

# Multisensory Therapy in Letter Reversal of Dyslexic Pupils

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**Abstract** This research is conducted to examine the problem of letters reversal among dyslexic pupils. The purpose of this study is to describe the multisensory therapy to solve the problem. The study sample consisted of ten dyslexic pupils from Malaysia Dyslexia Association at Ampang, Kuala Lumpur who have serious letters reversal problems. In this study, the researcher limited the problem to reversal of letters of similar shape, namely /b/, /d/, /p/, /q/, /m/, /w/, /n/ and /u/ based on Levinson's Dyslexia Theory Syndrome (1994). In addition, a multisensory approach is used to solve the problem. This research uses observation, interviews and questionnaires methods. The research tools used are questionnaires and field notes. The results show that all the subjects in this study had the letter reversal problem of the eight letters, but the types of the letters that were reversed are different depending on the individuals. To solve this problem, the researchers developed ten therapies using multisensory approach and found that all of the therapies were able to solve the problem of letters reversal among the subjects. Through this research, teachers and parents can know the type of letters reversal among dyslexic pupils. This study also helps educators and parents plan appropriate and effective activities in solving the problem of the letters reversal that faced by their pupils and their children.

**Keywords** Dyslexia, Letters Reversal, Letters of Similar Shape, Therapy, Multisensory

## 1. Introduction

According to International Dyslexia Association, dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge.

Globally, Dyslexia International (2017) suggests that between 5-10% of the population experience dyslexia, which equates to around 700 million people worldwide.

Berita Harian (2012) reported that approximately 45,000 or 50 percent of over 90,000 children in Malaysia that suffers from learning problems since ages 5 to 6 are caused by dyslexia. The statistics received by the *Persatuan Disleksia Malaysia* from the Ministry of Education found that the ratio of children whom potentially have dyslexic reading problems is 5:100 and this is very worrying. When a dyslexic student reads, the eyes fixate and detect the letters. Dyslexic students' eyes are not able to scan the different letters, words, and sentences (Vijayaletchumy Subramaniam, 2008). Due to this, their command of the vocabulary becomes limited and this situation leads to other reading problems (Wan Muna Ruzanna Wan Mohammad, 2013). Other than that,

according to consultant developmental paediatrician Dr Raja Juanita Raja Lope, there are still some children under the age of five whom are still not able to read and spell words with easy syllables. In fact, parents are still under the impression that this is normal. Instead, their children might be facing a specific learning difficulties or disruption called dyslexia dan for children who suffer from dyslexia will normally face difficulties in reading (Berita Harian, 2017). According to Soeisiwati Lidwina (2012), the ability to read for normal children can be seen from ages 6 to 7. However for dyslexic children, they are not able to show their reading capabilities as early as stated. In fact, in their adulthood, they will still face difficulties in reading. Dyslexics face difficulties in learning due to their struggles in doing reading and writing-based activities. This interference is not a physical disability such as blindness, but is due to a brain disorder that changes and processes information that is being read.

According to Vijayaletchumy and Wan Muna Ruzanna (2012), dyslexia from a reading aspect does exist, however a number of educators are not aware of this matter due to a lack of knowledge regarding dyslexia. Due to this, a dyslexic student is put in a normal class and is forced to compete with a student who is typical in all learnings that are language-based. As a consequence, the dyslexic student receives a lower mark than their normal counterpart and will be therefore be deemed as 'slow'. According to Levinson (1994), there are seven types of wrong reading mechanism amongst dyslexic students which are dropping, moving, insertion, replacement, reversal, condensing, and estimation. However, the most obvious problem done by a dyslexic student when reading is reversal (Sairah Amirin, 2000). The reversal problem happens when dyslexic children reads reversely. Reversal can be split into two types, namely letter reversal or word reversal. Letter reversal normally happens when a dyslexic child sights a letter that have similar shapes, such as /b/, /d/, /p/, /q/, /m/, /w/, /n/, or /u/. Word reversal on the other hand happens when the dyslexic child reads a syllable in reverse, for example when /nasi/ becomes /sina/ or /batu/ becomes /tuba/. However, in this research, the researchers limits it to the problem to letter reversal only. This is because in order to master reading, a student must first recognise the letters. Therefore, the researchers produced an intervention to solve the letter reversal problem among dyslexic students, which are ten therapies based on the multisensory approach that involves using the various senses in the children, known as VAKT, which are visual, audio, kinesthetic, and tactile. According to International Dyslexia Association, multisensory teaching is one important aspect of instruction for dyslexic students that is used by clinically trained teachers. Multisensory learning is to enhance memory and learning of written language. Links are consistently made between the visual (language we see), auditory (language we hear), and kinesthetic-tactile (language symbols we feel) pathways in learning to read

and spell.

## 2. Problem Statement

The most obvious problem seen with dyslexic students when they read is that they often reverse some letters in the words (Sariah Amirin, 2000). Letter reversal happens when dyslexic children are not able to differentiate letters that have a similar shape. Generally, the examples of mistakes made are when the letter /b/ turns into the letter /d/, letter /p/ turns into the letter /q/, /m/ turns into /w/, and /n/ into /u/. Besides that, when observing reversal of the word, dyslexic children will reverse the position of the syllable that is contained in a word. For example, the word 'tisu' becomes 'situ', 'buka' becomes 'kabu', and 'buta' turns into 'tuba'. There is less reseach on the dyslexic childrens' reading problems that focuses on letter reversal, as was the research conducted by Sumiyati Abdul Halim Jikem (2009) about the learning problems faced by students with regards to reversed numbers and letters. Although the research focuses on the problem of the reversed letters and numers, however the student involved did not show any characteristic of a child at risk of dyslexia, and in fact only showed characteristics of being a student who is a weak learner. Research conducted by Zaliza Zubir, Mahfuzah Md Daud and Ahmad Hifzurrahman (2014) studied dyslexia from the aspect of spelling Bahasa Melayu readings. However this research did not focus on the problem of reversed letters in detail, in fact the research scope was wide. The research focuses on all the seven mistakes a dyslexic child could possibly make, in terms of dropping, insertion, reversal, reversal, condensing, moving, replacement, and estimation. As the research on the problems of letter reversal by a dyslexic student was not the main focus, it therefore created a gap that allowed researchers to conduct furthur studies.

Teachers and parents oftentimes face difficulties in finding a solution for dyslexic children's reading. This is because they lack knowledge and references on the appropriate learning methods for dyslexic children. In a study conducted by Sri Utami Soraya Dewi (2015), she used multisensorial methods to solve the dyslexic children's reading problems. The outcome of the research shows an increase in the capabilities of the dyslexic child in recognising syllables. Just as how research by Ann Lee Sien Sut (2016) that implements MyBACA programme, which is a reading programme that applies multisensory techniques for the purpose of rehabilitating dyslexic children for their problems of confusion between letter and sound. By using this method, the results shows positive impact. Past studies conducted has proven that a multisensory approach gives a positive impact in a majority of learning problems faced by a dyslexic student. However, these studies did not focus on the problem of letter reversal. This produced a gap for researchers to produce ten

therapies by using multisensory approach to solve the reversed letter problems within dyslexic students.

### 2.1. Research Objectives

To elaborate multisensory therapy to solve the problem of reversed letters faced by dyslexic students.

## 3. Literature Reviews

Research by Rajesvari Ramasamy (2008) was conducted to measure the level of which dyslexia problems influenced a rehabilitation student's achievement in studies as well as their behaviour in primary schools in general as well as to identify the challenges faced by rehabilitation education teachers as well as steps that can be taken to help rehabilitation students who face dyslexia. Respondents comprised of 120 rehabilitation students and 25 special education teachers from ten different schools in Penang. In the quantitative data collection, the research instrument was shaped based on Dyslexic Checklist Instrument. Research conducted showed that there are some dyslexic problems amongst the rehabilitation students involved. This research gave exposure to teachers and parents to gain deeper knowledge with regards to the learning difficulties faced by dyslexic children. Other than that, the study may also be a resource for special needs educators in recognising as well as understanding problems that arise with dyslexia. Meanwhile, a similar study as conducted by Rajesvari Ramasamy (2008) was also done by Sumiyati Abdul Halim Jikem (2009) to identify learning difficulties faced by dyslexic students.

Sumiyati Abdul Halim Jikem (2009) conducted a study on a student who was having problems in mastering writing specific numbers and letters, whereby it was written inversely. To overcome this obstacle, six approaches were used which were deductive approach, learn-through-play approach, practice approach, repetition while teaching approach, air writing approach, and tracing in an order approach. The findings of this study saw that the subject of the research showed positive changes. The subject no longer wrote numbers and letters inversely, and the most obvious change that occurred to the subject was in terms of work. This showed that guiding individuals by using the six techniques above may solve the problems of reversed numbers and letters. Research by Sumiyati Abdul Halim Jikem (2009) is referenced by researchers to shape other approaches in helping solve the reversal problem that happens among dyslexic children.

Zaliza Zubir, Mahfuzah Md Daud and Ahmad Hifzurrahman (2014) conducted a research to identify the backgrounds of dyslexic children and to analyze incorrect spelling through *Ujian Diagnostik Bahasa Melayu* as well as to connect the error based on Levinson's Theory (1994). The focus of this research is on the learning of language by

analyzing incorrect spelling that only involved auditory and visually dyslexic students. The outcome of the reading diagnostic test that was run found that the subjects in the study displayed dyslexic characteristics. The study's findings from four subjects found that they have dyslexia. The subject of the study made errors in reading letters just as the errors mentioned in Levinson's Theory (1994). Among them are letter reversal, letter addition, letter insertion, letter exchange, letter condensing, letter transfer, and letter dropping. A shortfall of this study was that the researchers did not propose a technique or solution to the dyslexic problems mentioned. The study also allowed a gap for researchers to study in greater detail towards one of the problems that is stated in Levinson's Theory (1994) and subsequently plan a solution method to overcome the problem. Research conducted by Zaliza Zubir, Mahfuzah Md Daud and Ahmad Hifzurrahman (2014) differs from a research done by Treiman, Gordon, Boada, Peterson and Penington (2014) who studied the learning difficulties that focused on the issue of letter reversal.

Treiman, Gordon, Boada, Peterson and Penington (2014) studied this fault in letter reversal that renders them unable to read. In the study, the letter writing of children ages five to six were examined to identify if there was a reversal mistake. Approximately 130 children were chosen as a sample and 92 of them had difficulties in sounding the letters. This became a factor that caused them to face problems reading. Other than that, the research found that the research sample tended to make letter reversal to the left rather than the right. Just as Zaliza Zubir, Mahfuzah Md Daud and Ahmad Hifzurrahman (2014), the study also did not offer solutions to solve the letter reversal problem in children. This shortfall gave researchers a chance to implement intervention in solving the letter reversal problem among dyslexic students.

In overcoming the learning difficulties amongst dyslexic students, appropriate and effective techniques and methods should be practiced in the teaching process. In a study by Sri Utami Soraya Dewi (2015), she was of the opinion that a child's capability to recognise letters and words while reading is influenced by the teaching method used by the teacher. When the students are being taught using the technique or method that is suited to their own learning style, they are able to learn faster and are able to defend and apply the concepts much easier for their further studies. In this study, intervention by using several multisensory methods was classically taught to dyslexic students over seven sessions, each session lasting 60 minutes. The findings of this research showed that there was an increase in the subject's ability in recognising words, no matter how insignificant. Even though the increase was only slight, the study showed a positive outcome. To acquire a more significant result, the researcher should not fix a specific time duration. This is as every dyslexic student's ability to acquire a concept needs a longer timeline. Research done by Sri Utami Soraya Dewi (2015) had similarities to

research conducted by Ann Lee Sien Sut (2016).

In Ann Lee Sien Sut's (2016) study, a programme named *MyBACA* was conducted. *MyBACA* is a reading programme that implements multisensory techniques that focuses on the decoding process and was built to aid rehabilitation in dyslexic children. The outcome of the study showed that there was an increase in decoding skills, a fluency in reading, as well as motivated learning among the participants. Results from this research also found that there is a pronounced problem in sound-letter among children with dyslexia. Implementation of this multisensory technique in the *MyBACA* programme with dyslexic children showed improvement. It is known that the multisensory method is an appropriate method in solving learning difficulties in dyslexic children. This paper work benefits researchers in forming new intervention techniques based on multisensory methods as therapy in solving issues concerning dyslexic students. The effectiveness in using multisensory methods in research done by Ann Lee Sien Sut (2016) was corroborated by Nur Syuhada Mohd Abdul Wahab and Faridah Yunus (2017).

Research by Nur Syuhada Mohd Abdul Wahab and Faridah Yunus (2017) aimed to dive into the meaning of multisensory technique in teaching and learning letter literacy among children in pre-school education. According to Nur Syuhada Mohd Abdul Wahab and Faridah Yunus (2017) in their research, implementation of multisensory techniques is recommended as an alternative in teaching and learning children's literacy. This is as multisensory techniques that are implemented are capable in stimulating their senses and makes the teaching and learning process more enjoyable. However, in this research, the researchers only explain the meaning of multisensory techniques and recommend the usage of the method in teaching and learning in general. This explanation without testing the methods on subjects does not enhance credibility of the results. The researchers should implement multisensory methods in teaching to see its effectiveness in solving learning difficulties in students.

Research on the usage of multisensory methods as studied by Nur Syuhada Mohd Abdul Wahab and Faridah Yunus (2017) was also conducted by Noor Syamilah Md Maliki and Mohd Hanafi Mohd Yasin (2017). The objective of this research was to identify level of letter recognition skills after using multisensory methods in special needs education. This research used a quasi-experiment approach and research methods included pre and post testing adapted from research done by Clay (2005). Six students who are afflicted with learning disabilities were chosen as samples and were then divided into two groups, which were group A (treatment) that used the multisensory learning methods while group B (control) used traditional learning methods in class. The findings of this research showed a rise in value in the post test for the treated group as compared with the control group. This shows that the multisensory method is effective and is

appropriate to be used with teaching special needs children with learning disabilities. Research by Noor Syamilah Md Maliki and Mohd Hanafi Mohd Yasin (2017) showed similarity with a study conducted by Majeda Al Sayyed Obaid (2013) where a multisensory approach was used with pre and post testing that was comprised of treated and control groups.

Majeda Al Sayyed Obaid (2013) conducted a study to identify the impact of using multisensory approach towards students whom have learning difficulties. Research sample was of 117 Standard 6 students following a Mathematics class. The research sample was then divided into treatment group which were taught with multisensory methods, and a control group that did not utilize any multisensory approach in their lessons. To achieve the research objective, pre and post testing was built to measure the students' achievement in the Mathematic subject. The findings of this research showed significant statistical differences between the treatment group and the control group, and the results sided with the treatment group. This findings showed that using a multisensory approach in teaching special needs children to be very appropriate and effective.

However, the research by Majeda Al Sayeed Obaid (2013) differed in opinion from Sharifah Nawirdah Syed Hassan (2016). She views that using traditional methods such as multisensory methods are not able to completely solve learning problems faced by dyslexic children. According to her, multisensory methods are not able to explain certain symptoms that can classify a child as dyslexic. She put forward a learning technique using the Davis Dyslexia Correction Programme for dyslexic children. The findings of the research showed that Davis Dyslexia Correction Programme gave a positive impact in forming reading and spelling skills in children afflicted with dyslexia. This is due to the fact that the focus is given towards an individual's strength in helping them to improve their skills. In a statement by the researcher saying that the multisensory method is not able to fully solve the problems faced by dyslexic children is not fully convincing. This is as her opinion is not supported by any other sides or other researchers. The researcher should use both methods, which are the multisensory approach and Davis Dyslexia Correction Programme in testing the reading and spelling skills in dyslexic children. The findings from both methods will then be compared and the valued based on which method gives the most obvious positive effect.

## 4. Methodology

This study is conducted at a dyslexic centre which is *Persatuan Dyslexia Malaysia* (Dyslexia Association of Malaysia) in Ampang, Kuala Lumpur. The choosing of this particular location is because this dyslexia centre is the headquarter and is the main branch for all dyslexia centres

all across Malaysia. Other than that, the students here have been diagnosed through diagnostic testing and subsequently classed according to their dyslexia level, which are beginner, intermediate, and advance. In this study, the researchers chose ten students whom are beginner dyslexics as the research subjects. This is as their letter reversal problem is at a serious level. Next, the methodology used for this study was observation, interviews, and questionnaires. The observation is divided into two, which are participant observation and non-participant observation. In this research, the researchers used participant observation, whereby the researchers are involved as one of the members of the group that needs to be observed and at the same time makes the observation. The role of the researchers as an observer towards behavioural changes in the subjects and the ways they interact with each other in class whether from a distance or close up. This method is used when the researchers executes the therapy process by using the multisensory method that was specially designed for the research subjects to overcome the letter reversal problem. As for the interview methodology, the researchers will use unstructured interviews, whereby it will not have a specific script and questions are formed spontaneously. Interviews will be done on two teachers who teach the research subjects at the dyslexia centre. The interview method is done to get additional ideas as well as opinions from the teachers with regards to the therapy that was formed. The researchers uses an open detail questionnaire for open-ended answers in order to obtain feedback and opinions of the ten multisensory therapies produced. The questionnaire is given to the two teachers involved. In this study, the researchers chose Puan Sariah Amirin, president of *Persatuan Disleksia Malaysia* as an expert consultant. She was chosen as she has expertise in the field of dyslexia and has extensive experience in solving learning difficulties in dyslexic children. Puan Sariah Amirin has checked the questionnaire to ensure the listed questions and points in the questionnaire is accurate to the researchers' objectives and is appropriate with the respondents whom are the dyslexia teachers. Other than that, the data recorded in the researchers' filed notes have also been verified by her.

10 study samples were divided into two different groups, of which only 5 study samples in one teaching session, while another 5 people will carry out activities in another teaching session. The purpose of reducing the number of samples in each session is so that they can pay full attention to each activity carried out. This is because dyslexic children easily lose focus if the number of students in a class is too large. In the process of doing activities with the study sample, the researcher allocated two hours to do one therapy in one day. In addition, in one day the researcher also carried out two teaching sessions, namely in the morning and evening because the study sample has two groups. Therefore, the researcher allocated a period of 10

days to complete 10 therapies as in one day the researcher only did one therapy. Researchers continued to perform the activities repeatedly for 5 months until the study sample showed encouraging results.

## 5. Findings

### 5.1. Multisensory Therapy to Solve Letter Reversal Problem among Dyslexic Students

Multisensory therapy is a therapy that was created by the researchers to solve the problem of letter reversal among the research subjects. The researchers produced ten types of therapy that involves the usage of the four main senses in children, namely visual, audio, kinesthetic and tactile. Lessons using the multisensory methods were able to stimulate the senses in the children and indirectly help their brains to understand and interpret the lessons learned into something more concrete (Nur Syuhada Mohamad Abdul Wahab and Faridah Yunus, 2016). The following are the ten multisensory therapies:

#### Activity 1: Recognizing Sound

According to the expert consultant, before introducing a dyslexic child to a letter they should first be exposed to the sounds in their environment. This is to reinforce their sense of sound to train them to better focus on a specific sound. Zulikha Jamaludin (2017) also stated that a teacher should encourage the student to identify the sounds that are present around them.



Figure 1. Activity 1 (Recognizing Sound)

This activity helps to sharpen the dyslexic child's sense of hearing and trains them to better focus on the audio played. Besides stimulating their auditory perception, these activities are able to also stimulate their sense of sight while they are looking for the correct picture to be circled, and may also stimulate their kinesthetic senses when they move their hand while gripping the pencil. In this activity the dyslexic student is given a random picture (image) of an object or animal on a piece of paper. The teacher will play audio sounds at random. The dyslexic student will identify and guess the name of the object or animal based on the sound played. The choosing of the sounds must be

sounds that they are familiar with, such as the sound of a cat, dog, bells, telephone ringing, cars, thunder, rain, and so forth. According to the expert consultant, a dyslexic student is able to differentiate the different siren sounds between a police car, firetruck, and ambulance sirens without having to refer to an image. They are able to do so as they have a high intelligence quotient (IQ). After, they will need to circle the correct image on the paper given based on the sounds that were heard.

**Activity 2: Object Identification**

Before introducing a dyslexic child to the shape of a letter, they should first be exposed to the shapes in their environment. This will help sharpen their visual perception by training them to be more focused on seeing and recognizing the shape of an object. Expert consultant states that visual reinforcement functions to sharpen dyslexic children’s eyesight and stimulate their mind by identifying and recognizing the objects they see.



**Figure 2.** Activity 2 (Object Identification)

This activity will help the dyslexic child to focus on the questions given and this may help stimulate their auditory perception. Other than that, this activity also trains them to focus on scrutinizing the object in the image in detail. When they begin to observe and identify the objects in the images, a visual reinforcement happens. Other than stimulating their sense of hearing and sight, this activity also helps increase cognitive skills and basic skills for the dyslexic child such as counting, colours, and direction depending on the questions given. In this activity, objects are displayed through images in the shape of space, environment, scenery, or solitary objects. The images shown to the dyslexic child should be familiar to the child. The teacher will then question the dyslexic child with various questions pertaining to the image.

**Activity 3: Letter Sound Listening**

Before teaching a dyslexic child writing, introduction to the latter by the letter name, letter sound, and letter shape has to be done first. The method the teacher introduces a letter to a dyslexic child is very important. A creative technique or method is able to stimulate their thinking for the student to easily recognize and remember the name as well as the shape of the letter.

Contoh-contoh video mengajar memburrayakan huruf secara fonik di Youtube:



**Figure 3.** Activity 3 (Letter Sound Listening)

Dyslexic students should be involved in active learning (Green, 2007). They prefer to learn through having fun. According to Naimah Yusoff (2005), children should be taught with exciting methods, according to their suitability and interest at the base level of their learning and not through force. An example of a fun activity is singing. This activity is also able to stimulate sense of sight in the student while observing the picture and the sense of hearing can be reinforced while hearing the sound of the letter. Dyslexic students have short-term memory, therefore the activities should be repeated from time to time so that they will not forget their lesson. In this activity, videos of singing the letters phonetically can be played for the sake of learning. A creative teaching method may help a dyslexic child avoid feeling disinterested too quickly. The contents of the video can be accompanied by interesting pictorial illustrations to further attract the attention of the dyslexic student in paying attention to the activity.

**Activity 4: Identifying Letter Shape through Symbols/Emblems**

In the fourth therapy, the researchers created an activity to identify letter shapes through symbols/emblems that are familiar to most children. Dyslexic students are able to learn a concept by using a different learning method than typical students (Zulikha Jamaludin, 2017).



Figure 4. Activity 4 (Identifying Letter Shape through Symbols/Emblems)

The expert consultant states that letters that are reversed are different according to each individual based on how exposed each dyslexic student has been with each letter. This does not imply that they are exposed to this in only their learning process in class, as they may also be exposed to it in an environment outside the classroom in their everyday activities at home. In this technique, the researchers created a way to identify letters through symbols or logos that are familiar to a dyslexic child. For example, when parents often bring their children out to fast food restaurants such as McDonald's, surely the dyslexic child will be exposed to the McDonald's symbol which is the letter 'm'. When they often see the letter 'm', then there will be a reinforcement of the letter 'm' and they will find it not as difficult to face the letter reversal problem for this particular letter. Symbols or emblems may come from signboards seen on the roads, places that are frequented such as playgrounds or restaurant names, as well as symbols from the headlines from their favourite television shows.

**Activity 5: Identifying Letters Through Objects**

Every student has their own learning style and this determines their learning strategies (Roshidah Hassan, 2017). Therefore, teachers may also choose appropriate activities so that their students may actively involve themselves in their learning (Redi & Green, 2007). A multitude of interesting activities has the ability to stimulate the creativity in a dyslexic student as well as balance their thoughts and focus while performing the activity. Other than introducing letter shapes through

symbols or emblems, a dyslexic student may also receive letter introduction exposure through objects.

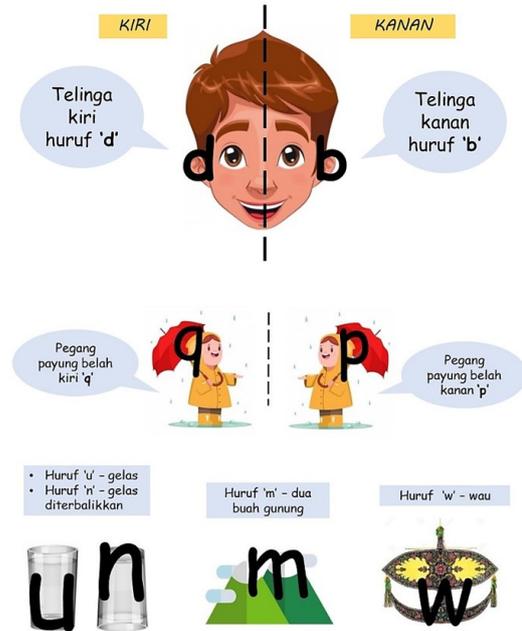


Figure 5. Activity 5 (Identifying Letters Through Objects)

This activity also helps the dyslexic student to enhance their directional skills that have mirror image such as left to right, right to left, down to up, or up to down. The selection of the objects is based on two criteria, the first being the chosen object should have a similar shape to the reversed letters, while the second criteria is that the object must have been previously seen by the dyslexic student. This activity also allows the sense of sight to be stimulated in the dyslexic student when they observe the shape of the letter through the object.

**Activity 6: Writing on Wrist**

The sense of touch in dyslexic students is a sense that needs to be stimulated so that they may respond accordingly to the stimulus given.

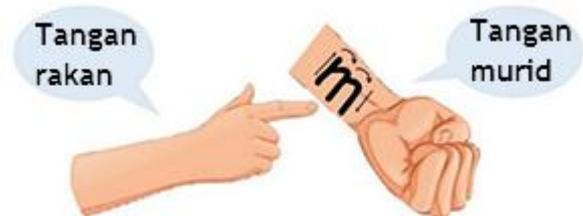


Figure 6. Activity 6 (Writing on Wrist)

This activity helps sharpen the dyslexic student's higher level thinking skills. This activity requires pairing whereby

a friend will be similarly involved. A student will close their eyes while simultaneously holding out their hand. The partner will sight the letter that is shown by the teacher without saying it out loud or sounding the letter. The partner will then write or trace the letter that is sighted onto the student's wrist using their finger. Through the sense of touch felt on the wrist, the student will then attempt to guess and name the letter that was traced. This activity can be done in turns with each partner.

**Activity 7: Writing on a Rough Surface**



Figure 7. Activity 7 (Writing on a Rough Surface)

This activity will help to stimulate the dyslexic student's mind to think and imagine the shape of the letter in their brain and transfer it to through writing on the rough surface. Exposure to various tactile textures enables their brains to learn how to adapt and adjust to the different types of textures in their environment, whether it may be soft, rough, smooth, or coarse. This activity requires the dyslexic student to write on a surface that has a rough texture, such as the floor, tracing paper or sandpaper, dan on sand. The teacher will say the name of the letter without showing the shape of the letter and ask the student to trace the letter on the surface provided.

**Activity 8: Question and Answer**



Figure 8. Activity 8 (Question and Answer)

This activity will help the dyslexic student to be give more attention towards the questions given and helps to train them to focus on identifying the position of the letter in the image thoroughly. The visual and auditory

perception of a dyslexic student can be fortified through this activity when they identify the letters in the pictures and sound it out. Other than that, this activity may also help increase their high level thinking skills for sense of direction. In this activity, the dyslexic student is given an image and in the image there are reversed letters that are arranged at random. The teacher will ask the the dyslexic student various questions regarding the letter in the image.

**Activity 9: Finding the Difference Between Two Pictures**



Figure 9. Activity 9 (Finding the Difference Between Two Pictures)

This activity helps dyslexic students improve their memory skills. In this activity, the dyslexic student will be given two identical images with the same scenery, environment, or space. The first picture will contain reversed letters that have been randomly places while the second picture does not contain the reversed letters. The first image that contains the reversed letters will be displayed in front of the student as their reference. The student will then scrutinize the picture carefully and attempt to recognize the placement of the letter in the picture so that they may identify the placement of the letters. Then, the first image is removed from their sight. Next, the dyslexic student will be given reversed letter stickers and will be asked to correctly paste the letters in the second image based on the first image.

### Activity 10: Rewards System

Dyslexic students are not interested in formal learning environments as they might lose attention and focus faster. Therefore, pull the attention of a dyslexic student to learn while playing by using activities that are more fun such as playing games.

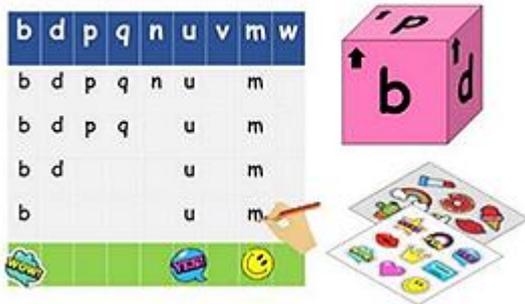


Figure 10. Activity 10 (Rewards System)

In this activity, the dyslexic student is able to build high level thinking skills by arranging a strategy while playing and may also help improve gross motor skills by moving their body parts while playing. The dyslexic student is given a piece of paper in the shape of a square as space for them to write letters. Prepare a dice where on each side of the dice there are reversed letters. Every side should have arrows pointing upwards to show the correct position of the letter to avoid the student's confusion towards similar letters. The student will then throw the dice and see which letter is on the top of the die. For example, if the letter that is at the surface of the die is 'b' the the dyslexic student will write the letter 'b' on the paper given earlier, which is the space in the box. If the student successfully fills in the reversed letters until the box is full, give them a reward such as stickers. This reward system is able to pull the children's interest in actively engaging themselves to participate in the activities. This is because they are given motivation to engage themselves by participating in activities based on the rewards given.

### 5.2. Results

According to Milano and Ullius (1998), the usability of a product is seen through three aspects, namely the effectiveness, efficiency, and customer satisfaction. In this section, the researchers has used two aspects which are effectiveness and customer satisfaction. In this study, the effectiveness aspect refers to how far a learning module is able to solve the reversed letter problem in the subject of the study. From the aspect of customer satisfaction, this refers to the teacher's assessment of the dyslexic student's behaviour through observation while the researchers carries out the experiment.

### SUBJECT A

Table 1. Reversal Letters of Subject A

SUBJECT A		
Original Letter	Letter Reversal	
b	↔	d
p	↔	b
q	→	-
m	↔	w
n	↔	u

Subject A is a Malay boy aged 6 years. At the beginning, Subject A had reversed letter problems with letters 'b', 'd', 'p', 'm', 'w', 'n', and 'u' except 'q'. However, after going through the learning process by using the ten therapies that were suggested by the researcher, Subject A was able to write all letters properly without making any reversal. This shows that the ten therapies with the implementation of the multisensory method is able to solve the letter reversal problem that Subject A faced. Other than that, through the observation of the researchers, the researchers noted that Subject A is an active student when completing an activity. This is proven when the researchers was running the therapy process, Subject A was one of the first to attempt every activity and Subject A showed an interest with the materials prepared.

### SUBJECT B

Table 2. Reversal Letters of Subject B

SUBJECT B		
Original Letter	Letter Reversal	
b	↔	d
p	↔	q
m	↔	w
n	↔	u

Subject B is a Malay boy aged 8 years. Before following the ten therapies suggested by the researchers, Subject B suffered letter reversal for eight different letters. However, after going through the learning process with the ten multisensory therapies, Subject B was able to write all letters well without making any mistakes or reversal. This goes to show that by employing the ten therapies by implementing the multisensory method proved to solve the letter reversal problem faced by Subject B. Other than that, from the researchers' observations, the researchers noted that Subject B was slightly slower in completing a task as other more active friends proved to be a distraction. However, Subject B still managed to complete the activities well although it took a slightly longer time as compared to their other friends.

SUBJECT C

Table 3. Reversal Letters of Subject C

SUBJECT C		
Original Letter	Letter Reversal	
b	↔	p
d	→	-
q	→	-
m	→	-
w	→	-
n	↔	u

Subject C is a Chinese boy aged 9 years. Subject C was a student with the least letter reversal problems. Subject C faced problems with only four letters out of eight, which are 'b', 'p', 'n', and 'u'. After going through the learning process by using the ten therapies with the multisensory method, Subject C was able to write all letters well without making any reversal or mistakes. This goes to show that the ten therapies was able to help with Subject C's letter reversal. Through the observation of the researchers, it was noted that Subject C was excellent in performing activities and often helps other classmates who faced difficulties. Subject C is an outgoing student and active in every activity. Subject C was also able to understand every instruction given and showed delight in performing the activities that were run.

SUBJECT D

Table 4. Reversal Letters of Subject D

SUBJECT D		
Original Letter	Letter Reversal	
b	↔	p
d	→	-
q	→	-
m	↔	w
n	↔	u

Subject D is a Malay boy aged 7 years. Subject D suffered from letter reversal for the letters 'b', 'p', 'm', 'w', 'n' and 'u'. Subject D showed no reversal problems for the letters 'd' and 'q'. By using the ten multisensory method therapies, Subject D was able to write all letters well without making any reversal or mistakes. This showed that the ten multisensory therapies was able to clear the reversal letter problem faced by Subject D. Through the researchers' observations, it is noted that Subject D finds interest in activities that involved the senses rather than activities that used pencils. However, the other activities were still completed with flying colours and showed positive reaction.

SUBJECT E

Table 5. Reversal Letters of Subject E

SUBJECT E		
Original Letter	Reversal	
b	↔	d
p	↔	q
b	↔	p
m	↔	w
n	↔	u

Subject E is a Malay boy aged 6 years. Before utilizing the ten therapies suggested by the researcher, Subject E faced letter reversal problems for all eight letters. However, after going through the learning process using the ten multisensory therapies, Subject E was able to write all letters without any reversal. This showed that the ten therapies with the multisensory method was able to solve the letter reversal problems faced by Subject E. Observation by the researchers noted that Subject E was a bit more shy in communicating with the researchers. Subject E needed a longer period of time as compared to the other classmates to understand a certain concept. However, after receiving instructions from the researchers for every activity, Subject E still showed positive response and was able to perform the activities well.

SUBJECT F

Table 6. Reversal Letters of Subject F

SUBJECT F		
Original Letter	Letter Reversal	
b	↔	d
p	↔	q
m	↔	w
n	↔	u

Subject F is a Malay boy aged 7 years. Subject F too faced problems with letter reversal for all eight letters. After going through the learning process using the ten multisensory therapies, Subject F was found to be able to write all letters well and without reversal or mistakes. This showed that the ten therapies with the multisensory method was able to solve the letter reversal problems faced by Subject F. Observation by the researchers showed that Subject F was an inquisitive student and had high levels of curiosity. Subject F did not show any awkwardness or shyness in communicating with the researchers when faced with any confusion when completing the activities. Subject F showed interest and exuded enjoyment while performing every activities.

## SUBJECT G

Table 7. Reversal Letters of Subject G

SUBJECT G		
Original Letter	Letter Reversal	
b	↔	d
p	↔	q
m	↔	w
n	↔	u

Subject G is a Chinese boy aged 7 years.. Subject G too faced problems with letter reversal for all eight letters. After going through the learning process using the ten multisensory therapies, Subject G was found to be able to write all letters well and without reversal or mistakes. This showed that the ten therapies with the multisensory method was able to solve the letter reversal problems faced by Subject G. Observation by the researchers showed that Subject G was the only female student in the classroom. This made Subject G more reserved and was uncomfortable to mix around with her classmates. Due to this, the researchers gave more attention to Subject G in every activity. For the duration of the therapy process, Subject G showed interest in every activity as performed it well.

## SUBJECT H

Table 8. Reversal Letters of Subject H

SUBJECT H		
Original Letter	Reversal	
b	↔	d
p	↔	q
m	→	–
w	→	–
n	↔	u

Subject H is a Malay boy aged 12 years. Subject H suffered from letter reversal for letters 'b', 'd', 'p', 'q', 'n' and 'u' but did not have any problems with letters 'm' and 'w'. After going through the learning process using the ten multisensory therapies, Subject H was found to be able to write all letters well and without reversal or mistakes. This showed that the ten therapies with the multisensory method was able to solve the letter reversal problems faced by Subject H. Observation by the researchers noted that Subject H was very interested with activities that involved audio and videos such as Therapy 1 (Recognizing Sounds) and Therapy 3 (Listening to Letter Sounds). However, Subject H managed to perform the other activities well and is an active participant. Other than that, Subject H has a high level of curiosity. This was shown when Subject H was excited to begin an activity even though the researchers has not begun it yet.

## SUBJECT I

Table 9. Reversal Letters of Subject I

SUBJECT I		
Original Letter	Reversal	
b	↔	d
p	↔	q
m	→	–
w	→	–
n	↔	u

Subject I is a Chinese boy aged 11 years. Subject I suffered from letter reversal for letters 'b', 'd', 'p', 'q', 'n' and 'u' but did not have any problems with letters 'm' and 'w'. After going through the learning process using the ten multisensory therapies, Subject H was found to be able to write all letters well and without reversal or mistakes. This showed that the ten therapies with the multisensory method was able to solve the letter reversal problems faced by Subject H. Observation by the researchers showed that Subject I was very focused in every activity especially Therapy 9 which was to find the difference between two pictures. In this activity, Subject I gave full attention to both images trying to find the differences. Subject I was one of the first to complete this task. However, Subject I still performed well at the other activities and showed positive reactions.

## SUBJECT J

Table 10. Reversal Letters of Subject J

SUBJEK J		
Original	Letter Reversal	
b	↔	d
p	↔	q
b	↔	p
m	↔	w
n	↔	u

Subject J is a Malay boy aged 9 years. Subject J suffered from letter reversal for all eight letters. After going through the learning process using the ten multisensory therapies, Subject H was found to be able to write all letters well and without reversal or mistakes. This showed that the ten therapies with the multisensory method was able to solve the letter reversal problems faced by Subject H. Observation by the researcher noted that Subject J was not ashamed to ask for help from the researchers or classmates when coming across difficulties. Subject J showed interest in trying something new. This was shown when Subject J showed enjoyment in performing every activity and gave full attention. While Subject J was took a longer time to complete a task, Subject J was still diligent and actively participated to complete an activity.

### 5.3. Overall Analysis

Based on observations, all of the research subjects showed positive behaviour and response towards every therapy. All the research subjects actively participated even though some took a longer time to complete certain activities. In conclusion, the findings of this study shows that after each research subject went through the ten multisensory method therapies, the problem of letter reversal they faced was fixed. Every research subject was able to write letters that has similar shape without any reversal done. Other than that, the teachers acting as observers also gave positive feedback towards the ten multisensory therapies that was created. This shows that the multisensory therapy is very effective in solving the problem of letter reversal among dyslexic students.

## 6. Conclusion

In summary, it can be concluded that all of the research subjects suffered from letter reversal. This occurs as they are affected by a disorder in scanning letters that have similar shapes. The eyes of dyslexic children sees a letter with a similar shape in reverse. However, expert consultant, the president of *Malaysia Dyslexia Association*, Puan Sariah Amirin, states that each letter that is seen as reversed differs from one individual to another. This is factored by how much exposure a dyslexic child is given to the reversed letters. They might not only have been exposed during the learning process in the classroom, but exposure also occurs outside the classroom when they perform their daily activities at home. With that, in order to overcome the problem of letter reversal in dyslexic children, suitable therapy should be practiced as well as implementation of concepts that are easier in teaching should also be done so that they may learn more effectively. In this research, it was shown that ten multisensory method therapies that were practiced by the researcher in the learning process of dyslexic children has shown positive effects. Observation by the researchers also noted that dyslexic children are active participants in every activity that was carried out. This shows that multisensory methods are very effective in solving the problem of recognizing letters for dyslexic children. Mohd Anuar Abdullah (2012) also stressed that in minimizing the mastery gap in reading skills among dyslexic children, the use of multisensory method is very effective. Meanwhile, Nur Syuhada and Faridah Yunus (2016) also emphasized that the implementation of multisensory techniques is recommended as an alternative in the teaching and learning of children's literacy. This multisensory technique is implemented to stimulate children's senses and make the teaching and learning process more enjoyable. The findings of this research will be able to help teachers in school to use the correct therapy in their teaching process and learning process in dyslexic students. This research is also able to provide ideas to

teachers to innovate interventions that were suggested by the researchers by creating new intervention methods that are more suitable and effective for their students. Besides teachers, this research is also very important for parents as a basic guide to help their children's studies. Parents' understanding on dyslexia needs to be given more attention from the teachers as dyslexic children will spend more time at home with their parents.

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