based on his language proficiency and experience and they will not have to analyse by exploring every each word. They will use their knowledge of language structure, keywords, context, and basic knowledge to fully understand the meaning.

Next, reading comprehension divided into three categories which are establishment (literal understanding), interpretation (inferential understanding) and evaluation of meaning (critical understanding). Establishment is like a fundamental and most important skill in reading comprehension. Without understanding the meaning of a word or phrase, pupils will have difficulty to understand what has been read (Hamzah & Mahamod, 2021). In the process of understanding reading, it is important to emphasize in giving implicit meaning. These skills involve the ability of pupils to make inferences, predictions, deductions and understand the reading material (Zamri Mahamod et al., 2021). In terms of meaning assessment, pupils should always be critical thinking while reading. This is because critical thinking involves the ability of students to consider, compare and analyse.

However, one fact that cannot be ruled out which is the skills of students with learning difficulties in reading English are quite poor and very worrying. In this regard, English is the third most famous language with a total of 1.35 billion speakers worldwide. English is West Germanic Language which is the dominant language in the United Kingdom, the United States and most Commonwealth countries including Australia and Canada, and other former British colonies (Han 2019). English also serves as the dominant language or official language in most countries that were previously under British rule (Ahmad Johari Bin Sihes 2022). However, there is no official language control group to ensure uniformity and efficiency in the use of English in Malaysia as Bahasa Melayu has become the official language after independence.

Although English is not the official language in Malaysia, but it is still used by most Malaysians in the business sector (Romli et al., 2022). Roughly 80% of businesses in Malaysia deal in English. From small transactions such as selling in high-end supermarkets to academic and professional dealings involving international citizens. Thus, the importance of English cannot be overestimated (Ellangovan et al., 2022). Although English has a complex history, it nevertheless has a bright future. With so many people able to communicate in English, it can help connect us in a global

world (Mohd Amin & Abu Bakar, 2022). Furthermore, English can also provide benefits in personal and professional life.

As we know, the proficiency of English among students is essential in preparation for them to face the complex world challenges and contribute to many different fields such as engineering, education, business, medicine, jurisprudence and so on (Romli et al., 2022). Awareness of the importance of English proficiency among students in Malaysia has long been realized, and this prompted the Ministry of Education to implement the Higher Immersive Programme (Romli et al., 2022) with the aim of promoting student's interest in using English as the second language in and out of the classroom. This programme can also encourage the use of English among students more effectively. However, most students still have difficulty speaking English and do not engage in using the language in their daily conversation as English is the second language for them (Mazlan, 2022).

3. STUDY METHODOLOGY

The aim of this study was to examine the impact of using TTSReader as an assistive technology to improve the reading skills of students with learning difficulties in English at SK Sungai Tayai. Researchers will conduct pre- and post-tests throughout the study to examine the effectiveness of TTSReader. Therefore, the most suitable study design used for this study is the experimental study. In this regard, data collection will be carried out using a mixed method approach i.e. quantitative and qualitative methods. The quantitative approach adopted by the researchers in this study is to collect primary and secondary data through pre- and post-tests in order to collect data on the level of mastery of reading skills. In addition, a qualitative approach will also be used in this study using observational methods: running records and interviewing with respondents to further confirm the findings of the studies found. For the researchers, both methods can provide accurate and clear information and potentially meet the requirements of the study questions made.

In addition, this study will be conducted at SK Sungai Tayai which is in rural areas, and it is one of the schools implementing the Integration Special Education Programme (PPKI). The researchers choose SK Sungai Tayai, Tatau as the study site because SK Sungai Tayai is the only school that implements the Integration Special Education Programme (PPKI) which others school in Tatau do not offer PPKI classes. In PPKI class, SK Sungai Tayai has enough number of special needs students who are in the category of learning difficulties. Finally, PPKI class of SK Sungai Tayai also has complete set of ICT facilities that can support the study. Therefore, SK Sungai Tayai was chosen to be the location of this study.

Next, sampling is related to the process of selecting several subjects from a population to be used as a respondent in the study. For this study, the sample of the study consisted of special needs students who were in the category of learning difficulties. 8 students with special needs will be randomly selected as a sample study while 4 special needs students will be classified as treatment groups and another 4 special needs students will be classified as control group. All samples of these studies were learning-impaired pupils who had different development and growth with typical pupils. Not only that, they are also students who have been identified and confirmed by clinical professionals as having a disability that interferes with the learning process. All

respondents will be divided into two groups, which is control group that will follows the learning as usual and the treatment group that will using assistive technology: TTSReader in learning.

3.1. Pre And Post Tests

The tests are based on English syllabus of special education. The test contains 10 words (20 marks), 5 sentences (10 marks) and 1 short passage (20 marks) and the respondent needs to read everything without any help. The total score is 100%. The questions are in the form of a checklist and the time allotted for this test is 30 minutes. Both groups of respondents will get the same question. Pre- and post-test will be carried out twice in order to assess the dependent variable: reading skills before and after the independent variable: the application of assistive technology: TTSReader is manipulated. With this instrument, the researchers were able to find out and compare the data between both groups and then determine whether the application of assistive technology: TTSReader can impacted on reading skills in English.

3.2. Observation

The researchers will guide the teachers of PPKI SK Sungai Tayai to observe by using the assessment: running record while the respondents take the test with or without the application of TTSReader assistive technology. These teachers of PPKI SK Sungai Tayai will be directly involved throughout the interpretation in the classroom, and they will send the observations result to the researchers.

3.3. Interview

Face-to-face interviews are used in this study to identify the level of adoption of assistive technology applications: TTSReader in mastering reading skills. At the initial stage, the researcher selects a questionnaire instrument to collect respondents' views on the level of adoption of assistive technology: TTSReader. However, the problem of fewer respondents caused the researchers to convert the instrument to an interview. Interviews with open questions are very challenging and likely to be unsuccessful because the respondents are the students with learning difficulties, and they often have trouble to present their own views in detail and accurately. Therefore, structured interview in the form of a closed question were used in this study and it was compiled in detail before it was conducted. Interviews with every respondent will be conducted separately by the researchers after the post-test. The questions are related to their view of the perception of usefulness and perception of ease of use in assistive technology: TTSReader. Only 12 questions will be questioned in each interview. Therefore, all feedback of the respondent will be recorded to enable the analysis work. With this, researchers can get a widespread picture of the level of adoption of assistive technology in reading skills after two months.

3.4. Instrument: Running Record

One of the instruments used in this study is the observation which the PPKI teacher will interpret the pupils with an observation form: running record throughout the reading process at school. This interpretation was created by Dr Marie Clay to help teachers to access pupils' behaviour while

reading effectively and quickly. This running record can analyse the development of reading skills in the signalling system such as the existence of errors, self-correction as well as accuracy rate and self-correction rate during the reading process. In each error and self-correction, the researcher will analyse more thoroughly in terms of meaning, structure and visual (visual). Furthermore, accuracy rate analysis is to determine whether the text is easy enough for the reader to master or challenging enough to encourage reading and avoid disappointment or it is too difficult for the reader to master. Not only that, the rate of self-correction is also to measure the ratio of readers who correct his mistakes while reading. For example, 1:3 means that the reader corrects 1 out of every 3 errors. Therefore, if the reader's correction rate is at a ratio of 1:3 or less than this, this indicates that he can monitor the reading process himself and try to read accurately and avoid mistakes.

Next, the interpretation: running record will be demonstrated by the researchers with every PPKI teacher SK Sungai Tayai. The researcher will introduce this interpretation first and show the video which related to the running record. Not only that, the demonstration of the use of running record forms will also be showed before special education teachers observe students with learning difficulties during pre and post-tests. Every observation will only be conducted by PPKI teachers of SK Sungai Tayai while the researchers will act as analysts in this study. Two observation sessions will be conducted before and after pre-testing and post-testing after 4 weeks to 8 weeks of assistive technology application: TTSReader in the classroom for 30 minutes. After the observation, the form will be collected by the researchers and all data will be analysed by the researchers together with the PPKI teacher SK Sungai Tayai. In the results of the observation, the researchers were able to make an overall analysis about the development of reading skills of students with learning difficulties in English. Finally, the results of the analysis will be recorded in order to support the findings of this study.

As we know, the quantitative data obtained through the pre-post-pupil test data can display the level of mastery of reading skills. These data will be processed using the SPSS *(Statistical Package For Social Sciences)* statistical software and the results will be scheduled based on frequency and percentage. On the other hand, observational data and interview data will also be conducted descriptive qualitative analysis to obtain a more comprehensive picture of the efficiency of assistive technology: TTSReader and respondents' achievement in reading skills as well as the level of adoption of assistive technology: TTSReader. Finally, all data collected through pre-post-tests, observations and interviews will be analysed, linked, and parsed to examine the effect of assistive technology in helping students with learning difficulties in improving reading skills in school.

4. FINDINGS

The findings of the study will answer the question of the study, specifically the effect of using assistive technology: TTSReader on the reading skills of students with learning difficulties in English at SK Sungai Tayai, Tatau. Researchers used inference statistics to explain differences in pupil achievement after the use of TTSReader in reading skills with a t-distribution test (*t-test*). In addition, interview analysis and observation: *running records* are also carried out as a support to

link and examine the effect of assistive technology in helping pupils with learning difficulties in improving reading skills in school.

4.1. COMPARATIVE ANALYSIS OF POST TEST RESULTS BETWEEN CONTROL GROUP AND TREATMENT GROUP

Tables 1 and 2 showed differences in post-tests between treatment groups and control groups. The statistic results of the t-test showed significant differences (t=-3.421, P(0.011 < 0.05). Researchers managed to reject the nul hypothesis. Post-test results have shown that the use of assistive technology: TTSReader can influence the improvement of reading proficiency levels in English. Not only that, the difference in mean score values for these two groups of pupils in table 2 is large enough to reject the nul hypothesis. In addition, the observational results: running records filled by PPKI teachers SK Sungai Tayai can also show that the use of assistive technology: TTSReader can have a significant impact on reading skills for the treatment group.

Table 1: Comparison of pre- and post-test results between control groups with treatment groups

Respondents	Control Groups		Treatment Groups	
	Pre-Test	**Post Test**	**Pre-Test**	**Post Test**
R1	74%	74%	78%	89%
R2	66%	76%	66%	88%
R3	72%	64%	76%	84%
R4	66%	75%	68%	92%
Sums	278	289	288	353
Mean Score	69.50	72	72.25	88.25

Table 2: Standard-t comparison of mean score (post-test) after application of TTSReader between control group and treatment group

N	Control Groups		Treatment Group		Vary Min	T value	Value Significant
	Min	Deviation Standard	Min	Deviation Standard			
8	72	5.888	88.25	3.304	16.25	-3.421	.011

Significant level p<0.05

4.2. Analysis Of Interview Data Of The Perception Of Usefulness

In analysing the level of adoption of assistive technology: TTSReader, the researchers interviewed with the treatment group after the post-test was implemented. The structured interview will be

conducted separately by the researcher and the questions asked are related to the respondents' views on the perception of usefulness and perception of ease of use of assistive technology: TTSReader. Only 12 questions for the perception of usefulness and perception of convenience will be questioned in each interview. Analysis of interview data has shown that the perception of usefulness of the survey respondents is very high. Through the 6 questions of the perception of usefulness presented to all four respondents of the study, this study was able to show that all respondents of the study strongly believe in using this assistive technology. This is because the respondents believe that the use of TTSReader can provide useful benefits such as helping them to improve their reading skills.

4.3. Analysis Of Interview Data Of The Perception Part Of Ease Of Use

Analysis of interview data has shown that the perception of ease of use of respondents is quite high. Through the 6 questions of the perception of ease of use presented to all four respondents of the study, this study was able to show that 75% of the respondents of the study which R1, R2 and R4 strongly believe in the use of TTSReader are easy to do while 25% of the respondents to the study which R3 thinks that TTSReader is quite challenging. This is due to the difficulties in accessing and using technology, the lack of devices and the difficulty of mastering TTSReader perfectly.

4.4. Comparative Analysis Of Errors And Self-Correction Between Control Groups And Treatment Groups

Through table 3 and table 4, it was clear that there was a significant improvement in respondents in the treatment group compared to the respondents in the control group. This is because the number of errors and self-correction for the treatment group has significantly reduced in post-tests.

Table 3: Comparison of errors and self-correction in pre-test results for control groups and treatment groups

Respondents		Control Groups		Treatment Group	
		Error	Self-correction	Error	Self-correction
	R1	8	4	8	4
	R2	10	9	6	4
	R3	8	3	8	7
	R4	5	9	6	6
Pre-Test					

Table 4: Comparison of errors and self-correction in post-test results for control groups and treatment groups

Respondents		Control Groups		Treatment Group	
		Error	Self-correction	Error	Self-correction
	R1	5	3	2	2
	R2	8	6	3	3
	R3	8	2	3	3
	R4	6	4	1	2
Post Test					

4.5. Comparative Analysis of Error and Self-Correction Aspects Between the Control Group and The Treatment Group

Through table 5 and table 6, there was a significant reduction in the number of error and self-correction aspects of the treatment group in the post-test.

Table 5: Comparison of error and self-correction aspects in pre-test results between control groups and treatment groups

		Control Groups	Treatment Groups
		Pre-Test	Pre-Test
		Error & Self-Correction Aspects	Error & Self-Correction Aspects
	R1	M: 2 Q: 4 V: 6	M: 1 Q: 2 V: 9
	R2	M: 0 Q: 7 V: 12	M: 1 Q: 1 V: 8
RESPONDENTS	R3	M: 0 Q: 4 V: 7	M: 0 Q: 3 V: 10
	R4	M: 1 Q: 5 V: 8	M: 0 Q: 5 V: 7

Table 6: Comparison of error and self-correction aspects in post test results between control group and treatment group

		Control Groups	Treatment Group
		Post Test	Post Test
		Error& Self-Correction Aspects	Error& Self-Correction Aspects
RESPONDENTS	R1	M: 0 Q: 2 V: 6	M: 0 Q: 2 V: 2
	R2	M: 0 Q: 2 V: 12	M: 0 Q: 2 V: 4
	R3	M: 0 Q: 4 V: 6	M: 0 Q: 3 V: 3
	R4	M: 0 Q: 2 V: 8	M: 0 Q: 1 V: 2

4.6. Analysis Of Accuracy Rates and Self-Correction Rates Of The Control Group With The Treatment Group

Table 7 showed the results of a comparative analysis of accuracy rates and self-correction rates after pre-testing of the control group and treatment group. The results of the analysis for both groups showed poor accuracy rates and poor correction rates.

Table 7: Comparison of accuracy rates and self-correction rates in pre-test results for control groups and treatment groups

Respondents		Control Groups		Treatment Groups	
		Accuracy Rate	Self-correction Rate	Accuracy Rate	Self-correction Rate
Pre-Test	R1	86%	1:3	86%	1:3
	R2	82%	1:2	89%	1:3
	R3	86%	1:4	86%	1:2
	R4	91%	1:2	89%	1:2

Figure 1: Comparison of accuracy rate and self-correction rate in pre-test results for control group and treatment group (R1-R4)
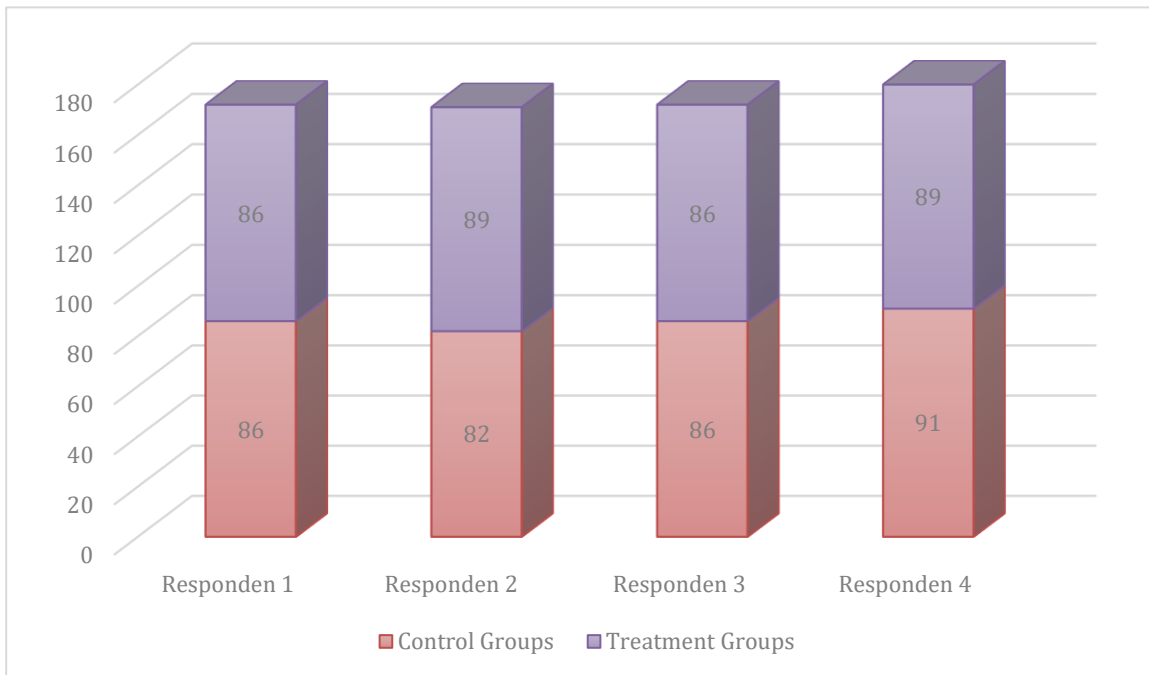

Table 8 showed the results of a comparative analysis of accuracy rates and self-correction rates after post-testing of the control group and treatment group. The results of the analysis for the treatment group showed high accuracy rates and very satisfactory corrective rates after the application of TTSReader.

Table 8: Comparison of accuracy rates and self-correction rates in post-test results for control groups and treatment groups

Respondents		Control Groups		Treatment Groups	
		Accuracy Rate	Self-correction Rate	Accuracy Rate	Self-correction Rate
	R1	91%	1:3	96%	1:2
	R2	86%	1:2	95%	1:2
Post Test	R3	86%	1:5	95%	1:2
	R4	89%	1:3	98%	1:2

Through figures 1 and 2, it is clear that the application of TTSReader has successfully improved the reading skills of the survey respondents during the post-test. This can be evidenced by the increase in accuracy and self-correction rates. All respondents in the treatment group achieved

scores as high as 95% and above and this means that reading tests are easy for all readers. In addition, the rate of self-correction increased significantly because the respondents in the treatment group would correct 1 out of every 2 errors. Therefore, with a ratio of 1:2, the respondents will constantly monitor the reading process themselves and try to read accurately and avoid mistakes.

Figure 2: Comparison of accuracy rate and self-correction rate in post test results for control groups and treatment groups (R1-R4)
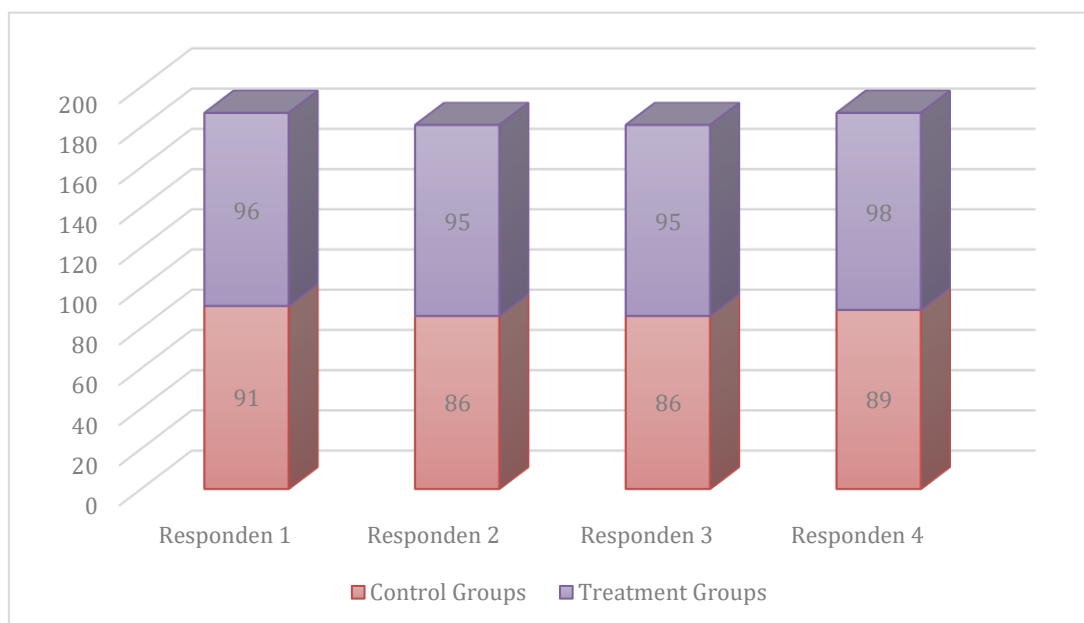
5. DISCUSSION

In this study, experimental studies were applied, the respondents were divided into two groups, which is control and treatment groups in order to compare the level of mastery of reading skills. Typically, the treatment group that received the intervention would show improved results compared to the control group after the post-test. This is evidenced by Syukor et al., (2019) that the teaching and learning of Islamic Education that integrates Health Sciences is more effective than teaching and learning using common methods. In addition, the results of the analysis of the data in this study showed that there was generally a significant difference in the level of mastery of reading skills between the treatment group and the control group. In the study of Adibah Nor Mokles and Abu Bakar Mohd Sheikh, (2021), he also stated that his study found significant differences in the learning behaviour of Preschool pupils for the group of pupils who did not use game-based teaching with groups of pupils who used game-based teaching activities.

Besides that, it is clear that the mean scores for pre-tests in both groups were approximately similar while the mean scores for the post-tests in both groups were significantly different. As in Bin Tangkui study, (2021), he also proved that the treatment group scored a higher mean of post-test achievement compared to the control group. This means that pupils experience improved and more optimal achievement scores when undergoing interventions such as Minecraft in teaching and

learning. In addition, the results of the t-test analysis of the mean score (post-test) after the application of TTSReader between the control group and the treatment group have shown significant differences. With this, data analysis has managed to reject the nul hypothesis. Post-test results have shown that the treatment group that received the intervention managed to establish a significant improvement in reading skills in English subjects. Similarly, with the study of Syukor et al., (2019), he stated that interventions carried out such as the use of Health Science integration modules in the teaching and learning of Islamic Education had influenced the increase in mean scores for the experimental group. Thus, it is clear that the improvement in reading skills between the treatment group and the control group was significantly different and this has proven that the use of TTSReader has helped the study respondents in mastering reading skills more accurately and effectively.

Next, based on interview results from the subjects, the study found that 75% of study subjects were able to fully accept the use of assistive technology: TTSReader in teaching and learning for English. This can be proved by the interview results of the perception part of usefulness. All respondents are confident and believe that the use of this assistive technology can provide useful benefits such as offering alternative options for users to translate text from pdf or web page to voice quickly and easily. This will reduce the complexity and the system will be more user-friendly including students with learning problems. This study is in line with the findings of the Ismail et al., (2021) study which is that the use of appropriate digital tools will enrich teaching and learning methods that also contribute to the impact that encourages students to learn more effectively.

It is undeniable that TTSReader can lead to results or benefits that promote the improvement of reading skills. The use of this assistive technology can bring positive results to users, and this is an important factor that can influence one's attitude and intention to use and ultimately use TTSReader. The findings of the Rahmat & Mohamad Nizar (2021) study also show that technology is more likely to be accepted when it is beneficial to consumers. For example, a well-designed user interface and systematic development of MART materials can help users in effectively understanding learning content. Not only that, this finding is also in line with the findings of F. N. Ismail & Mokhtar (2021) which is that the use of QR codes is very simple and unburdensome and it is more productive in improving the performance of purchase transactions.

In this study, assistive technology: TTSReader is quite simple and easy to understand, learn, use, and master. This can be evidenced by the interview results of the perception part of ease of use. In this regard, the use of assistive technology has given students with learning difficulties the opportunity to experiment with 21st Century learning to master reading skills. As in the study of Mohammad Taufiq Abdul Ghani et al., (2019), he stated that the access of e-campus outside the room provides an opportunity for students to practice self-learning and thus increase soft humour as well as the skills of using digital equipment. Furthermore, in a study of Ibrahim et al., (2019), he also stated that QR mobile payment systems that have easy interaction and payment process via QR that are easy to follow and easy for its users to understand.

In addition, data analysis also shown that the use of TTSReader has greatly helped and facilitated the process of reading in class. In the study of Ismail et al., (2021), he shared that most students show positive learning outcomes and they have shown that e learning can contribute to the

effectiveness of learning English writing. In the meantime, these findings also coincide with the findings of the Zulkurnain et al., (2021) study, which says that simple technology can influence students' interest in learning. The use of flexible and convenient technology will influence the tendency of consumer behaviour in using a technology. Therefore, user friendly apps such as TTSReader will directly influence the attitude of the user and the tendency of the behavior to use the technology in mastering reading skills in the classroom.

In this regard, the discussion of the findings of observational: running records has shown that the use of assistive technology is effective for the treatment group in improving reading skills as well as reducing errors and self-correction during the reading process. Aliyah (2022) stated that the use of scan cards has provided an opportunity for students to read repeatedly so that it will affect short-term memory and thus become a long-term memory. Thus, the selection of suitable learning methods can indeed encourage students to learn comfortably and unencumbered as well as master reading skills effectively. In addition, this study is very similar to Asis & Ilyas (2023) which states that the use of flipchart media can provide improvements to reading ability in early childhood. In this context, Affendi & Majid (2022) also stated that the 'JeWo' intervention has helped pupils who are poor in reading skills change significantly. They are getting more fun and interested in learning because they can read more words. Thus, teaching and learning that apply interventions or strategies is more effective than traditional teaching and learning. Ja'afar et al (2021) stated that after 12 weeks of implementation of the CARR intervention, the accuracy of pupil readings has improved significantly. This has shown that with the intervention, pupils are able to read texts of various levels independently and it has shown that the implementation of interventions in teaching and learning is very effective. This is also evidenced by the results by observation: running records which presented that the control group showed no progress after 8 weeks while the treatment group showed progress in prominent reading skills.

In addition, we were also able to observe differences in the development of reading skills for the control group and treatment group. Significant differences could be detected in post-trials where error reduction and self-correction for the treatment group decreased significantly compared to the control group. This is because the treatment group has been applying assistive technology: TTSReader for 8 weeks, The findings of this study are in line with the Rosyati Manaf & Kamariah Abu Bakar (2022) study, which stated that the use of teaching aids is very important as it can attract them to interest in the lessons taught. This has proven that teachers need to explore the appropriate aids or assistive technologies so that the learning atmosphere is more cheerful and attractive, so that the students can also improve their reading skills. Not only that, this study coincides with the study of Sukarwati et al. (2023) where he stated that there was an improvement through observation: running records after the treatment was carried out and the students were able to find the main ideas contained in the text reading material as well as being able to develop their understanding in answering questions related to the supporting ideas that are in the text. Finally, this study is also in line with the Hamzah & Mahamod (2021) study, where he said that the most common strategy practiced throughout online PdP on reading skills is a material-centered strategy. This strategy involves materials in the form of technology online or offline so it is more interesting, effective and can be implemented without the presence of teachers in their homes.

As we know that the application of TTSReader has assisted respondents in improving reading skills while in class. Through the study data, there was a significant difference in the results of comparison of accuracy rates and self-correction rates between the control group and the treatment group. The treatment group has shown outstanding achievements and developments after post-testing, and this has proven that the application of assistive technology: TTSReader in teaching and learning is very successful. The findings of this study are in line with the statement by Vijayaletchumy Subramaniam & Kavenia Kunasegran (2022) that students who practice reading skills strategies will achieve high achievement compared to students who practice less reading skills strategies. This is because as in this study, the group of students who use assistive technology will enjoy the process of reading, mastering reading skills by increasing the accuracy rate and correction rate during the reading process. Therefore, teachers are responsible to assist every pupil overcoming all problems in teaching and learning with the necessary steps or efforts. As in Rani's statement (2021), he also discussed that educators should take appropriate approaches or strategies towards language learning to ensure that all students are able to develop the ability to use language more effectively in the real world.

6. CONCLUSION

This study examined the effects of the application of assistive technology in improving the English reading skills of students with learning problems in SK Sungai Tayai, Tatau. The results of the study have shown that the application of assistive technology can have an impact on improving reading skills. As we know, in education, the use of assistive technology to improve the reading skills of students with learning difficulties marks a transformative step towards inclusiveness and self-learning. By recognising the diverse needs of pupils, educators need to innovate by using technology to address specific challenges that hinder the development of reading. In conclusion, collaboration between educators, researchers and technology developers is essential for the continuous improvement and development of assistive technologies in the field of reading teaching. With continuous efforts in exploring new technologies and aligning them with the latest pedagogy, we can ensure that they can evolve in tandem with the dynamic educational landscape. Through this collaborative effort, we can further unravel barriers to learning, promote a more inclusive and equitable educational environment that recognizes and celebrates the diverse strengths of each pupil. Last but not least, the integration of assistive technology in the process of teaching students learning problems is not just a technological innovation but it is a deep commitment to foster a future where every pupil regardless of their abilities so that they can thrive in the world of literacy.

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