

**I-ROLE 2023****International Conference of Research on Language Education****DYSLEXIA AS LEARNING DISABILITY: KNOWLEDGE, BELIEF  
AND APPROACH IN LANGUAGE TEACHING**

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**Abstract**

Dyslexia is a common learning disability affecting children all around the globe. A misconception on dyslexia is that they only have difficulties in reading and often write letters backwards. This study aims to investigate the correlation between knowledge on dyslexia and teaching approach as well as the way teaching approach is influenced by the beliefs on dyslexia. The sample was selected through simple random sampling technique and identified primarily by referring to the G\*Power Calculation Software. The data collection was through questionnaire where its reliability and validity as well as the analysis were performed via PLS-SEM software. The findings reported significant relationship between the beliefs on dyslexia and teaching approach in language learning. Though respondents have decent knowledge on dyslexia but at the same time they also believe that the teaching approach for students with dyslexia should be tailor-made specifically for dyslexic students, focusing on reading, spelling and phonological skills.

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## 1. Introduction

The awareness of children learning disabilities is highly important in order to ensure that they also have similar learning experience with those without learning disabilities. As echoed by Sónia (2012), it is essential that every child, with or without learning disability, has the same access to education though there are always questions raised in special education especially in the curriculum and pedagogy. Children that are born with learning disabilities are still able to progress as adults and live independently, at the very least, should they receive the right amount of attention for their learning needs.

Unfortunately, these children's achievements are often overlooked and received less recognition in our society. It is often brilliant students in the academic and co-curriculum fields that stand out in newspapers or mass media (Mohd Dom, 2019).

In this effort to promote education for all, the society first needs to educate themselves in understanding the wide spectrum of learning disabilities. Next, it is vital to also be aware of the challenges faced by the children, family as well as learning institutions and use our voice in overcoming these difficulties. For these reasons, the objectives for carrying out this research is to examine how knowledge as well as beliefs on dyslexia impact the language teaching approach for children with dyslexia.

### 1.1. Learning disability: Dyslexia

According to Learning Disabilities Association of America (LDA) (n.d.), those with learning disability face a lifelong challenge that can impose a negative impact on their academic performance, career, relationships and life in the community. The most common types of learning disability are dyscalculia (affects a persons' mathematical skills), dysgraphia (affects a persons' fine motor skills) and dyslexia (affects a persons' reading skills).

A person born with dyslexia, or a dyslexic, has a neurological condition that causes the brain to be "wired differently" and is untreatable which would require the individuals to eventually learn coping strategies (International Dyslexia Association [IDA], 2002). Its aetiology is linked to genetic, neural and social factors, and dyslexics' brain physiology embodies differences in development and functions (Rahul & Ponniah, 2021). It is reported to affect between 4% to 17% of the world population and commonly, dyslexics have complications with carrying out learning activities which include spelling, reading, writing as well as any other activities related to cognitive (Dyslexia Association of Ireland, 2022). Some are mildly affected while some may have severe dyslexia. Dyslexics usually face challenges in recognising words and often have poor spelling and decoding abilities, resulting in reading comprehension problems that may impede their vocabulary and background knowledge. This is due to the problem in certain sections of the brain that processes language aspects such as orthographic and phonological (Davis et al., 2011). In short, and medically documented, dyslexics' brains are structurally and functionally different compared to children without dyslexia (Wright, 2021).

It has been reported that dyslexia has no known cure. There are no quick fix solutions available but specific programs or training can help to overcome dyslexics' challenges (Sawyer & Jones, 2009). If their

condition is not dealt with at an earlier stage, they will encounter language and social complications as they uncover complex sentences with wider vocabulary.

Nevertheless, there are many well-known individuals that grew up with dyslexia, from the legendary inventors Thomas Edison and Alexander Graham Bell to actors Keanu Reeves and Jennifer Aniston to Steve Jobs and Jamie Oliver (Dyslexia Association of Ireland, 2022). Their success stories prove that living with dyslexia will not interfere with their intelligence or skills in other areas. It is evident that this type of learning disability can be overcome with appropriate support and intervention.

### **1.2. Knowledge and belief on dyslexia**

Unfortunately, there are still misconceptions attached to dyslexia. It is not just a lack in reading skills, spelling issues or writing the letters backward. Children with dyslexia may also have deficits in phonemic and phonological awareness of language which affect their ability to hear and identify the structure of a spoken word (Learning Disabilities Association of America [LDA], n.d.). Due to this, they often face difficulties in identifying words and spelling and reading aloud (Kalsoom et al., 2020).

Dyslexia Association of Ireland (2022) through their Report of the Task Force on Dyslexia in 2001 has listed common dyslexia indicators in individuals, from as young as the age of 3 up to young teenagers. At younger age, children with dyslexia exhibits delays in pronouncing words, maintaining rhythm while speaking, problems in recognising the alphabets and difficulties in telling a story in the correct sequence. As they grow older, similar indicators are also seen especially in reading text aloud, essay writing, mispronunciation of words, lack background knowledge in reading as well as has a poor self-image. It has been a common misconception that the only predictor of dyslexia is children writing letters backward or they have below-average intelligence (Kumaş et al., 2021). It has been reported that dyslexic children may even have average or above-average intelligence (Norton et al., 2015). Additionally, according to Beckman et al. (2012) as cited in Kumaş et al. (2021), children who have poor reading skills are not necessarily dyslexics as there are other inclusive factors such as economic disadvantages and lack of motivation to learn.

In recent years, it can be seen that the awareness on learning disabilities especially through social media, programs, studies and publications have become more active and vastly available. The main objective for this pursuit is to educate the public about learning disabilities and at the same time, it also helps individuals with dyslexia to acknowledge their condition without the fear of being misunderstood.

### **1.3. Teaching approach for dyslexics**

Special education has been given more attention these days. The curriculum is now shaped to accommodate students with learning disabilities. There are also more special education classes and teachers trained specifically in special education. In 2019, it was announced by the Malaysian Education Minister that at least two classes for students with special needs will be added in schools across the country (Mohd Dom, 2019). This shows that parents have more awareness in providing the best education for their children. The article also reported that the students are able to attend regular school with special learning equipment as well as guidance from specially trained teachers. This is in line with the Program Pendidikan Inklusif or Inclusive Education Program (PPI) where it focuses on providing equal learning

opportunities to all students (Abdullah, 2017). This program aims for special needs students to be placed in the same classroom with other students and to be taught by the same teachers. It is to ensure they are able to experience conventional learning environment. However, for skills or subjects that they are lacking in, they still need to attend different sessions with teachers trained in special education.

The Malaysian special education objective is to provide quality education to special needs students, focusing on reading, writing and mathematical skills, develop their self-confidence as well as to be able to join normal classroom after a few years (Jabatan Pendidikan Khas, 2012). The curriculum also needs to be suitable with students' skills and knowledge in order to further develop their skills and potentials (Nasri et al., 2010). The challenge for dyslexic students is that they do not receive adequate lessons that focus on their major disability. Dyslexic students take longer time to understand and fulfil a task, they will experience more serious learning difficulties without proper learning environment (Kalsoom et al., 2020). This means the teaching strategies used should benefit the needs of students with dyslexia without making them feel like an outcast. Students with dyslexia have shown measurable improvements in the brain's left hemisphere specifically the language area after they received reading interventions where the focus was on multisensory approach that emphasized the organization of spoken and written discourse, including phonology, orthography, syntax and morphology, among others (Johnston, 2019). They are also capable to develop their skills with the right learning experience.

## 2. Research Methods

This study focuses on investigating the correlation between knowledge and belief on dyslexia and teaching approach for dyslexic students. For the purpose of answering the research questions, and to investigate teaching approach in the context of society in Malaysia, more specifically, a quantitative research method will be utilized to retrieve data. This analytical and descriptive study uses online questionnaire administered throughout Malaysia to collect the primary data. Apart from questions on demographic, there were 15 statements for the knowledge on dyslexia development, 12 statements looking into the respondents' beliefs on dyslexia and 14 statements investigating the teaching approach suitable for dyslexic students.

In carrying out this study, simple random sampling technique was used, and the responses were collected via online using Google Form. The 178 people who responded for this study was identified largely by referring to the G\*Power Calculation software (Hair et al., 2019). According to G\*Power Calculation Software 3.1, the effect size ( $f^2$ ) for this study is 0.15 in minimum. Cohen (1992) stated that though  $f^2$  has medium effect in current studies, it is still justified in social sciences. The minimum sample size required for G\*Power calculation for this study is 138 respondents and since 178 people participated in this study, it can therefore be said that the minimum sample size prerequisite has been met.

A seven-point Semantic Differential-based scale was used to categorised the best possible response from the respondents. The categories of the semantic differential scales that were used included, "1-Strongly Disagree" to 7-Strongly Agree (Johns, 2010). To assess the reliability of the responses from the questionnaires in this study, reliability analysis was used. This evaluation was conducted by referring to the rule of thumb set forth by Hinton et al. (2014). Hinton et al. (2014) defined Cronbach's alpha ( $\alpha$ ) 0.90 and above as excellent reliability, while 0.70 to 0.90 shows high reliability. The score of 0.50 to 0.70

indicates moderate reliability, and if the score is .50 and below, low reliability is indicated. All factors identified as the “independent variables” (knowledge & belief) and “dependent variables” (teaching approach) was tested with the use of SPSS. 28.

The data cleaning process was performed using SPSS 27.0 software after the number of respondents needed was achieved via Google Form survey, which was accessible for two weeks. Although there was no missing data, four respondents had to be eliminated since there was a straight lining error which may reduce data quality. Data normality was also checked to ensure it was within non-normality range accepted by PLS-SEM which would be  $-1$  and  $+1$  ( $1$  and  $\beta 1$ ). In the end, the total respondents eligible to the final analysis was 174.

To study the link between knowledge and belief on dyslexia and teaching approach for dyslexic students, standard deviation, regression analysis, correlation, as well as mean were used. Aside from these, the analyses are also conducted to discover the most prominent factors that influence teaching approach for students with learning disability.

### 3. Findings

#### 3.1. Descriptive analysis

In carrying out this study, a total of 174 people responded to the online Google form questionnaires distributed. The results showed that majority of the respondents were females ( $n=115$ , 66.1%) while the males were 33.9% ( $n=59$ ). In terms of the respondents' race, majority were Malay ( $n=164$ , 94.3%), followed by Chinese ( $n=4$ , 2.3%), others ( $n=5$ , 2.9%), and Indian ( $n=1$ , 0.3%). They were between the ages of 20 to 29 years old (“ $n$ ”=88; “5”.6%), 30 ‘until 39 years’ ( $n=45$ ; 25.9%), 40 to 49 years ( $n=28$ , 16.1%) and 50 to 59 years ( $n=1$ , 0.3%). The educational qualification of the respondents shows that 33.3% ( $n=58$ ) at the level bachelor’s degree, followed by master’s degree ( $n=51$ , 29.3%), diploma ( $n=41$ , 23.6%), PhD ( $n=19$ , 10.9%) and certificate ( $n=5$ , 2.9%), but no respondents from SPM/STPM level. The respondents were from different states involving Melaka ( $n=48$ , 27.6%), Selangor ( $n=44$ , 25.3%), Johor ( $n=13$ , 7.5%), Kelantan ( $n=9$ , 5.2%), Negeri Sembilan ( $n=8$ , 4.6%), Kedah ( $n=8$ , 4.6%), Wilayah Persekutuan Kuala Lumpur ‘( $n=7$ , 4%)’, Pulau Pinang ‘( $n=6$ , 3.4%)’, Terengganu ( $n=6$ , 3.4%), Perak ( $n=5$ , 2.9%), Pahang ( $n=5$ , 2.9%), Sabah ( $n=5$ , 2.9%), Sarawak ( $n=5$ , 2.9%), Perlis ( $n=4$ , 2.3%), and Putrajaya ( $n=1$ , 0.6%). In addition, majority of the respondents come from semi urban ( $n=85$ , 48.9%), rural ( $n=27$ , 15.5%), and urban ( $n=62$ , 35.6%). It has been discovered that most of them know what dyslexia is ( $n=137$ , 78.7% respectively), with only 37 respondents (21.3%) do not know about it. Most of the respondents got information about dyslexia from mass media ( $n=105$ , 60.3%), educational curriculum ( $n=21$ , 12.1%), others ( $n=46$ , 26.4%), and seminar/conference ( $n=2$ , 1.1%).

#### 3.2. PLS-SEM approach

##### 3.2.1. Measurement model

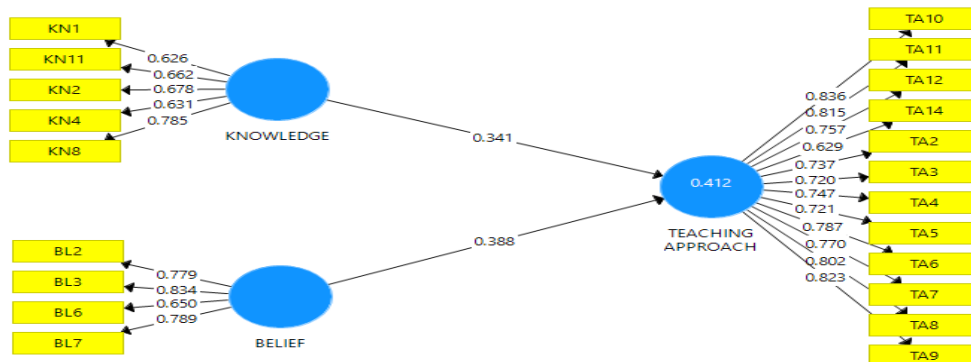
Validity and reliability testing were carried out under this section. As stated by Ramayah et al. (2018), the three conditions required under this section are ‘convergent validity’, ‘discriminant validity’

and ‘internal reliability’. ‘Convergent validity’ refers to the degree to which several items can measure the same concept. Validity will be achieved when all ‘average variance extracted’ or AVE values surpass 0.50 and composite reliability’ or CR is greater than 0.6 in social science research (Hair et al., 2017). The ‘construct reliability’ or ‘factors studied’ were analyzed using Cronbach’s (1951) alpha and rhoA values with the minimum value required is not lesser than 0.7. The findings of this study have revealed that the minimum requirements for ‘convergent validity’, ‘discriminant validity’ and ‘reliability’ of the questionnaire items are met (Gold et al., 2001). The results of the analysis are reflected in Table 1 and shown as a model in Figure 1.

**Table 1.** Convergent reliability test

Construct	Item	Loading	Cronbach	rhoA	CR	AVE
Knowledge (KN)	KN1	0.626	0.706	0.713	0.809	0.501
	KN2	0.6787				
	KN4	0.631				
	KN8	0.785				
	KN11	0.662				
Belief (BL)	BL2	0.779	0.76	0.777	0.849	0.557
	BL3	0.834				
	BL6	0.650				
	BL7	0.789				
Teaching approach (TA)	TA2	0.737	0.935	0.940	0.944	0.583
	TA 3	0.720				
	TA 4	0.747				
	TA 5	0.721				
	TA 6	0.787				
	TA 7	0.770				
	TA 8	0.802				
	TA 9	0.823				
	TA 10	0.836				
	TA 11	0.815				
	TA12	0.757				
	TA14	0.629				

rhoA & CR: Composite Reliability, AVE: Average Variance Extracted



**Figure 1.** Reflective measurement model

Heterotrait-Monotrait (HTMT) method was used to examine ‘discriminant validity’ (Henseler et al., 2015). Should the HTMT value be equal or smaller than 0.90, this shows that ‘discriminant validity’ is achieved. As shown in Table 2, the ‘discriminant validity’ was achieved among the constructs as it was within the HTMT 0.90 range (Gold et al., 2001).

**Table 2.** Ratio heterotrait-monotrait (HTMT)

	BL	KN	SG
BL			
KN	0.741		
SG	0.662	0.5	

BL: Belief, KN: Knowledge, TA: Teaching Approach

### 3.3. Structural model

This study was performed to examine the influence between knowledge and belief on dyslexia students and teaching approach. To meet this objective, two hypotheses were constructed between the variables. The SmartPLS 3.0 bootstrapping function (Ringle et al., 2015) was utilized to investigate the impact level and t-value for all path coefficients in the research model. The analysis established that a path coefficient of knowledge and belief were found to affect teaching approach significantly at the level of 0.05 with a value of  $t \geq 1.96$ .

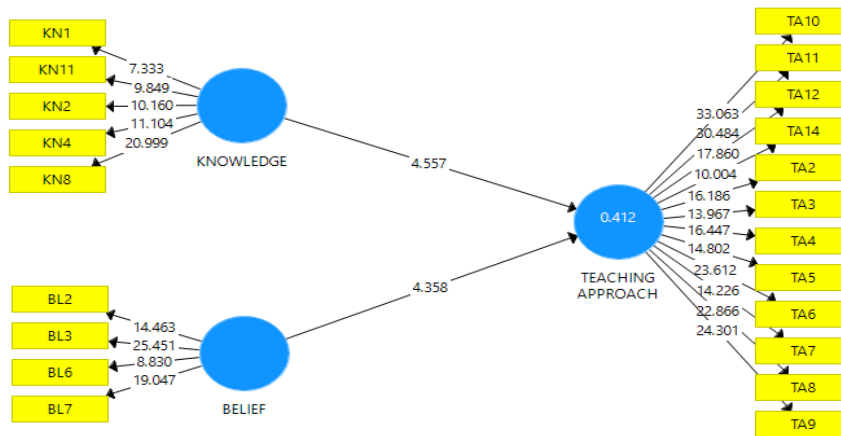
Next, the quality of the research model was ascertained through the values of effect size ( $f^2$ ),  $R^2$  and  $Q^2$  (Hair et al., 2017). The assessment reported that the effect size was intangible between both constructs at 0.150 and 0.179. Meanwhile, the  $R^2$  value was higher at 0.412 and  $Q^2$  value exceeded 0 at 0.229 which indicated that items were well reconstructed and the research model had predictive relevance. Table 3 represents the analysis of the research hypothesis and quality models while Figure 2 shows possible causal dependencies between variables.

**Table 3.** Path coefficients test result

Hypothesis	Correlation	Std. Beta	Std. Error	t-value	Result	$R^2$	$f^2$	$Q^2$
H1	KN -> TA	0.341	0.075	4.557**	Supported	0.412	0.150	0.229
H2	BL -> TA	0.388	0.089	4.358**	Supported		0.179	

BL: Belief, KN: Knowledge, TA: Teaching Approach

\*\* $p < 0.05$ , t value more than 1.96



**Figure 2.** Structural Model

### 3.3.1. Importance-performance map analysis (IPMA)

To acquire the diagnostic value of the model, IPM analysis was carried out to provide performance score between 0-100 (Martilla & James, 1977). This evaluation was based on a comparison between the average value of teaching approach (TA) with PLS expectation, which calibrates the significance of each construct in the research model. In other words, through the analysis of IPMA, the importance and achievement of each factor that affected teaching approach were identified.

**Table 4.** IPMA analysis

Construct	Importance (total effect)	Performance (index value)
KN	0.341	70.249
BL	0.388	75.348
TA	-	71.731

Table 4 clearly states that the belief factor (BL) is the most significant factor with importance value of 0.388 and performance value of 75.348 compared to knowledge (KN) with importance and performance values of (0.341) and (70.249) respectively. By considering this IPMA analysis, both these aspects, particularly belief on dyslexia which has been found to be the most significant factor in influencing the right teaching approach, in consideration to improve special education for dyslexic students.

### 3.4. Discussions

This study aims to investigate the beliefs and knowledge on dyslexia and their influence on teaching approach best suits to assist dyslexic students' learning development. The respondents display decent awareness about dyslexia. The SmartPLS analysis results have shown that beliefs about dyslexia have more significant relationship with teaching approach compared to their knowledge in dyslexia.



### 3.4.1. Dyslexia beliefs and teaching approach

According to the analysis, the respondents have the tendency to show agreement on statements that revolve around reading techniques as well as the phonological aspects of a language. This shows that the respondents believe in the importance of teaching approach or strategies that are suitable and relevant for children with dyslexia. For instance, they agree that repeated reading techniques are useful to improve reading fluency and suitable reading materials must be selected by the teachers for the dyslexic students (TA2). The books should also be based on the difficulty level of the vocabulary. Berliner (2004) as cited in Kalsoom et al. (2020) stated that specifically when teaching language, teachers need to assist dyslexic students in reading, writing, spelling and memorising the words. The vocabulary level that is introduced to the students are vital in shaping their language skills in their later years. Understanding the concepts of abstract versus concrete is also a challenge for children with dyslexia as they can “see” animals, people and objects but may not be able to imagine or comprehend abstract ideas (Mishra & Mohan, 2016). In relation to teaching reading, respondents also believe the use of flashcards and drills should be used in classroom in order to enhance the children’s knowledge of vocabularies (TA7). This is a very common practice for toddlers but tend to be overlooked for older children with dyslexia.

Next, the data also reveals that respondents believe there is a misunderstanding in labelling the condition of dyslexia. The most common misconception is dyslexics are lazy and unintelligent. This statement is highly disagreed by the respondents, and by being aware of the terms allows better understanding towards children with dyslexia. Muin et al. (2020) expressed that dyslexic students’ low learning achievement is not the effect of laziness but due to the dysfunction of neurology system in the brain which contributes to low learning achievement. Without early identification of the condition, they are likely to develop low self-esteem and the belief that they are lazy and can never be smart enough (Sutton & Shields, 2016). This may derive from unsuitable teaching approach or teachers have lack of trainings in order to meet special education needs. It is also found in the data analysis that teachers should regularly test spelling and explicitly teach spelling to the students with dyslexia. The respondents also believe that these students need structures, sequential and direct instruction in basic skills and learning strategies. For example, learning to spell is systematic and thus should be more tailor-made for dyslexic students. Spelling itself is a very complex process since it involves “phonological, morphological, semantic and orthographic skills” (Hoiem & Lundberg, 2000), and the right teaching approach can help students to develop this skills faster and aid them in both reading and writing activities. Interestingly, Wai et al. (2014) found that in spelling practices, dyslexic students do not tend to make consistent mistakes and most mistakes spontaneously happened. This further explains that spelling lessons require not just effective spelling strategies but also sufficient time in order to provide fulfilling learning sessions for dyslexic students (TA6).

Another significant finding is where the respondents highly believe that intervention programs are effective in helping the dyslexic students. These programs should highlight the phonological facets of language with the visual support of letters (TA8, TA11). In relation to the teaching of spelling, most respondents agree that spelling involves listening carefully to the sound within words (TA9). They also believe that children’s phonemic awareness skills foresee their capability to learn to spell at younger age (TA10). The phonological model theory of dyslexia explains the phonological deficit in the brain where it

hinders dyslexics from understanding the meaning of a reading text due to the inability to attain deeper linguistic processing (Muin et al., 2020). The same study also reported that phonological awareness training interventions have improved reading ability tremendously compared to other language training programs. In short, intervention programs are highly beneficial for students with dyslexia in improving their skills in identifying words, eventually develop their reading skills. These programs need to be specifically moulded to fit the needs of dyslexics. Vaughn et al. (2000) found that specific programs designed to enhance reading fluency have positively affected reading skills for children with this disability.

### **3.5. Knowledge on dyslexia and teaching language**

Data analysis reveals that a majority of the respondents are aware that dyslexia is the result of a neurologically-based disorder (KN1). Therefore, the brains of dyslexic persons are not the same from those who are without this condition (KN4). This shows that dyslexic students undeniably require a different teaching approach as compared to children without dyslexia (TA11). The lack of proper education for dyslexic students is often the result of mis-implementation of intervention programs or little formal training for the teachers (Kumaş et al., 2021). Teachers need to be mindful of the behaviours of these students as they may have a shorter attention span and difficulties with listening and concentrating. The respondents also notice that children with dyslexia often write letters backwards (KN11) and have difficulties in constructing sentence that is correct grammatically or semantically (KN2). In order to overcome these challenges, practices need to be personalised and are provided with simple and clear instructions (Sutton & Shields, 2016). This is where teachers need to be in control of the books to be used in lessons down to the words the students need to learn to spell (TA2, TA3).

In addition, the respondents also demonstrate knowledge on dyslexia condition where they agree that demonstrating fluent reading should repeatedly be utilized as a teaching approach for dyslexics (KN8). It is essential for teachers to adopt a high teaching approach that is different from the ordinary one so that it allows dyslexic students to also succeed under the same condition as their classmates (Cano et al., 2021). Apart from that, regular spelling test can also aid fluent reading sessions (TA4) by having model speakers as the voice can help written text makes sense. This is very much related in the teaching of phonic skills to dyslexic students (TA7, TA10). The absence of effective phonemic awareness in students will slow down their analysis skills that help to decode words and eventually will have difficulties with proficient reading in school (Paige, 2020).

## **4. Conclusions**

Dyslexic students should have the same opportunity to succeed in school as other students who are without this condition. This study has revealed that the dyslexia awareness among the public and their knowledge and belief on this learning disability significantly provide insights in developing teaching approach that caters specifically to students with dyslexia. Based on the findings, special education teachers can focus on reading techniques, spelling drills and phonic skills-based activities in guiding dyslexic students to reach full potential in their language learning development. The policymakers should

also ensure that sufficient trainings are provided for special education teachers to enable them to manage the challenges in teaching these students with learning disabilities.

#### 4.1. Recommendations

For future research, it is recommended to reach a larger group of special education teachers and parents of dyslexic children. Their thoughts and experience in dealing first-hand with dyslexic children can facilitate policymakers and education ministries around the world to develop a curriculum and intervention programs that accelerate the learning growth of children that grow up with dyslexia.

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