Asia Pacific Journal of Developmental Differences

Volume 9 ♦ Number 1 ♦ January 2022

DYSLEXIA ASSOCIATION OF SINGAPORE

Published by the Dyslexia Association of Singapore Limited (DAS)

ISSN 2717 5200 (digital)

Contact:

The Managing Editor
Dyslexia Association of Singapore Limited
1 Jurong West Central 2
#05-01, Jurong Point
Singapore 648886

Email: editor@das.org.sg

Asia Pacific Journal of Developmental Differences

Asia Pacific Journal of Developmental Differences
Volume 9 | Number 1 | January 2022

Contents

Asia Pacific Journal of Developmental Differences
Vol. 9, No. 1, January 2022, pp. 1—3

Editorial Comment

Angela J. Fawcett, Editor-in-Chief

It is a very great pleasure to publish this issue of the Asian Pacific Journal of Developmental Differences, now in its 9th year of publication, which is published by the Dyslexia Association of Singapore Limited. We have now revised our mission statement to cover a broader range of learning difficulties, recognising the increasing evidence of co-morbidity between many disorders, and no doubt this will be reflected in our publications. The response to the previous issues continues to be extremely gratifying, and we maintain these high standards in this issue and forthcoming issues. We are grateful for the support of the academics and professionals involved in resolving any issues arising, and ensuring our journal maintains high professional and ethical standards.

I am particularly proud of the scope and depth of the articles we are presenting in this issue, with content drawn from Singapore, Indonesia, Malaysia and India. In addition to the small-scale experimental articles which are typically submitted to a journal of this type, we are now receiving a number of interesting and exciting articles, which address new models of training, and their feasibility, systematic spreading of dyslexia awareness across the region, and the impact of individual motivation in secondary school students, as well as the impact of dyslexia in University. Many of the approaches presented here have been inspired by the pandemic, which has introduced a different method of working, building on the opportunities for remote access. It is extremely satisfying to recognise the flexibility and novel approaches which have been adopted in order to deal more successfully with a challenging period, which shows little evidence of ending in the near future.

In the first article in this issue, Chua Minqi, formerly from DAS, joins with Yeo Lay See to present an article on the impact of training in Enhanced Reading Comprehension Curriculum, an area of literacy traditionally considered to be one of the most difficult to improve. Here they consider the ease and flexibility with which therapists adopt a new curriculum, identifying teachers with experience of between 2 and 4 years as most amenable to change, incorporating more aspects of the comprehension curriculum in their teaching following training, and finding greater ease in incorporating these measures. By contrast, it seems that educational therapists with more extensive experience are less amenable to change having adopted a teaching approach which is

more likely to be fixed. The importance of recognising these individual differences in motivation to change are highlighted as key to successfully changing and enhancing any curriculum, with feedback from the staff involved seen as key in future studies.

The next article in this issue addresses an area which has had a major impact on provision for dyslexia worldwide. A key aspect of ensuring that support for dyslexia becomes embedded within a nation's custom and practice is to ensure the proliferation of awareness of dyslexia. Building on an initial survey of 1781 teachers that identified misconceptions on the nature of dyslexia and how children could be supported, the Dyslexia association of Indonesia, led by pediatricians Dr Kristiantini Dewi Soegondo and Dr Purboyo Solek, set out with their team to spread awareness across Indonesia. The task has been challenging, because of the nature of the country in terms of the geography and because of an existing lack of awareness of the issues involved. Adopting a bursary system which allowed those who demonstrated an interest and awareness to continue studying free of charge, the model adopted allowed the development and dissemination of a training course for teachers over a 5 year period. Initially delivered face to face, the constraints of COVID, led to online sessions, with 894 teachers trained. Finally, a small group of 7 teachers agreed to continue disseminating awareness more widely, the whole approach providing an effective model for a system useful in countries where resources are sparse and awareness low.

The next study originated in India, led by Dr Sushree Sahu with colleagues including Nandini Singh who developed and published DALI, a skill-based assessment for dyslexia, in a number of native languages. Here a small comparative pilot study is presented examining the usefulness of DALI in conjunction with curriculum-based assessment (NIHMANS) in identifying issues for dyslexic children. However, the NIHMANS battery was originally developed in 1991, is only available in English, and no further editions have been forthcoming, so the intention was to identify whether or not the DALI subtests could serve the same purpose for use with Hindi speaking children. A number of good correlations were established in this pilot sample for English spelling, Reading and Comprehension, and with Hindi spelling. Other subtests of non-literacy were found to correlate with English reading and comprehension, because the NIHMANS test uses passage-based reading, following the curriculum, which is not appropriate for the younger children in grades 1-2. So, for example, English comprehension correlated with fluency, rhyming, and picture naming, all typical components of modern screening tests present in the DALI. Use of the DALI is therefore recommended to augment the more traditional methods for bilingual children.

The impact of COVID has meant that many children have been home schooled or have engaged in remote schooling. In the next article in this issue, Julia Lee Ai Cheng presents a study on home based educational strategies for supporting children with SpLD during school closure. One aspect that has been highlighted as particularly problematic has been helping children with homework, which has become an even more extensive

problem during the pandemic. Here a number of strategies that are shared that have been successfully evaluated to encourage SpLD students to persist in their home-based work, including building motivation and self-esteem, interspersing academic activities with physical to maintain attention and sharing an external problem-solving mode with children to ensure greater success. There is no doubt parents will find these suggestions invaluable.

The next article from Joanne Tan Shi Huey from DAS, examines the impact of motivation on vocational decisions for secondary school children with dyslexia. This is an interesting approach, identifying that for these students, the role of the peer group and social media is less prominent than has been suggested in the literature for typically achieving children, and neither intrinsic or extrinsic motivation were significantly related to their vocational decisions. For this group of secondary year 3 and 4 children, the family was the most significant influence, and those who had a clear view of their vocational future were found to show high levels of competence, relatedness and autonomy. The importance of building these strengths in this age group of children with SpLD in order to ensure successful outcomes is highlighted.

An interesting approach is adopted in the following article, from Dr Damaris Carlisle, who investigates the successes and failures in the 1st year of tertiary education for students with a range of invisible disabilities. This is an area of key importance, given the growing awareness of the needs of these students in Singapore and moves to ensure greater engagement in the tertiary sector. The article is richly illustrated with the voice of the student, demonstrating a model of the impact of success and failure on the lived experience of the students. Research of this type is likely to be of growing importance in ensuring a level playing field for students with disabilities to ensure they have the best possible chance of fulfilling their strengths while combatting their weaknesses. Recommendations for policy and practice for this group are included here.

The final article in this issue from Dr Rexsy Taruna from Indonesia highlights the importance of phonological difficulties in the acquisition of literacy for children in a country where awareness of dyslexia remains patchy. Five children aged 7-9, a key age group for remediation, received a short targeted phonological intervention in 16 sessions comprising 960 minutes in total for each child. Using an individually based approach employing multisensory instruction in an intensive session designed to maximise engagement, explicit instruction was given via a puppet to ensure that the best possible outcomes were achieved. Significant improvements in phonemic blending, phonic and word reading fluency were achieved for all 5 children participating.

In conclusion, we hope that you will enjoy the breadth and variety of material presented here, and we look forward to welcoming as many of you as possible to join is on our online conference UNITE SpLD in June 2022.

Asia Pacific Journal of Developmental Differences
Vol. 9, No. 1, January 2022 pp. 5—30
DOI: 10.3850/S234573412200009X

Educational Therapists' Perceptions after Training for an Enhanced Reading Comprehension Curriculum

Minqi Chua[1*] and Lay See Yeo[2]

1. *Dyslexia Association of Singapore*
2. *National Institute of Education, Singapore*

Abstract

This study examines Educational Therapists' perceptions and teaching behavior after receiving training in teaching an Enhanced Reading Comprehension Curriculum. It also examines the relationship between teaching experience and changes in perception. Findings showed that Educational Therapists' length of teaching experience affected the frequency they taught skills following training, and only Educational Therapists with less than four years of experience taught more of the skills on which they were trained. The training also did not increase the perceived importance of skills covered for the most experienced group of Educational Therapists (more than four years of experience), although it did for less experienced Educational Therapists. Nonetheless, all Educational Therapists reported increased ease in teaching the skills covered during training. More experienced Educational Therapists with two and a half to four years of experience further reported an increase in their perceived ease in teaching the reading comprehension skills not yet covered in training, while this remained unchanged for the most experienced Educational Therapists. With these findings, curriculum teams and trainers need to consider the teaching experience of educators when implementing in-service training. They also need to consider feedback from educators and address possible resistance towards changes to ensure that training is effective.

Keywords: Therapist Training, Dyslexia, Reading Comprehension Instruction

* *Correspondence to:*
Minqi Chua, Former Senior Educational Psychologist, Dyslexia Association of Singapore. Email: minqichua28@gmail.com

INTRODUCTION

Dyslexia is considered to be one of the most common specific learning disorders, with its prevalence reported to range from 4 to 10% of the populations in the United States, the United Kingdom, and Australia (Landulfo, Chandy, & Wong, 2015). According to the Ministry of Education (as cited in Heng & Tam, 2006), the prevalence for Singapore is lower, where around 3 to 5% of the students in Singapore are estimated to have dyslexia.

According to the British Dyslexia Association (2007), dyslexia is a specific learning difficulty in the areas of language and literacy, which largely affects fluency in accurate word reading and spelling. For dyslexic readers who face difficulty with fluent reading, the task of comprehending reading materials poses an even greater difficulty. Given their lack of automaticity in word recognition, much of their cognitive resources are devoted to word decoding. Consequently, much lesser cognitive resources are left to allow dyslexic readers to comprehend the texts they read (Therrien, 2004). Given that the main aim of reading is to access the meaning of texts, it is important to incorporate reading comprehension as a component of literacy intervention for students with dyslexia, along with decoding and encoding strategies.

The Dyslexia Association of Singapore (DAS) provides the Main Literacy Programme (MLP), which is a specialised literacy programme for students who are diagnosed with dyslexia and attending mainstream primary or secondary schools. Reading comprehension instruction is covered as part of the intervention, but the reading comprehension curriculum used was not standardised in the old DAS curriculum nor the newer DAS integrated curriculum that was implemented in 2014. This lack of a standardised curriculum meant that the Educational Therapists lacked the "order and continuity" provided by standardised curriculums (Sparapani & Perez, 2015, p. 83). They had to rely on what they perceived their students needed and teach the skills they deemed appropriate, using methods such as the Know, Want-to-Know and Learned (K-W-L) reading strategy (Ogle, 1986). Guidance on the varied skills required for reading comprehension, structured ways to teach those skills, as well as comprehensive resources targeted at specific skills were also lacking. Hence, the therapists often had to seek out their own materials, as well as rely on the help from the more senior Educational Therapists.

Given the need for an explicit, structured, and standardised reading comprehension curriculum, the DAS Curriculum Team developed the Enhanced Reading Comprehension curriculum, in consultation with Dr Shanti Benjamin of ELCOT Consultants. The DAS team consulted Dr Shanti's work on secondary school-level reading comprehension skills and typical text features present in English Language Papers that meet requirements of the Cambridge University examinations. While referencing mainstream primary and secondary school materials, some of the skills highlighted by Dr Shanti were adopted, and the DAS team expanded the list of reading comprehension skills to include those

were needed for the primary school curriculum. The result was a skill-based curriculum that is aligned to the mainstream primary and secondary English Language curriculum, and includes a list of a wide range of skills (e.g., Question Analysis, Prediction, Referencing) that can be used with DAS students across a range of age as well as language and literacy abilities. In addition, resources (e.g., worksheets) to teach targeted skills and ways to teach each skill (e.g., prompts for specific questions) were provided as part of the Enhanced curriculum.

The implementation of the Enhanced Reading Comprehension curriculum brings about various changes for all DAS Educational Therapists. They now have to adopt the structured curriculum and teach the specific skills based on their students' literacy skills (or bands). The structure imposed by the Enhanced Reading Comprehension curriculum also creates a need for the Educational Therapists to change their perceptions regarding the importance of the different reading comprehension skills and alter their focus on skills taught in their classrooms.

While change is inevitable in many educational settings, it can be daunting for many people. A major factor that influences teachers' motivation to learn and adopt new training practices is their teaching experience. Rahimi and Alavi (2017) surveyed and interviewed 127 language teachers in Iran who experienced three years of change in curriculum. They found that both novice and experienced teachers were optimistic about the new curriculum but experienced teachers were more cautious about change and the practical obstacles of change. Similarly, Hargreaves (2005) studied 50 elementary and secondary teachers of different ages in Canada. The researcher found that younger teachers were more optimistic and enthusiastic, and they have been "socialised into working with change" (p. 973). In contrast, teachers in the late career stage were more likely to be strongly resistant to change. These teachers questioned changes more directly and needed to see that the changes were relevant to their teaching. In comparison, the mid-career teachers were open to try new practices but may be selective in the changes they adopt, and they may also go back to their old ways.

In a study that extended into the special needs education sector, Paloș and Gunaru (2017) studied 142 teachers who have a range of two to over 26 years of teaching experience from regular and special needs education in Romania. They found that dispositional resistance to change negatively predicts teachers' learning enjoyment, and that the personality factor of conscientiousness "moderates the relationship between dispositional resistance to change and the enjoyment of learning" (p. 468). For instance, teachers with low disposition resistance to change and a high level of conscientiousness enjoyed learning experiences more. With higher enjoyment from learning, it is expected that teachers across both mainstream and special needs education are more likely to partake in continued education and adopt the training methods learned.

PURPOSE

Past research has been heavy on the five essential components of effective literacy intervention, which includes reading comprehension (Point, 2004). However, the research has been focused on whether training teachers for reading comprehension instruction leads to improvements in students' performance, the methods of reading comprehension instructions (e.g., direct explanation or transactional), as well as the reading comprehension strategies (e.g., summarisation) that are effective for normal readers (National Reading Panel, 2000). In contrast, there is a dearth of research on the effective ways to train teachers in using evidence-based strategies in their reading comprehension instruction both during pre-service and in-service training (NRP, 2000). This seems especially so in the case of educators who work with students with learning disabilities.

Within DAS, the Educational Therapists in service differ on the personal front. These include their age, gender, pre-service educational background and training, as well as their experience in teaching students with dyslexia. These teacher characteristics could play a role in affecting the changes in the therapists' teaching and perceptions towards the training for the updated curriculum, as noted by NRP (2000). This research will thus contribute to the literature on training therapists who work with students with a learning disability (i.e., dyslexia) for instruction of a higher-order literacy skill such as reading comprehension. The findings will give a better understanding of the effectiveness of the internal training workshop conducted at the DAS and the factors that contribute to its effectiveness. The information can then be used to guide future training programs during curriculum changes.

RESEARCH QUESTIONS & HYPOTHESES

This study examined the changes in Educational Therapists' teaching behaviours and perceptions – their teaching frequency of reading comprehension skills, perceived importance of the skills, and perceived ease in teaching the skills – following training for an Enhanced Reading Comprehension curriculum. It also evaluates the role that teaching experience plays in these changes. The four research questions are listed as follows:

Research Question One: Does training and teaching experience affect the frequency at which Educational Therapists teach reading comprehension skills in their classes?

It is expected that following the training workshop for the DAS Enhanced Reading Comprehension curriculum, the frequency at which Educational Therapists teach the reading comprehension skills covered during training will increase, regardless of teaching experience. It is also hypothesised that following the training workshop for the DAS Enhanced Reading Comprehension curriculum, the frequency at which Educational Therapists teach the reading comprehension skills not covered during training will not change, regardless of teaching experience. This hypothesis is exploratory in nature as

past research rarely focused on investigating changes in areas/skills that are not covered during training.

Research Question Two: Does training and teaching experience affect Educational Therapists' perceived level of importance of reading comprehension skills?

It is expected that the perceived importance of reading comprehension skills that were covered during the training for the Enhanced Reading Comprehension curriculum will increase from pre to post-training, regardless of the Educational Therapists' teaching experience. It is also expected that for reading comprehension skills that are not yet covered during training, there will be a decrease in the perceived importance of these skills for Educational Therapists with lesser teaching experience. In contrast, for Educational Therapists with more teaching experience, it is expected that there will not be a significant change in the perceived importance of the skills not covered in training.

Research Question Three: Does training and teaching experience affect Educational Therapists' perceived level of ease in teaching reading comprehension skills?

It is expected that the perceived ease in teaching the reading comprehension skills that were covered during the training for the DAS Enhanced Reading Comprehension curriculum will increase from pre to post-training, regardless of the Educational Therapists' teaching experience. For skills that are not yet covered during training, it is expected that there will be a decrease in the perceived ease in teaching these skills for Educational Therapists with lesser teaching experience, whereas this would remain unchanged for Educational Therapists with more teaching experience.

Research Question Four: What are the reasons for changes in the Educational Therapists' frequency in teaching comprehension skills as well as their perceived importance of these skills?

Various reasons may contribute to the increase or decrease in the motivation of the Educational Therapists in adopting the skills in the Enhanced Reading Comprehension curriculum in their teaching. As noted by Osman & Warner, (2020), teachers may vary in how much they value the ideas presented in training, and their implementation of the training is influenced by contextual factors including curricular constraints and other training programs (Kennedy, 2016; Opfer & Pedder, 2011). By surveying the Educational Therapists directly, this research question looks into factors that influence the changes in their behaviours and thoughts, further informing on the gaps that should be addressed during training and curriculum enhancements.

METHODOLOGY

This paper is based on the dissertation submitted in fulfilment of the requirements for the degree of Master of Arts (Applied Psychology) at the National Institute of Education (NIE), Nanyang Technological University, under the same title (Chua, 2018). This current paper is also based on a longitudinal study that was designed and started by collaborators from Temasek Polytechnic and the DAS in 2016. The collaborators presented the preliminary findings under the title, 'An Investigation on the Teaching Practice of Reading Comprehension Skills for Individuals with Dyslexia in Singapore', at a symposium held at the NIE in 2017.

Participants

This study involved 47 Educational Therapists (7 male and 40 female) who were part of a longitudinal research project conducted by the DAS. These Educational Therapists provide specialised literacy remediation to students with dyslexia at one of the 13 DAS Learning Centres located island wide in Singapore. All Educational Therapists, including those recruited midway during the research project, were required to complete three surveys in the original research study as part of their work requirement. However, they were informed that their participation and responses would not affect their performance appraisals. At the time of the first survey, the age of the Educational Therapists ranged from 23 to 59 years old ($M = 35.91$, $SD = 10.99$), and they had three weeks to over 16 years of experience teaching students with dyslexia (approximate $M = 4.57$ years, $SD = 4.26$). Most of the Educational Therapists do not have formal teaching credentials such as the Postgraduate Diploma in Education from the NIE. Twenty-nine of the Educational Therapists possess an undergraduate degree, while nine of them have a Master's Degree, such as a Master of Education from the NIE. The remaining nine Educational Therapists have a Postgraduate Certificate or Diploma from the DAS.

Materials

The original DAS research study involved students from Temasek Polytechnic's Diploma in Psychology Studies program. The students created a series of three teacher surveys in collaboration with the DAS as part of their Final Year Project. DAS researchers adopted and modified the surveys created by the students to suit the various stages of curriculum adoption as well as added items of interest to the DAS Curriculum Team.

Two versions of survey forms were used at the two points of data collection for this study: before Educational Therapists received training for the DAS Enhanced Reading Comprehension curriculum (Survey 1), and one year after adopting the Enhanced Reading Comprehension curriculum (Survey 2). The surveys contained questions on the teaching methods that the Educational Therapists used to teach reading comprehension skills, teaching resources, and feedback on the Enhanced Reading Comprehension curriculum

Table 1: Survey items corresponding to research questions

	Survey	
Research Question	**Survey 1**	**Survey 2**
Does training and teaching experience influence the frequency at which Educational Therapists teach reading comprehension skills in their classes?	Q1. Across all the classes that you have taught since working as a DAS Educational Therapist, we want to find out how often you teach the following Reading Comprehension skills in the classroom.	Q1. Across all the classes you teach since the implementation of the enhanced curriculum, we want to find out how often you teach the following Reading Comprehension skills in the classroom.
Does training and teaching experience influence Educational Therapists' perceived level of importance of reading comprehension skills?	Q2. We would like to find out which Reading Comprehension skills you think are important. Please rate the following Reading Comprehension skills based on their importance.	Q3. We would like to find out which Reading Comprehension skills you think are important. Please rate the following Reading Comprehension skills based on their importance.
Does training and teaching experience influence Educational Therapists' perceived level of ease in reading comprehension skills?	Q3. We would like to know which Reading Comprehension skills you find easy or difficult to teach. Please rate the following skills based on their ease of teaching.	Q4. Educational Therapists have been introduced to explicit and scaffolded ways of teaching Reading Comprehension through the enhanced curriculum. We are interested to find out more about the ease of teaching Reading Comprehension skills based on the enhanced curriculum. Please rate the following Reading Comprehension skills based on your ease of teaching them.

(on Survey 2). Three questions in Survey 1 and their corresponding questions on Survey 2 were selected to answer the research questions in this study (refer to Table 1).

The final version of Surveys 1 and 2 each contained three subscales which corresponded to aspects of comprehension instruction in the three research questions: Frequency, Perceived Importance, and Perceived Ease. The Educational Therapists were required to rate their responses on a 5-point Likert scale and an option of Not Applicable (N.A.) was available for reading comprehension skills that they did not know or were unfamiliar with. For the Frequency subscale item, the response options were: (1) Not at all, (2) Rarely, (3) Sometimes, (4) Often, and (5) Always. For the Perceived Importance and Perceived Ease subscale items, the Educational Therapists rated the extent to which they agree that the skills were important or easy to teach, respectively. For these subscales, the options provided were: (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, and (5) Strongly Agree.

In Survey 1, 24 reading comprehension skills were included for each question. Survey 2 had 29 reading comprehension skills for each question, with five reading comprehension skills added to match the Enhanced Reading Comprehension Curriculum. Besides the ratings on the subscales, Educational Therapists were required to explain their low frequency in teaching the reading comprehension skills (i.e., the skills that they rated "Not at all" or "Rarely" for the Frequency subscale). They were further asked what other skills they taught besides the reading comprehension skills listed in the surveys.

The surveys also collected demographic information such as the Educational Therapists' sex, age, their highest educational qualification obtained, the number of years they taught students with dyslexia, the number of years they taught at the DAS, as well as the literacy level of students they taught at each survey.

PROCEDURE

This study utilised part of the data from the DAS' longitudinal research project beginning from June 2016. Prior to commencement of this study, approval was obtained from the DAS to use the data collected and to collect new data from the Educational Therapists. The Psychology and Child & Human Development Academic Group (formerly Psychological Studies Academic Group) at the NIE also reviewed this study and deemed it to meet ethical guidelines.

At the time when Survey 1 was conducted, the Educational Therapists were informed of the purpose of the original DAS study (i.e., to learn more about how reading comprehension is taught in the DAS classes and the effectiveness of the Enhanced Reading Comprehension curriculum). The purpose of this dissertation study was later conveyed via an information sheet/consent form that was disseminated together with Survey 2 for Educational Therapists to complete and return to the student researcher.

Written consent for the use of their survey responses were obtained and the Educational Therapists were ensured of the confidentiality of their responses.

Training for the DAS Enhanced Reading Comprehension Curriculum

Educational Therapists who were in the DAS Curriculum Team conducted three half-day mass training workshops for the other Educational Therapists on the DAS Enhanced Reading Comprehension Curriculum. The first training workshop session took place on 3 August 2016, the second session on 23 August 2016, and the last session was on 5 September 2016. The Educational Therapists began using the Enhanced Reading Comprehension Curriculum in September 2016.

The training workshops utilised PowerPoint slides which explained the reading comprehension skills and their importance, as well as handouts/activities to show the teaching of reading comprehension skills. Examples and materials on the teaching of some skills were differentiated for students in different literacy ability bands. Each workshop session also included a summary of the skills covered at the start and/or end of the session, and the videos of the workshops were made available to the Educational Therapists. In addition to the training workshops and slides, a copy of the curriculum pack containing resources for the Enhanced Reading Comprehension curriculum was made available at each DAS Learning Centre. One reading comprehension skill (Contextual Clues) was not covered explicitly in the workshop but was included in the resource pack for Educational Therapists.

Administration of Teacher Surveys

The first survey in this study (Survey 1) was administered between June and August 2016, before the Educational Therapists attended the training workshops for the Enhanced Reading Comprehension Curriculum. The second survey (Survey 2) was administered in September 2017. Both surveys were administered online using Google Forms and the Educational Therapists were notified to complete the surveys via email from the DAS researchers. The surveys were each completed in two to three weeks and email reminders were sent before deadlines to remind the Educational Therapists to participate.

Due to unforeseen difficulties with the Google Form used to collect data, only information from a subset of the Educational Therapists (109 responses) from Survey 1 were recorded. Moreover, the number of completed surveys over the two time points decreased from 109 to 49. In all, 48 Educational Therapists responded to both Surveys 1 and 2, but only 47 responses were analysed as one Educational Therapist did not give consent for her data to be used.

DATA ANALYSIS

In this study, reading comprehension skills were split into three categories: skills covered during the training workshops or in the curriculum pack, skills that were not yet covered in training, and skills that were dropped from the Enhanced Reading Comprehension curriculum as reading comprehension skills. For each group of skills, three mixed between-within analyses of variance (ANOVA) were conducted with Time as the within-subject factor and Length of Teaching Experience as the between-subject factor. The dependent variables were Educational Therapists' reported frequency at which skills were taught, their perceived importance of the skills, as well as their perceived ease in teaching the skills.

Survey 1 was developed based on the original DAS Reading Comprehension curriculum whereas Survey 2 was developed based on the Enhanced DAS Reading Comprehension curriculum. Hence, the five additional reading comprehension skills present in Survey 2 but not in Survey 1 were excluded from the data analysis. In addition, Survey 1 contains seven skills which were dropped from the Enhanced DAS Reading Comprehension curriculum and were no longer considered relevant Reading Comprehension skills for analysis. Three skills were further omitted after initial analysis as nine or more Educational Therapists (20% or more of responders) chose the 'N.A' option on them and it was inferred that they were unfamiliar with these skills and thus have not taught them in their classes.

The final set of data consisted of 14 reading comprehension skills which were grouped and analysed based on whether they were covered during training or not yet covered. The 11 reading comprehension skills covered during the workshop or included in the curriculum resource pack were Literal Questions, Contextual Cues, Referencing Skills, Vocabulary Inferential Skills, Sequencing Skills, Synonyms or Antonyms, Similes, Metaphors, Idioms, Irony, and Use of Conjunctions. Three reading comprehension skills that were not yet covered during the training but were supposed to be taught to the Educational Therapists after this study has concluded were Content Inferential Skills, Prediction Skills as well as Summarising and Paraphrasing.

For the between subject factor (teaching experience), a large majority of the Educational Therapists reported a short length of teaching students with dyslexia; 34 out of the 47 participating Educational Therapists (72%) had less than five years of experience. Given the small number of usable survey responses, Educational Therapists of all lengths of teaching experience were included in the analysis. Hence, the Educational Therapists were ranked chronologically from the lowest to the highest in terms of their years of teaching experience at the time of Survey 1. Based on this ranking, the 47 Educational Therapists were placed in three roughly even-sized groups: 16 in the least experienced group (two years or less), 16 in the more experienced group (two and a half to four years), and the last 15 Educational Therapists in the most experienced group (more than four years).

RESULTS

Six separate mixed between-within subject analyses of variance (ANOVAs) were conducted. Time (pre and post-training) served as the within-subject variable. Length of teaching experience served as the between-subject variable.

Research Question One: Does training and teaching experience affect the frequency at which Educational Therapists teach reading comprehension skills in their classes?

Frequency of teaching reading comprehension skills covered in training. There is a significant interaction between length of teaching experience and training on the frequency at which Educational Therapists taught the 11 reading comprehension skills covered in training, $F(2,44) = 4.50$, $p = .017$, $\eta 2 = .17$ (see Table 2). There is no significant main effect of training, $F(1,44) = 1.23$, $p = .274$, $\eta 2 = .03$, nor length of teaching experience, $F(2,44) = 0.98$, $p = .385$, $\eta 2 = .04$.

Table 2: ANOVA summary table for frequency of teaching reading comprehension skills

Types of Skills	Source	*SS*	*df*	*MS*	*F*	*p*	η^2
Skills taught in training	Length of Teaching (A)	0.82	2	0.41	0.98	.385	.04
	Training (B)	0.21	1	0.21	1.23	.274	.03
	A X B	1.55	2	0.77	4.50	.017*	.17
	Error	7.57	44	0.17			
Skills not yet taught in training	Length of Teaching (A)	0.65	2	0.32	0.47	.626	.02
	Training (B)	0.58	1	0.58	2.11	.153	.05
	A X B	1.85	2	0.93	3.35	.044*	.13
	Error	12.13	44	0.28			
Non-reading comprehension skills	Length of Teaching (A)	0.10	2	0.05	0.07	.929	.003
	Training (B)	0.43	1	0.43	1.55	.22	.03
	A X B	1.57	2	0.79	2.82	.071	.11
	Error	12.25	44	0.28			

*p <.05

Table 3: Means of frequency in teaching the reading comprehension skills

	Length of teaching students with dyslexia	n	Pre-training		Post-training		
			M	SD	M	SD	t
Skills taught in training	Least Experienced	16	3.13	0.52	3.35	0.51	-1.53
	More Experienced	16	3.04	0.42	3.37	0.40	-2.98*
	Most Experienced	15	3.55	0.66	3.28	0.70	1.45
Skills not yet taught in training	Least Experienced	16	3.31	0.65	3.31	0.48	0.00
	More Experienced	16	3.29	0.64	3.38	0.61	-0.51
	Most Experienced	15	3.78	0.57	3.22	1.07	2.27

*p<.05 (significant p value <.0167 after Bonferroni correction)

Tests of simple main effects found that for Educational Therapists who are more experienced, the frequency at which they taught the 11 reading comprehension skills covered in training increased significantly from pre-training (M = 3.04, SD = 0.42) to post-training (M = 3.37, SD = 0.40): t(15) = -2.98, p = .009 (see Table 3).

Frequency of teaching reading comprehension skills not yet covered in training. There is a significant interaction between length of teaching and training on the frequency at which Educational Therapists taught the three reading comprehension skills not yet covered in training, F(2,44) = 3.35, p = .044, $\eta 2 = .13$ (see Table 2). There is no significant main effect of training, F(1,44) = 2.11, p = .153, $\eta 2 = .05$, nor of the length of teaching, F(2,44) = 0.47, p = .626, $\eta 2 = .02$.

Tests of simple main effects did not find any significant changes in the frequency at which the reading comprehension skills not yet covered in training were taught for Educational Therapists of all lengths of teaching experience (see Table 3).

Research Question Two: Does training and teaching experience affect Educational Therapists' perceived level of importance of reading comprehension skills?

Perceived importance of the reading comprehension skills covered in training. There is a significant interaction between length of teaching experience and training on the perceived importance of the 11 reading comprehension skills covered in training, F(2,44) = 3.31, p = .046, $\eta 2 = .13$ (see Table 4). There is no significant main effect of training, F (1,44) = 1.00, p = .324, $\eta 2 = .02$, nor length of teaching experience, F(2,44) = 0.01, p = .999, $\eta 2 = .000$ (see Tables 4 and 5).

Table 4: ANOVA summary table for perceived importance of reading comprehension skills

Types of Skills	Source	*SS*	*df*	*MS*	*F*	*p*	η^2
Skills taught in training	Length of Teaching (A)	0.001	2	0.000	0.001	.999	.000
	Training (B)	0.10	1	0.10	1.00	.324	0.02
	A X B	0.65	2	0.32	3.31	.046*	.13
	Error	4.30	44	0.10			
Skills not yet taught in training	Length of Teaching (A)	0.08	2	0.04	0.18	.837	.008
	Training (B)	1.78	1	1.78	17.00	<.001*	.28
	A X B	0.42	2	0.21	2.02	.145	.08
	Error	4.61	44	.11			
Non-reading comprehension skills	Length of Teaching (A)	0.09	2	0.04	0.16	.852	.007
	Training (B)	0.76	1	0.76	5.20	.027*	.11
	A X B	0.54	2	0.27	1.87	.166	.08
	Error	6.39	44	0.15			

**p <.05*

Table 5 Means of perceived importance of reading comprehension skills

	Length of teaching students with dyslexia	Pre-training			Post-training		
		n	*M*	*SD*	*M*	*SD*	*t*
Skills taught in training	Least Experienced	16	4.13	0.45	4.17	0.32	-0.31
	More Experienced	16	4.01	0.40	4.29	0.45	-2.44
	Most Experienced	15	4.22	0.41	4.09	0.47	1.42
Skills not yet taught in training	Least Experienced	16	4.60	0.43	4.15	0.36	
	More Experienced	16	4.48	0.32	4.33	0.40	
	Most Experienced	15	4.44	0.45	4.22	0.48	
	Total (All Lengths)	47	4.51	0.40	4.23	0.42	

**p<.05* (significant *p* value <.0167 after Bonferroni correction)

Tests of simple main effects did not find any significant changes in the perceived importance of reading comprehension skills covered in training for Educational Therapists of all lengths of teaching experience (see Table 5).

Perceived importance of the reading comprehension skills not yet covered in training. There is no significant interaction between length of teaching and training on the perceived importance of the three reading comprehension skills not yet covered in training, $F(2,44) = 2.02$, $p = .145$, $\eta 2 = .08$ (see Table 4). There is no significant main effect of length of teaching experience, $F(2,44) = 0.18$, $p = .837$, $\eta 2 = .008$. However, there was a main effect of training where the Educational Therapists reported a significant decrease in their perceived importance of the reading comprehension skills not yet covered from pre-training ($M = 4.51$, $SD = 0.40$) to post-training ($M = 4.23$, $SD = 0.42$); $F(1,44) = 17.00$, $p < .001$, $\eta 2 = .28$ (see Tables 4 and 5).

Research Question Three: Does training and teaching experience affect Educational Therapists' perceived level of ease in teaching reading comprehension?

Perceived ease in teaching the reading comprehension skills covered in training. There is no significant interaction between length of teaching and training on the perceived ease in teaching the 11 reading comprehension skills covered in training, $F(2,44) = 2.77$, $p = .074$, $\eta 2 = .11$ (see Table 6). There is no significant main effect of length of teaching experience, $F(2,44) = 2.30$, $p = .112$, $\eta 2 = .10$. However, there was a main effect of training, where Educational Therapists reported a significant increase in their perceived ease in teaching reading comprehension skills covered from pre-training ($M = 3.49$, $SD = 0.60$) to post-training ($M = 3.90$, $SD = 0.52$); $F(1,44) = 19.42$, $p = <.001$, $\eta 2 = .31$ (see Tables 6 and 7).

Perceived ease in teaching the reading comprehension skills not yet covered in training. There is a significant interaction between length of teaching experience and training on the perceived ease in teaching the three reading comprehension skills not yet covered in training, $F(2,44) = 3.74$, $p = .032$, $\eta 2 = .15$ (see Table 6). There is no significant main effect of length of teaching experience, $F(2,44) = 0.31$, $p = .734$, $\eta 2 = .01$ but a significant main effect of training, $F(1,44) = 12.39$, $p = .001$, $\eta 2 = .22$.

Tests of simple main effects found that for Educational Therapists who are more experienced, their perceived ease in teaching the three reading comprehension skills not covered in training increased significantly from pre-training ($M = 3.08$, $SD = 0.55$) to post-training ($M = 3.81$, $SD = 0.52$): $t(15) = -4.77$, $p < 0.001$ (see Table 7).

Table 6: ANOVA summary table for perceived ease in teaching reading comprehension skills

Types of Skills	Source	*SS*	*df*	*MS*	*F*	*p*	η^2
Skills taught in training	Length of Teaching (A)	1.83	2	0.92	2.30	.112	.10
	Training (B)	3.74	1	3.73	19.42	<.001*	.31
	A X B	1.07	2	0.53	2.77	.074	.11
	Error	8.46	44	0.19			
Skills not yet taught in training	Length of Teaching (A)	0.32	2	0.16	0.31	.734	.01
	Training (B)	3.43	1	3.43	12.39	0.001*	.22
	A X B	2.07	2	1.03	3.74	.032*	.15
	Error	12.16	44	0.28			
Non-reading comprehension skills	Length of Teaching (A)	1.34	2	0.67	1.44	.248	.06
	Training (B)	1.69	1	1.69	7.88	.007*	.15
	A X B	0.21	2	0.11	.49	.616	.02
	Error	9.46	44	0.22			

**p <.05*

Table 7: Means of perceived ease in teaching reading comprehension skills

	Length of teaching students with dyslexia	Pre-training			Post-training		
		n	*M*	*SD*	*M*	*SD*	*t*
Skills taught in training	Least Experienced	16	3.44	0.43	3.84	0.59	
	More Experienced	16	3.23	0.40	3.89	0.46	
	Most Experienced	15	3.82	0.78	3.96	0.52	
	Total (All Lengths)	47	3.49	0.60	3.90	0.52	
Skills not yet taught in training	Least Experienced	16	3.25	0.64	3.67	0.57	-2.15
	More Experienced	16	3.08	0.55	3.81	0.52	-4.77*
	Most Experienced	15	3.58	0.78	3.58	0.69	0

**p<.05* (significant *p* value <.0167 after Bonferroni correction)

Additional Data Analysis

It was noted that Educational Therapists who are most experienced showed a decreasing trend in the frequency at which they taught the 14 reading comprehension skills following the training workshop. To explore the skills which the most experienced Educational Therapists possibly taught in their classes, further analyses were conducted on the seven skills which were no longer considered as reading comprehension skills in the DAS Enhanced Reading Comprehension curriculum.

Frequency in teaching skills no longer considered reading comprehension skills. There is no significant interaction between length of teaching experience and training on the frequency at which Educational Therapists taught the seven non-reading comprehension skills, $F(2,44) = 2.82$, $p = .071$, $\eta 2 = .11$ (see Table 2). There is also no significant main effect of training, $F(1,44) = 1.55$, $p = .22$, $\eta 2 = .03$, nor of length of teaching, $F(2,44) = 0.07$, $p = .929$, $\eta 2 = .003$ (see Table 8).

Table 8: Means in teaching non-reading comprehension skills

	Length of teaching students with dyslexia	Pre-training			Post-training	
		n	*M*	*SD*	*M*	*SD*
Frequency	Least Experienced	16	3.29	0.66	3.33	0.56
	More Experienced	16	3.29	0.64	3.35	0.61
	Most Experienced	15	3.64	0.78	3.13	0.91
Perceived Importance	Least Experienced	16	4.48	0.44	4.11	0.55
	More Experienced	16	4.30	0.44	4.29	0.47
	Most Experienced	15	4.31	0.48	4.15	0.36
	All Lengths	47	4.37	0.45	4.19	0.46
Perceived Ease	Least Experienced	16	3.58	0.62	3.79	0.57
	More Experienced	16	3.37	0.41	3.77	0.61
	Most Experienced	15	3.76	0.76	3.96	0.47
	All Lengths	47	3.57	0.62	3.84	0.55

Perceived importance of the non-reading comprehension skills. There is no significant interaction between length of teaching and training on the perceived importance of the three non-reading comprehension skills, $F(2,44) = 1.87$, $p = .166$, $\eta 2 = .08$ (see Table 4). There is no significant main effect of the length of teaching experience, $F(2,44) = 0.16$,

$p = .852$, $\eta 2 = .007$. However, there is a significant main effect of training, where the perceived importance of the non-reading comprehension skills decreased significantly from pre-training ($M = 4.37$, $SD = 0.45$) to post-training ($M = 4.19$, $SD = 0.46$); $F(1,44) = 5.20$, $p = .027$, $\eta 2 = .11$ (see Table 4 and 8).

Perceived ease in teaching the non-reading comprehension skills. There is no significant interaction between length of teaching experience and training on the perceived ease in teaching the seven non-reading comprehension skills, $F(2,44) = 0.49$, $p = .616$, $\eta 2 = .02$ (see Table 6). There is also no significant main effect of length of teaching experience, $F(2,44) = 1.44$, $p = .248$, $\eta 2 = .06$ (see Table 6). However, there is a significant main effect of training, where the perceived ease in teaching the non-reading comprehension skills increased significantly from pre-training ($M = 3.57$, $SD = 0.62$) to post-training ($M = 3.83$, $SD = 0.55$); $F(1,44) = 7.88$, $p = .007$, $\eta 2 = .15$ (see Table 8).

Research Question Four: What are the reasons for changes in the Educational Therapists' frequency in teaching comprehension skills as well as their perceived importance of these skills?

Although the changes were insignificant, it was observed that the frequency in teaching of the 14 reading comprehension skills following training generally decreased for the most experienced group of Educational Therapists following training. To investigate the reasons for this decrease, qualitative responses from the 15 Educational Therapists with most teaching experience were explored.

When asked to explain why they did not teach the listed reading comprehension skills, among the 15 most experienced Educational Therapists, 10 of them (66.67%) stated that the skills were less relevant to their students compared to other skills. They elaborated that their students needed more support in basic literacy skills first before tackling the listed higher order reading comprehension skills. Another reason cited by an experienced Educational Therapist was that there was too much content to teach while another Educational Therapist explained that she did not know what some of the skills were. The last three Educational Therapists gave a "not applicable" response.

DISCUSSION

DAS Educational Therapists were surveyed on the frequency at which they taught reading comprehension skills, their perceived importance of those skills, as well as their perceived ease in teaching those skills before and after attending a training workshop for the DAS Enhanced Reading Comprehension curriculum. This study also explored the role of experience in teaching students with dyslexia on the changes in the Educational Therapists' perceptions following the training. Overall, the results showed some support for the hypotheses across the three areas of Educational Therapists' perceptions (frequency, perceived importance, and perceived ease).

Teaching Frequency

It was found that whereas the least and more experienced Educational Therapists taught the skills covered in training more frequently, the most experienced group of Educational Therapists showed a decrease in their teaching of the skills covered in training. Hence, there was little support for the hypotheses that training but not teaching experience would affect the frequency change at which the reading comprehension skills were taught post workshop. Little support was also found for the hypothesis that following training, the frequency at which Educational Therapists teach the reading comprehension skills not covered during training will not change, regardless of teaching experience. For the skills not yet covered in training and the non-reading comprehension skills, the most experienced Educational Therapists generally taught less of the skills whereas Educational Therapists with least or more experience showed little change in their teaching frequency of these skills.

Despite having received the same training and materials for a standardised curriculum, Educational Therapists with different lengths of teaching experience changed differently in the frequency at which they taught the reading comprehension skills following training. For Educational Therapists with the least experience (less than two years) and more experience (two to four years), their positive reaction to the training is in line with past research, which found that beginning teachers are more receptive to change and adopting new practices (Hargreaves, 2005; Rahimi & Alavi, 2017). As suggested by Hargreaves (2005) in his study on Canadian teachers' emotional responses to educational change, this could be because less experienced teachers (with less than five years of teaching experience in his case) are in the process of building up their teaching competence and repertoire of skills. Therefore, they may be more responsive towards adopting changes and new practices.

In contrast, opposite effects of training were found for Educational Therapists with the most teaching experience. In this study, it appears that a teaching experience of four years was sufficient to lower Educational Therapists' responsiveness to in-service training. This finding concurred with those of Hargreaves (2005) as well as Rahimi and Alavi (2017), who found that more experienced teachers are more cautious and resistant to change, or they could be more selective in the changes that they adopt. Similar lines of research by Saborit, Fernandez-Rio, Estrada, Mendez-Gimenez, and Alonso (2016) further highlighted that there was a negative correlation between teaching experience and attitudes towards innovative teaching methods (i.e., cooperative learning in their study). Overall, it appears that teaching experience plays a large role in influencing how much therapists adopt new skills in their teaching, and training may be less effective for most experienced educators if their pre-existing mindset and perceptions are not addressed during the training.

Perceived Importance

There was little support for the hypothesis that the training will increase the perceived importance of the skills covered during training regardless of teaching experience. However, the results showed that teaching experience played a role. The least and more experienced Educational Therapists showed the expected increase in their perceived importance of skills covered in training. In contrast, the most experienced Educational Therapists perceived the skills covered in training as being less important. For the skills that were not covered in the workshop, the hypothesis that teaching experience will affect the change in perceived importance of skills was not supported as well. Across all three levels of teaching experience, Educational Therapists showed a decrease in their perceived importance of skills not yet covered in training as well as the non-reading comprehension skills.

In line with findings on changes in teaching frequency, experienced therapists who work with students with a learning disability, similar to teachers in mainstream settings, may be less receptive to changes imposed on their teaching practices. It could be possible that more experienced Educational Therapists have developed their own ways of teaching along with their preferred set of skills to teach over the years. Moreover, with experience, the Educational Therapists could have developed greater flexibility in their selection of materials and concepts to teach in their own classes, in a way noted by Shawer (2017) in his study. He found that some teachers diverged from coursebook materials and adapted their own teaching as they gained confidence and curriculum knowledge to do so. Hence, even with a standardized curriculum, the experienced teachers could alter the delivery of the curriculum at the classroom level. In this present study, this could be seen in the qualitative responses from the most experienced Educational Therapists, where they highlighted that they considered some of the skills included in the Enhanced Reading Comprehension curriculum to be irrelevant for their students. This perception could have eventually affected their decisions to teach the reading comprehension skills covered in training to a smaller extent, and they might have taught more of the skills that were not included in the Enhanced Reading Comprehension curriculum.

It was further noted that the perceived importance of skills not yet covered in training decreased for the most experienced Educational Therapists. This is contrary to the prediction that the perceived importance of these skills will remain unchanged for this group of Educational Therapists. This finding suggests that the training did change the Educational Therapists' thoughts about the importance of skills that were not covered, although it remains unclear which skills have gained importance since the most experienced Educational Therapists did not see the skills covered in training as well as the non-reading comprehension skills as being more important as well.

Perceived Ease

Support was found for the hypothesis that the training will increase the perceived ease in teaching the reading comprehension skills covered in training, regardless of teaching experience. In comparison, partial support was found for the hypothesis that length of teaching experience will affect the perceived ease in teaching reading comprehension skills not yet covered. As predicted, perceived ease in teaching skills not yet covered in training did not change significantly for the most experienced Educational Therapists. However, findings were opposite of what was expected for the Educational Therapists with least and more teaching experience – they reported an increase in ease in teaching reading comprehension skills not yet taught during training as well as the non-reading comprehension skills.

The finding that post-training, all groups of Educational Therapists found teaching of reading comprehension skills covered to be easier suggests that aspects of the training were effective in equipping the Educational Therapists with the pedagogy or materials to deliver the instruction. This could include the teaching strategies imparted as well as the teaching materials provided. In addition, this study also found that Educational Therapists with more teaching experience reported increased perceived ease in teaching the skills not yet covered in training. Similarly, for the least experienced Educational Therapist, there was also an increase in the perceived ease of the skills not yet covered, albeit the change being non-significant. It is possible that beginning teachers were exploring other skills not covered in training in their own capacity or through informal training (e.g., discussion with colleagues). Hence, they could be gaining more knowledge of skills and find skills generally easier to teach. It could also be possible that less experienced Educational Therapists have not accumulated enough knowledge to gauge the ease at which they could teach the skills not yet covered in training accurately.

IMPLICATIONS

The findings highlight the need to consider multiple factors when providing training and implementing a new curriculum for educators working with students with specific learning difficulties. Importantly, the teaching experience of the teachers needs to be considered and differentiated training methods may be required for the teachers of different levels of teaching experience, given that their responses towards the training differ.

Considering that the experienced Educational Therapists may be less receptive to changes in curriculum, they may need a longer time to gain familiarity with the new curriculum before they will adopt it and the relevant materials in their classroom teaching. To help transit the Educational Therapists into the new curriculum, it may be helpful to address their perceptions towards changes in curriculum directly during training sessions and obtain as well as adopt their feedback. As Kennedy (1999) noted,

addressing and raising the awareness of attitudes and beliefs in teachers is an important part when facilitating changes in their teaching behaviors in the classrooms. In addition, Buff (2014) found that if a person perceives that learning has value for them and that they have control over their learning situation, they experience more joy in learning. Increasing the participation of Educational Therapists in training could therefore reduce their resistance to changes, leading to positive shift in the perceived importance of the covered skills, thereby making the training more effective.

The study findings additionally point to the need for curriculum teams to evaluate the skills they select when developing a new curriculum. The skills included in the curriculum should be comprehensive enough so that they are relevant to the student population as well as perceived to be relevant by the experienced educators. Consulting experienced therapists during the process of curriculum development would thus be helpful.

For educators early in their career, it would be important to ensure that they receive continued support in their early development of teaching competency. Meister and Melnick (2003) found that teachers in the early stages of their career generally report struggles in many areas of teaching including classroom management and effective teaching of reading and language skills. Thus, tools such as sample lesson plans for reading comprehension teaching and checklists for the components of lesson plans can be made part of the curriculum resource pack to guide and monitor the therapists' progress in training.

LIMITATIONS OF CURRENT STUDY

This study was conducted in a naturalistic setting where DAS Educational Therapists taught students of varying ages/grades who have been diagnosed with dyslexia. The natural setting thus resulted in certain methodological limitations, which are discussed in the following section.

Teacher/Student Factors

While this study focused on the training workshop conducted for the DAS Enhanced Reading Comprehension curriculum and its effect on the Educational Therapists, it was highly likely that the Educational Therapists received additional support outside the workshop. Educational Therapists work closely with each other and they often informally share teaching materials and resources, as well as strategies for working with the students. A team of Educational Advisers (comprising senior therapists) also supports the less experienced Educational Therapists in their teaching. These informal sources of support could have exerted some influence on the Educational Therapists' teaching practices and their perceptions of the various reading comprehension skills.

Another teacher and student factor that rendered the design of the original DAS study

complicated is the fluidity in the movements of the students across the different literacy ability bands, along with the changes in classes/combination of students that Educational Therapists have to teach across terms. As this study spanned around a period of a year (four terms), there were changes in the students that each Educational Therapist had to teach, and the focus of literacy intervention changed as students moved between the literacy bands. Since the reading comprehension skills were differentiated for different literacy bands, the many changes among the students and Educational Therapists made it difficult to track the changes in the skills which the Educational Therapists needed to teach for each class. Nonetheless, it was noted that except for two Educational Therapists who only needed to teach the intermediate literacy band, all the other Educational Therapists needed to teach across a range of literacy bands across the four lesson terms. Thus, most Educational Therapists would have needed to work with students with a range of literacy abilities and teach a range of reading comprehension skills during this study.

Similarly, Educational Therapists were informed of the aims of this study prior to completing the final survey form. Hence, there is a possibility that the Educational Therapists' knowledge of the study goals could have influenced and led them to respond in ways that are deemed more desirable. As with other surveys used in research studies, social desirability bias could play a role in affecting individuals' responses (Lavrakas, 2008).

High Attrition Rate

Another limitation of this study would be the high attrition in the survey response rates across the two surveys. Despite the surveys being made compulsory for all active DAS Educational Therapists who attended the training workshop, the response rate declined significantly over time. This could be related to the surveys being lengthy and possibly time consuming to answer, and the fact that the Educational Therapists were aware that their responses would not affect their work appraisal. Eventually, the overlap between the Educational Therapists who responded in Surveys 1 and 2 was small, resulting in an overall small sample size for this present study. The most experienced Educational Therapists also provided little qualitative responses that could have helped to explain the reasons for not teaching the listed reading comprehension skills.

Lack of Fidelity Check

Besides limitations of the sample, the original DAS study did not incorporate a fidelity check on the implementation of the Enhanced Reading Comprehension curriculum during the period of study. Although DAS Educational Therapists were required to submit a recording of a segment of their lesson, it was not stipulated that it had to be part of a reading comprehension lesson. It was thus not possible to verify the teaching frequency of skills reported in this survey as well as the reading comprehension skills listed in the

Educational Therapists' lesson plans which were submitted to the DAS. As the survey was retrospective in nature, there could be inaccuracies when Educational Therapists attempted to recall the frequency at which they taught the 21 skills.

Progressive Changes in the DAS Enhanced Reading Comprehension Curriculum

The list of reading comprehension skills in Survey 1 was developed based on the information in the DAS Enhanced Reading Comprehension curriculum, which was accurate at the time of survey construction. However, between Surveys 1 and 2, changes were made to the curriculum and some items on Survey 1 were rendered irrelevant in the Enhanced Reading Comprehension curriculum. Furthermore, upon the request of the DAS Curriculum Team, items were also added to Survey 2, and these additional items had no corresponding items in Survey 1. Creating an accurate and relevant set of skills for the pre-and post-training surveys based on a finalised curriculum would have reduced unnecessary responding for Educational Therapists and provided a more complete set of data.

FUTURE DIRECTIONS

Due to the scope of this study, only a fraction of items from the original DAS Surveys were included. As the rest of the survey responses contain information on the other aspects of training, such as the teaching materials deemed useful by Educational Therapists, as well as their perceptions on the usefulness of the Enhanced Reading Comprehension curriculum, further analyses may reveal information that could aid in future curriculum development and enhancement efforts.

As highlighted in the report from NRP (2000), other teacher characteristics such as the therapists' age and pre-service educational background could affect their reading comprehension instruction and perhaps their responses to training. Future studies could also explore personality factors, such as conscientiousness, which has been noted by researchers like Palos and Gunaru (2017) to moderate teachers' resistance to change. In addition to teacher factors, there could be student factors and feedback that interact with teachers' knowledge and behaviors to influence the course of the lessons (Richards, Gallo, & Renandya, 2001). For instance, in the preliminary study, student interest was listed as an important point of consideration when Educational Therapists choose skills to teach. Future studies can thus investigate other teacher and student variables to give better insight into the factors that could be directly or indirectly influencing teachers' behaviors and perceptions.

For the current study, focus was given to Educational Therapists' perceptions and reported teaching behavior (i.e., frequency in teaching skills). Also based on the original DAS study, a sister study was conducted in which quantitative information on the DAS students' progress in reading comprehension skills in relation to the old and Enhanced

Reading Comprehension curriculum were collected. However, as students included in that study were not necessarily the same students taught by the Educational Therapists whose responses were included in this study, the findings in both studies could not be linked directly. Future studies could track changes in Educational Therapists' perceptions and teaching behaviors after training while correlating these changes to changes in their students' actual test performance. This will provide stronger evidence for the effectiveness of training contributing to actual improvements in students' skills. Educational Therapists can also be surveyed further on the impact of the Enhanced curriculum on their teaching, such as the perceived improvements in their students' skills, or the changes they have to make to their teaching of other literacy skills (e.g., phonology or morphology) and how this affects their students' intervention.

Future studies could also explore the effectiveness of the Enhanced Reading Comprehension curriculum for students in various literacy bands (i.e., with different literacy abilities). As noted by one of the most experienced Educational Therapist, some of the skills included in the Enhanced curriculum are too difficult for some students. While the curriculum has been differentiated and designed to cover students across all bands, monitoring the gains in the students' skills over time would confirm the suitability of the skills designed for each band, and modifications to these skills in future iterations of the curriculum enhancement can be made.

In addition, besides obtaining teachers' self-reports on their attitudes and behaviors, the curriculum team could obtain a more direct measure of the effectiveness of the training through testing actual changes in the teachers' knowledge of the reading comprehension skills before and after training. This will allow the curriculum developers and trainers to understand if the training had led to an increased knowledge of the skills considered important. Without the teachers having better understanding of the skills included in the enhanced curriculum from the training, they will be unlikely to try teaching those skills, even if they see them as being more important following the training.

Researchers can also consider surveying the teachers' behaviors and perceptions over a longer period of time. The period of the training could have possibly been too short to produce considerable impact on the Educational Therapists' attitudes and actual teaching. As Smith (2014) noted in his literature review, past research has shown that short courses or workshops held just once did not produce a lasting impact on teaching practice. With a longer period of study, Educational Therapists would have more time to absorb the information given and test out the strategies taught in their own practice. Feedback can then be given to the trainers or the curriculum team, and adopted in later stages of curriculum change. Moreover, the effects of training can be tracked to inform if they are lasting or if teachers revert to their old ways of teaching after a brief period of trying out the new curriculum and materials.

In future curriculum development and enhancement efforts, curriculum teams could

additionally consider holding focus group discussions with the educators. With additional input, the team may be better able to foresee issues with the new curriculum and make adjustments before rolling out the curriculum in full to the entire school/organisation. The focus group sessions could also shed light on the reasons for the low response rates for Survey 2, thereby aiding improvements in the data collection procedure.

CONCLUSION

Overall, this study contributes to the current literature by investigating the role of teaching experience in affecting Educational Therapists' response to training for an enhanced reading comprehension curriculum. This study differs from past studies in its focus on in-service therapist training on reading comprehension instruction for students with a learning disability. The findings show that it is important to consider teacher factors, such as length of teaching experience, when designing teacher training programs. To ensure that training is effective for curriculum changes, curriculum developers and trainers will need to tailor their programs, taking into consideration feedback from teachers/therapists.

REFERENCES

British Dyslexia Association (2017). Definitions. Retrieved from http://www.bdadyslexia.org.uk/dyslexic/definitions

Buff, A. (2014). Enjoyment of learning and its personal antecedents: Testing the change–change assumption of the control-value theory of achievement emotions. *Learning and Individual Differences, 31*, 21-29. doi:10.1016/j.lindif.2013.12.007

Chua, M. (2018). *Educational Therapists' Perceptions after Training for an Enhanced Reading Comprehension Curriculum.* [Master dissertation, National Institute of Education, Nanyang Technological University.] NIE Digital Repository. http://hdl.handle.net/10497/20269

Hanushek, E. A., & Rivkin, S. G. (2006). Teacher Quality. In E. A. Hanushek & F. Welch (Eds.), *Handbook of the Economics of Education*. Amsterdam: North Holland.

Hargreaves, A. (2005). Educational change takes ages: Life, career and generational factors in teachers' emotional responses to educational change. *Teaching and Teacher Education, 21*(8), 967-983. doi: 10.1016/j.tate.2005.06.007

Heng, M. A., & Tam, K. Y. (2006). Special education in general teacher education programs in Singapore. *Teacher Education and Special Education, 29*(3), 149-156. doi: 10.1177/088840640602900301

İlter, I. (2017). Teaching word meanings to students at different reading ability: A controlled assessment of the contextual-based vocabulary instruction on reading comprehension. *Egitim ve Bilim, 42*(190). doi: 10.15390/EB.2017.6482

Kennedy, D. (1999). The foreign trainer as change agent and implications for teacher education programmes in China. In Kennedy, C., Doyle, P., & Goh, C. (Eds). *Exploring change in English language teaching.* Oxford: Macmillan Heinemann English Language Teaching, 29-37.

Kennedy, M. M. (2016). How does professional development improve teaching? *Review of educational research, 86*(4), 945-980.

Landulfo, C., Chandy, C., & Wong, Z. Y. (2015). Expanding the provision for people with dyslexia in Singapore. *Asia Pacific Journal of Developmental Differences, 2* (2), 234-276. doi: 10.3850/S2345734115000307

Lavrakas, P. J. (2008). *Encyclopedia of survey research methods*. Sage Publications.

Meister, D. G., & Melnick, S. A. (2003). National new teacher study: Beginning teachers' concerns. *Action in Teacher Education, 24*(4), 87-94. Retrieved from Education Source, EBSCOhost

National Reading Panel (US), National Institute of Child Health, & Human Development (US). (2000). Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. National Institute of Child Health and Human Development, National Institutes of Health. Retrieved from https://www1.nichd.nih.gov/publications/pubs/nrp/Documents/report.pdf

Ogle, D. M. (1986). K-W-L: A teaching model that develops active reading of expository text. *Reading Teacher, 39*, 564-570. doi: 10.1598/RT.39.6.11

Opfer, V. D., & Pedder, D. (2011). Conceptualizing teacher professional learning. *Review of educational research, 81*(3), 376-407.

Osman, D. J., & Warner, J. R. (2020). Measuring teacher motivation: The missing link between professional development and practice. *Teaching and Teacher Education, 92*, 103064.

Paloș, R., & Gunaru, S. A. (2017). The relationship between resistance to change and Romanian teachers' attitude towards continuing education: the moderating role of conscientiousness. *Journal of Education for Teaching, 43*(4), 458-473. doi: 10.1080/02607476.2017.1297043

Point, L. (2004). *A closer look at the five essential components of effective reading instruction: A review of scientifically based reading research for teachers.* Naperville, IL: Learning Point Associates.

Rahimi, M., & Alavi, J. (2017). The role of teaching experience in language teachers' perceptions of a top-down curriculum change. *The Curriculum Journal, 28*(4), 479-503. doi: 10.1080/09585176.2017.1344134

Richards, J. C., Gallo, P. B., & Renandya, W. A. (2001). Exploring teachers' beliefs and the processes of change. *PAC Journal, 1*(1), 41-58. Retrieved from https://www.professorjackrichards.com/wp-content/uploads/exploring-teacher-change.pdf

Saborit, J. A. P., Fernandez-Rio, J., Estrada, J. A. C., Mendez-Gimenez, A., & Alonso, D. M. (2016). Teachers' attitude and perception towards cooperative learning implementation: Influence of continuing training. *Teaching and Teacher Education,59*, 438-445. doi: 10.1016/j.tate.2016.07.020

Shawer, S. F. (2017). Teacher-driven curriculum development at the classroom level: Implications for curriculum, pedagogy and teacher training. *Teaching and Teacher Education, 63*, 296-313. doi: 10.1016/j.tate.2016.12.017

Smith, G. (2014). An innovative model of professional development to enhance the teaching and learning of primary science in Irish schools. *Professional development in education, 40*(3), 467-487. doi: 10.1080/19415257.2013.830274

Sparapani, E. F., & Perez, D. M. C. (2015). A perspective on the standardized curriculum and its effect on teaching and learning. *Journal of Education & Social Policy, 2*(5), 78-87.

Therrien, W. J. (2004). Fluency and comprehension gains as a result of repeated reading: A meta-analysis. *Remedial and Special Education, 25*(4), 252-261. doi: 10.1177/07419325040250040801

Walker, Z. (2016). Special Education Teacher Preparation in Singapore's Dual Education System. *Teacher Education and Special Education, 39*(3), 178-190. doi: 10.1177/0888406415622251

Asia Pacific Journal of Developmental Differences
Vol. 9, No. 1, January 2022, pp. 31—41
DOI: 10.3850/S2345734122000108

Empowering teachers, empowering the nation: Developing an accessible training system for dyslexia in Indonesia.

Kristiantini Dewi Soegondo[1], Purboyo Solek[1], Munadia[1], Rima Natasha Hartanto[1], Wiyarni Pambudi[1], Rina Elizabeth[1], R. Irma Rachmawati[1], Yulianti Iman[1], Dina Alia[1], Athiyatul Aufie[1], R. Nur Brusiana Suandi[1], Ikfina Maufuriyah[2]

1. *Dyslexia Association of Indonesia*
2. *Komunitas Peduli Anak, Jepara, Indonesia*

Abstract

This article reports a large-scale qualitative research project designed to increase awareness of dyslexia in Indonesia, in 3 phases, i) evaluating current knowledge ii) updating current knowledge and iii) providing in depth training and application of skills, and disseminating this knowledge more widely. A large-scale questionnaire study of 1781 teachers revealed a high degree of misunderstanding and belief in myths about dyslexia within the teaching population in Indonesia. In response to this perceived need, the Dyslexia association of Indonesia undertook the development and dissemination of a training course for teachers, over a 5-year period, originally designed to be delivered in person, but most recently delivered online in 2021, in response to the limitations of Covid. 894 teachers in all benefitted from this training, delivered over 28 sessions. Participants were asked to commit to attending regularly, and completed a questionnaire survey, and reflection on the course. Those who had achieved solid results from this initial training, based on the criteria of regular attendance and improvement on scores in understanding dyslexia, were invited to join a more focused in-depth bursary funded dyslexia workshop. Finally, the trained teachers were invited to disseminate their knowledge more widely, and seven teachers elected to set up their own seminars and workshops, and work on individual education plans for children that they taught. In this article, the potential of this approach is discussed for reaching a wider population of teachers in a country spanning an area equivalent to an eight of the earth's circumference in scattered islands, This approach has the potential to increase dyslexia awareness and understanding, and ensure that appropriate support for dyslexia can be provided more widely in Indonesia.

Keywords: Indonesia, dyslexia awareness, teacher training, dissemination

* *Correspondence to:*
Dr Kristiantini Dewi, Chairman of the Dyslexia Association of Indonesia Email: kristiantinidewi@gmail.com

INTRODUCTION AND BACKGROUND – THE NEED FOR TRAINING

Dyslexia has not yet been recognized in Indonesia in terms of legislation and is typically equated with learning difficulties or intellectual disability. Moreover, there are no special terms for dyslexia in the general school system, and children may be presented with a simplified curriculum based on misunderstanding of dyslexia, its causes and treatment (Dewi, 2021 in press). This has meant that the prospects for children with dyslexia in Indonesia have remained poor, and there is little public awareness of the strengths and weaknesses of dyslexia.

Over many years the Dyslexia association of Indonesia (DAI), founded in 2009 by professional parents, has sought to disseminate awareness of dyslexia including both educational and medical aspects to parents and teachers, in order to combat this lack of awareness and ensure a better outcome for children with dyslexia. The authors base their understanding of dyslexia on the literature from the UK and USA (e.g. Shaywitz and Shaywitz, 2003, Vellutino et al., 2004) including aspects such as phonological skill, fluency, and working memory, which advocate multi-sensory techniques for intervention, coupled with a broader awareness of problems in learning in dyslexia derived from the work of Fawcett and Nicolson (e.g. Nicolson and Fawcett, 2007). The authors academic knowledge is enhanced by their personal experience of working with many cases of children with dyslexia over the years in their school and clinic in Bandung, where they deliver a whole child approach to learning. Here they deliver programmes which emphasise written and spoken language, following instructions, issues with directions and learning the time, as well as phonological, working memory and mastery support (Solek and Dewi, 2013). In line with its mission and vision, the Dyslexia Association of Indonesia (DAI), has put in enormous effort in order to educate and empower the teachers in Indonesia, and work closely with them as they are the front liners who would initially recognize the learning difficulty issues in the field. In order to clarify the initial awareness of teachers in Indonesia, where there has been little recognition of dyslexia within teacher training or within the school system, in phase 1 of this research, they undertook an ongoing survey based on that previously delivered to parents, this time delivered to teachers.

The DAI also noted the findings taken from the survey previously distributed by the DAI to parents, that included a number of myths regarding dyslexia, and that these remained widely accepted based on a lack of knowledge of the research associated with dyslexia internationally.. A number of myths about dyslexia have been noted for some years in the literature, from the UK and USA, (Riddick, 1995). These include ongoing arguments on whether dyslexia really exists, (Elliott and Grigorenko, 2014, see Nicolson, 2005 for a different view), if it differs from other learning disabilities and requires different intervention, whether it reflects some inadequacies in the parents themselves, or whether it is simply an excuse from middle class parents seeking a suitable label to cover the low ability of their children (Riddick, 1995).

In terms of intervention, a number of approaches have been suggested over the years, with some designed to address issues such as self-esteem, and others more directly focused in reading itself. In Indonesia, lack of awareness and understanding of the problems of dyslexia has led to a number of myths, specific to the local context in Indonesia, in terms of intervention and cures. These myths, as well as some recognized facts about dyslexia were included in the questionnaire survey to identify levels of knowledge in teachers at the start of the research.

METHODS AND PARTICIPANTS.

The teacher survey was undertaken using simple questionnaires that consisted of several questions, outlined below covering both educational and medical aspects of dyslexia, as well as approaches to intervention. The total number of teachers participating by September 2021 were 1,781 teachers, (Dewi, 2019) who originally came from various places in all of the larger islands of Indonesia, which included the following: Sumatera Island, Java Island, Borneo Island, Bali Island, and Nusa Tenggara Island. Most of them (92%) were women, two thirds of them were in the age range 20-40 years old. Approximately 70% of them held bachelor degrees, and 40% among this group took Education as their major in faculty. More than half (56.2%) were nursery teachers, 28% were primary school teacher and the rest were teachers from secondary school, special school (for Intellectual Disability) and home-schooling bodies. Fifty two percent of participants said that they had students with dyslexia in their classes, and 76.4% of the teachers said that they have as many as 1-3 students with dyslexia in their classes. Unfortunately, 70.7% of teachers had never heard about the existence of Dyslexia Association of Indonesia and therefore had little expertise in dyslexia.

RESULTS

Phase 1 Survey

Key points addressed in the survey related to both educational and medical aspects of dyslexia. One myth arising in Indonesia was based on the perception that dyslexia was caused by a poor diet, whereas another implicated hypotonia and problems with spine. Attributions included poor parenting, poor teaching and disinclination to learn in the child themselves. Overall, 31.5% of the participant agreed with the myth that dyslexia was due to poor diet, hypo tonic muscles, and spinal problems. This belief is based on the posture that many dyslexic children adopt when asked to write or spell, and slumped across their desks, while hypertonia is linked to holding the pen awkwardly. Sixty two percent believed that dyslexia is a genetic-based condition, which is supported by family studies over the years, while 38% believed erroneously that dyslexia is variously due to poor parenting, poor teaching, gadget exposure or that the child was having too much fun on his own and therefore preferred not to engage with education, or maternity illness, and impairment of the back spine. Almost 24% of the teachers thought incorrectly

that the intelligence level of dyslexic student is below average. Only 16.2% of participants supported remedial educational therapy for dyslexia, and the rest suggested other untried therapies, for instance: massage, music, hiking, riding dolphins, meditation, and a natural setting. These therapies would be instrumental in improving the self-esteem issues associated with dyslexia, but are not specifically designed to improve the educational difficulties that prevent the development of potential for dyslexic children.

Phase 2. The Training Programme

Considering the gap in understanding of dyslexia that teachers showed from this survey, in terms of both origins and interventions for dyslexia, the DAI decided to conduct training programmes that would update and fulfill the needs of the teachers regarding child development and comprehensive management of students with dyslexia. It was important that these programmes were easily understandable and friendly, in order for the knowledge obtained to be applied in the classes on a daily basis. The programme was always preceded by a more general seminar on dyslexia, which participants were invited to attend. It was understood that many of the teachers might not be able to join the program due to the cost if they had to allocate some funds to pay for the training programme, therefore the programs were set up as a bursary programme. This means, there were some terms and conditions for the teachers to be eligible to join the programme, based on their commitment to attend regularly, complete the programme and submit the associated exercises. Once, they were deemed eligible, then all the operational cost was borne by the association. The funds used by the association to conduct this bursary program were from internal parties as there were no external sponsors at all. However, in its fourth batch, which was run in 2021, the association received support from a Child Care Community based Non-Government Organisation based in Jepara (a small city in West Java). The NGO name was KOMPAK and its leader had sponsorship from the Australian Government through the Alumni Grant Scheme (AGS) as she was an alumni of the Australia-Indonesia Moslem Youth Exchange Program (AIMEP) in 2014.

METHODOLOGY

Time Line

DAI has conducted 4 batches of The Bursary Programme for Teachers. The first three batches were run in offline settings in Bandung (2017), Jakarta (2018) and Aceh (2019) (Dewi, 2020). The fourth one was run online using the zoom platform in 2021. In the training programs that took place offline, the targeted teachers were teachers who were in the area where the training took place and its surroundings. The place used to hold the training were the function rooms provided by some schools that were willing to collaborate with DAI to support this event. In the fourth batch, the participants came from various regions in Indonesia (51 cities from many islands), not only focusing on one

location or area. This was only possible because the training was conducted online due to the pandemic situation. On top of that, this online setting allowed more participant capacity because it was not limited by the venue capacity.

Algorithm of the Bursary Program

The bursary program was always preceded by a general seminar for the public. The public seminars were unsurprisingly attended by many participants and all were enthusiastic to learn more about dyslexia. This was welcomed by the association with an offer to join the Bursary program. Interestingly, those who were interested in signing in to this program were not only teachers, but also parents, lecturers, health professionals (doctors, midwives, therapists), psychologists, as well as Organizers of the Special Needs Child Therapy Centers.

The bursary program was held in two parts. The first part was called the Education Class, while the latter one was called the Bursary Class. As mentioned earlier, in the Education Class, the participants were still varied in term of their professional background, however most of them were teachers. In this programme, there were 10 modules that were delivered to the teachers. All of these modules explained the normal developmental milestones of a child, covering the areas of gross motor development, fine motor skills, language, social interaction, cognition and personal skills in carrying out daily activities. Many participants initially questioned why they should study these topics, because they thought that they were taking this program to learn about dyslexia only. But as soon as they started learning these topics, they immediately came to understand that these topics were the science that underlies the science of dyslexia comprehensively, because in order to understand how dyslexic performance differs, it is necessary to understand normal developmental processes in learning and skills.

Table 1. The Education Class For Teachers

EDUCATION CLASS FOR TEACHERS	TRAINING			
	MODULE	SESSION	HOURS	NUMBER OF PARTICIPANTS
FIRST BATCH	10	10	25	258
SECOND BATCH	10	5	25	192
THIRD BATCH	10	5	25	200
FOURTH BATCH	16	8	36	244

As we can see from Table 1, there were 10 modules given in the Education Class, and delivered in 5 to 10 sessions, or approximately 25-36 hours in total. Particularly in the fourth batch, there were more modules provided in the training, but this was actually a

modification of the settings for the implementation of the training conducted online. The number of the sessions depended on the availability of both the function halls and the local steering committee. The number of the participants were approximately about 200-250 persons. The first three batches of training, were done off line in Bandung, Jakarta and Aceh, started in 2017, 2018, and 2019 consecutively. The fourth batch was done in 2021, and was the first one to be done online via the zoom platform, and therefore the participants came from a wide range of places in Indonesia.

In every session of The Education Class, the participants had to fulfil the pre-tests and post-tests, and write reflections upon the modules that had been taught in the session. This reflection was intended so that participants were able to understand the material more deeply because by writing their reflections, the participants needed to reread and process the material. Participants were also indirectly required to be able to perform critical analysis, evaluate, synthesize information, and reflect. With this reflection task, participants were also encouraged to always listen to the explanations of the speakers carefully, because often reflection questions were generated from the statements of the resource persons and were linked to previous materials. Through those assignments (pre-tests, post-tests, reflections), the organizers were able to supervise and monitor the understanding level of the participants and how well the material presented by the resource persons were digested. In this Education Class, participants were also subject to strict rules regarding attendance where they were required to always be present on time, not to be absent in the middle of the training, and also not to be off their camera nor leave the meeting room before the event was over.

Phase 3. The Bursary Class

To continue to the next training level, there were terms & conditions that must be met by participants to be eligible to join the Bursary Class. Participant screening was carried out through an assessment of attendance compliance, pre-test and post-test performance, and the quality of reflection.

Table 2: The Bursary class for teachers

BURSARY CLASS FOR TEACHERS	TRAINING			
	MODULE	SESSION	HOURS	NUMBER OF PARTICIPANTS
FIRST BATCH	24	6	42	32
SECOND BATCH	24	6	42	52
THIRD BATCH	24	6	42	45
FOURTH BATCH	26	14	63	94

As we may see from Table 2, in The Bursary Class, the number of the participants were considerably reduced to 15-30% of the number in the Education Class. There were 24 modules given in 6 sessions that took 42 hours of learning in total. And in the fourth batch, the modules were chunked into 26 modules that were delivered in 14 sessions that took 62 hours of learning in total. In the Bursary Class, participants learned in great detail how to deal with dyslexic children. Actually, this Bursary Program was more accurately described as a workshop because a great deal of the material taught was in the form of skills that can be applied hands-on in the class. The material provided included an explanation of the identification of cases of general learning difficulties and specific learning difficulties, differentiating between Delayed Development and Intellectual Disability, The Milestones of Dyslexia across the life span, Executive Function, Learning Strategies for Students with Dyslexia, Multisensory Approach Learning, Phonemic Awareness, Reading Comprehension, Socio-Emotional Problems in Dyslexia, Best Practice of Parenting for Children with Dyslexia, Handwriting and Dysgraphia, Dyscalculia, Comorbidities of Dyslexia, i.e.. Dyspraxia, ADHD and Giftedness. Furthermore, participants were also taught to set up an Individual Education Plan (IEP) and to familiarize themselves with using the compute-based "Indonesian Early Identification Tools for Dyslexia" programs that were developed by the Dyslexia Association of Indonesia (Dewi et al, 2018, Saputra, 2015, Saputra, Alfarozi and Nugroho, 2018). After completing the Bursary Programme, it is hoped that the participants will have better skills to manage dyslexic children at school.

Similar to the Education Class, in this Bursary Program participants were also asked to complete the pre-test, post-test and write reflections on each training session. At the end of each Bursary Class, we gave awards as a token of appreciation to participants who showed good reflection writing, who were active in discussions and who showed the best test results. Surprisingly, the participants also gave us feedback in the form of praise and gratitude for the opportunity they were given to be able to learn in this Bursary Class. In the closing ceremony of this Bursary Programme, teachers often said that they still wanted to always be in one community that was under the guidance of the association. Therefore, at the end of the fourth batch of Bursary Program, a new community called the Dyslexia Teacher Support Group was formed. The existence of this community was expected to be a consistent learning medium for teachers, a medium for sharing information among them, and for updating knowledge from competent resource persons from the association.

RESULTS

End of project quantitative evaluation

At the end of the programme, a brief survey was completed among all the participants, and the speakers, as well as the steering committee.

Table 3. Satisfaction with the programme

	Very satisfied %	Satisfied %	Overall
Satisfaction with the course	82.6	8.7	91.3
Duration	62.9	37.1	100

The survey questioned the content quality, the power point slides, duration of the symposium, how the resource persons conveyed the material, the topics presented, how beneficial the program was and how well the steering committee worked. All participants believed that this activity has a significant impact on improving the understanding of dyslexia of both teacher and community understanding of dyslexia.

QUALITATIVE EVALUATION OF THE PROGRAMME

Strengths

We also asked the participants what good things they could learn from the activity. From the perspective of the teachers, they felt that this program has widened their perspectives in terms of their understanding about dyslexia and other related learning difficulties, as well as their knowledge about general child development that led them to a more comprehensive skill in managing their classes, particularly in dealing with students with dyslexia. Many of those teachers hoped that they could take a wider role in educating society in the future because they realized that there were too many myths and misunderstandings in the field. From the perspective of the resource speakers from the DAI, they felt an extraordinary experience because at the same time they could share their knowledge and experience while also learning from each other with other resource persons and continuing to pick up various facts in the field presented by the teachers. As professionals, their horizons become wider when teachers convey many factual things that are happening in the community and at school. Professionals have acknowledged that with this online training setting, they have succeeded in reaching teachers from any region in Indonesia, including even remote areas. In addition, they feel very grateful and proud to be able to play a role in this excellent program. We also asked the same question to the executive committee from the association and also from the KOMPAK team. They said that they learned a great deal from the organization of this activity, where they saw the enthusiasm of the speakers in delivering the material presented in detail and comprehensively, in a language that was easily understood by the teachers, so this was received with great enthusiasm too by the participants eager to continue to learn the material presented.

Areas for improvement and continuation

As part of the feedback, we asked all participants about the things that were still felt to be lacking in the implementation of this program. From the perspective of the teachers, they felt that the duration of learning per session was very time consuming and draining of their energy. They proposed improving time management arrangements in this regard. Other than that, they still look forward to having an offline hands-on workshop with DAI once it is possible because they felt that some hands-on skills were less effective if they were not practiced offline. On top of that, they strongly proposed the need for regular remedial lectures from the resource persons in DAI to keep their knowledge updated. All resource persons, including the organizing committee, suggested a good digital log book so that they could document various activities in the Community Service program. This would certainly help the resource persons to assist the activities of the teachers in the community. They also hoped that this excellent program can continue to be sustainable with the support of attention and funds from sponsors, both from the government and the private sectors.

Online or offline

Finally, especially for the participants who participated in this program in the last batch, we asked their opinion on what they felt regarding the difference between offline and online training. All of the participants stated that the content of the material presented was no different, in fact there was always an update in each batch. However, they felt that offline training was always easier to understand because a lot of material was followed by hands-on practicum. In addition, the participants felt a very close relationship in the offline setting. This close relationship was also felt by both the speakers and the executive committee.

LIMITATIONS AND DIRECTION FOR FURTHER RESEARCH

In future research, the authors recognize the need to obtain direct quotations from the participants which could be included in the article, in order to enrich understanding of the impact that the bursary programme had on those who were able to take part, in addition to qualitative material of the type presented here.

One key aspect that was identified and has been followed up in ongoing research, is the need to maintain and update knowledge on dyslexia. Building on the format adopted with the dyslexic parents group in Bandung, it was agreed that selected participants who had shown a special commitment to the programme should be encouraged to continue sharing awareness with others, building in an extension programme which was designated the Community Service programme, and is outlined below.

THE COMMUNITY SERVICE PROGRAMME

In order to maintain and ensure that the knowledge delivered by the association is truly and correctly applied to the community (especially to dyslexic children), the Dyslexia Association of Indonesia encouraged the participants to spread this knowledge by carrying out activities called community service. Community Service Activities consist of: (1). Educating and sharing knowledge of dyslexia to their respective communities, (2). Using the dyslexia early screening tool developed by DAI, (Dewi et al, 2018) (3). Identifying cases of general learning disability and specific learning difficulty, (4). Setting up Individualized Education Plans, (5). Executing the IEP and (6). Giving feedback in an evaluation session from the resource from the association.

Currently, several participants (7) have started to make presentations to their respective communities, which include schools, religious communities, and local authorities, as well as to the public. This Community Service Program was set to be completed within one year after the closing of The Bursary Program. It is hoped that by that time there will be many more teachers, parents and communities who would understand about dyslexia. This knowledge of dyslexia will continue to roll on like a snowball effect, getting bigger and bigger all the time, reaching more and more people in Indonesian society to develop a greater understanding of dyslexia.

CONCLUSIONS

In this research we identified the need for greater understanding of dyslexia in teachers in Indonesia, in response to a survey of 1781 teachers. This survey indicated that not only was there an acceptance of some of the more general myths on dyslexia, such as reflecting low intelligence, poor parenting and teaching, but also some of the more idiosyncratic myths highlighted by earlier research with parents of dyslexics in Indonesia. This indicated a low awareness of the importance of educational intervention, with a preference for approaches such as swimming with dolphins or engaging with nature, interventions designed to improve self-esteem and executive function, but not necessarily to improve the educational impact of dyslexia. In response to this perceived need, we delivered a series of seminars and bursary classes in 2 phases, to provide general information on normal development and more in-depth information on identifying dyslexia and creating an individual development plan. The project was well received, with 894 in total completing the training, with the final tranche delivered remotely during the pandemic. Participants agreed that it was the most useful to meet in person, given the opportunities associated to implement and evaluate skills acquired. However, it was also clear that running the programme on line had considerably extended the numbers able to benefit from this approach. A lasting legacy of the training was the creation of a new support group for the DAI, coupled with community service from 7 participants who took it on themselves to become more deeply involved in their own regions, which is outlined in directions for further research above.

It is true that raising awareness was not easy at all. Not only should it incorporate theories and practices but also be coupled with a supporting system to gain better and faster outcomes. However, all the participants believed that this program was like a treasure trove of educators, providing knowledge beyond the comfort zone that could only be obtained with great genuine effort and determination. And because the teacher is the spearhead of change for his students, the teacher must not stop learning and renewing his knowledge. All we did was touch one heart to touch many more and to make a big difference in helping these special kids. We learn, we share and we help! In the end, DAI believes that this series of activities to educate teachers is one of the best efforts to empower the nation. It is very proud that the Dyslexia Association of Indonesia has taken an important role in this effort, and hopes to build on this approach in future research. The approach has considerable potential for use in countries where there is a need to update and maintain knowledge of dyslexia and other conditions, building on sound research developed internationally.

REFERENCES

Dewi, K. (2020). Raising community awareness of dyslexia by empowering parents and teachers as an important components of society. *Asia Pacific Journal of Developmental Differences, 7*, 346.

Dewi, K. (2021, in press). Dyslexia in Indonesia. In G., Gelberheri & S., Lee (eds) *Routledge International Handbook of dyslexia,* Routledge publishing: Oxfordshire.

Dewi, K., & Solek, P. (2019). Level of Understanding of Dyslexia among Indonesian Professionals, Teachers and Society. *Asia Pacific Journal of Developmental Differences, 6,*

Dewi, K., Irmanda, H. N., & Solek, P. (2018). Indonesia Computer-based Dyslexia Early Identification System. *Dyslexia Association of Singapore Handbook*, 285-309.

Elliott, J., & Grigorenko, E. (2014). *The dyslexia debate*. Cambridge University Press.

Nicolson, R. I. (2005) Dyslexia: beyond the myth. *The Psychologist, 18*, 658-659.

Nicolson, R. I., & Fawcett, A. J. (2007). *Dyslexia, learning and the Brain.* MIT Bradford press.

Riddick, B. (1995). Dyslexia: Dispelling the myths, *Disability & Society, 10*:4, 457-474, DOI: 10.1080/09687599550023453

Saputra, M. R. U. (2015). LexiPal: Design, Implementation and Evaluation of Gamification on Learning Application for Dyslexia. *International Journal of Computer Applications, 131*(7), 37–43.

Saputra, M.R.U., Alfarozi, S, and Nugroho, K. (2018). LexiPal: Kinect-based application for dyslexia using multisensory approach and natural user interface. *International Journal of Computer Applications in Technology. 57*(4):334

Shaywitz, S. E., & Shaywitz, B. A. (2003) The science of reading and dyslexia, *Journal of American Association for Pediatric Ophthalmology and Strabismus, 7*, 158–166.

Solek, P., & Dewi, K. (2013). *Dyslexia today, genius tomorrow*. Dyslexia Association of Indonesia press.

Vellutino, F. R., Fletcher, J. M., Snowling, M. J., & Scanlon, D. M. (2004). Specific reading disability (dyslexia): what have we learned in the past four decades?, *Journal of child psychology and psychiatry, and allied disciplines, 45*, 2–40.

Asia Pacific Journal of Developmental Differences
Vol. 9, No. 1, January 2022, pp. 43—63
DOI: 10.3850/S2345734122000113

A Comparative Pilot Study of Curriculum-Based vs. Skill-Based Assessment for Dyslexia

Sushree Sahu[1], Vandana Shriharsh[1], Triptish Bhatia[1], Pragati Goel[2], Nandini C. Singh[2,3], Smita N. Deshpande[1*]

1. *Atal Bihari Vajpayee Institute of Medical Sciences-Dr. Ram Manohar Lohia Hospital, New Delhi, India.*
2. *National Brain Research Centre, Manesar, India.*
3. *UNESCO-Mahatma Gandhi Institute of Education for Peace and Sustainable Development, New Delhi, India*

Abstract

Introduction: *Specific Learning Disability (SLD) is a certifiable disability for benefits under the Rights of Persons with Disabilities Act in India (2016) for which the NIMHANS SLD index is the legally mandated standard for assessment. We evaluated the NIMHANS battery against Dyslexia Assessment for Languages of India (DALI), a skill-based objective assessment.* ***Methods:*** *School going children (17 consented, 15 included in final analysis) from ages 5-10 years, and with IQ more than 85 on Malin's Intelligence Scale for Indian Children, and standard score 70 and above on Colored Progressive Matrices were assessed using the NIMHANS SLD index, curriculum textbooks, and DALI at the Department of Psychiatry and Clinical Psychology of a tertiary care, free teaching hospital in New Delhi. Various domains/tests were evaluated and categorized as comparable or non-comparable. Concordance analysis (kappa) was used to test for agreement in comparable domains and Spearman's rank correlation was used to test for relationship between all domains of NIMHANS battery and DALI.* ***Results:*** *Significant concordance between curriculum textbooks and DALI was found on tests for English and Hindi Spelling, English Reading, and English Comprehension. Significant correlations were found on tests for Spelling (both languages), Reading (both languages), and Comprehension (English only) between curriculum textbooks and DALI.* ***Conclusion:*** *We found curriculum textbooks, NIMHANS SLD index and DALI comparable in English tests for dyslexia and Hindi Spelling test. Given the complex education system and disparate examination testing systems in India, it might be beneficial to incorporate skill-based tests for SLD evaluation.*

Keywords: Dyslexia, Curriculum, NIMHANS SLD index, DALI

***** *Correspondence to: Dr. Smita N. Deshpande, Dept. of Psychiatry, De-addiction Services & Resource Center for Tobacco Control, Centre of Excellence in Mental Health, Atal Bihari Vajpayee Institute of Medical Sciences & Dr. Ram Manohar Lohia Hospital, Banga Bandhu Sheikh Mujib Road, New Delhi, India Email address: smitadeshp@gmail.com*

INTRODUCTION

Specific learning disabilities (SLD) are a heterogeneous group of disorders affecting school-going children manifesting as significant and persistent learning difficulties in literacy acquisition, specifically in reading, writing, listening, speaking and mathematics (Ahmad, 2015; Karande, Sholapurwala, & Kulkarni 2011). SLDs affect approximately 5-15% of school-going children and are attributed to dysfunction in the central nervous system (Karande & Kulkarni, 2005; Lagae, 2008). In a 5 year study of children reporting to the Learning Disability Centre in urban India, nearly 88% of children were diagnosed with dyslexia, dyscalculia and dysgraphia, and nearly 10% of children had dyslexia with dysgraphia (Singh et al., 2017). Children diagnosed with an SLD have adequate learning opportunity including the capacity and motivation for learning, as well as intact hearing and vision abilities (Karande & Venkataraman, 2012; Karande, Bhosrekar, Kulkarni, & Thakker, 2009).

Children with SLD have IQ of 85 and above (i.e. no intellectual impairment), but struggle with academic achievement expected of their chronological age, and need educational accommodations (John, Sadasivan, Sukumaran, District, & David, 2020). SLDs have been included in the disability category of the Rights of Persons with Disabilities (RPWD) Act in India (2016) necessitating the early identification, assessment, diagnosis and certification of vulnerable children (The Gazette of India Extraordinary, 2018) to enable early intervention. However, the certification of disability in SLD is often subjective and equivocal, creating confusion for clinicians and certifying boards (John, 2020). The most widely used battery for SLD assessment, diagnosis and certification in India is National Institute of Mental Health and Neurosciences (NIMHANS) index for SLD developed in 1992 (Kapur, John, Rozario, Oommen, & Uma, 2002). It is available for two levels- Level I for 5-7 years, and Level II for 8-12 years. The battery is available only in English, lacks objective and well-established norms for subtests across all the classes, is based on the Karnataka syllabus (considered to be easier than some other Indian boards) and lacks country-wide application (Kohli, Sharma & Padhy, 2018). For assessment and certification, the regular clinical practice has been to use the battery in conjunction with school-based curriculum textbooks in English and the respective regional language. Thus, the child is primarily assessed using school textbooks for domains like Reading, Writing, Dictation, Comprehension and Arithmetic. A child whose performance is two grades below the current grade is diagnosed with SLD. While the school curriculum is a criterion based assessment for SLD (Ahmad, 2015), it lacks standardization in the assessment of children (meaning two children of the same age and class might be assessed using different content and test items depending on the type of school, examination board, and the state they belong to). Moreover, it is difficult to ascertain the equivalence of the test items in English and the regional language, thereby creating an arbitrary assessment protocol. It is also unlikely that two assessors assessing the same child might assess him on the exact same items from the textbooks, adding to further assessment arbitrariness and reduced objectivity in SLD assessment.

In the light of these challenges, an objective standardized skill-based assessment with equivalent tests in English and the regional language becomes imperative. India is a multilingual and multicultural country wherein the three language formula is employed in teaching and academics in most states with the further complication of two types of schools: English-medium and the regional-medium which emphasize learning in different languages (Ramaa, 2000). To make standardized assessment available to all children with diverse backgrounds, DALI (Dyslexia Assessment for Languages of India) was developed as a skill-based assessment by the National Brain Research Centre, Government of India (NBRC, Singh, 2015) to be consonant with the Indian education policy that mandates the teaching of two or three languages in addition to English (Viswanatham, 2001). Thus, school children all over India learn to read and write in a minimum of two languages, one of which is typically English, and the other an Indian language (Koul & Devaki, 2001). Thus, children in India are biliterate and should be assessed in both the languages. Children's linguistic profiles in India also vary considerably due to differences in the sociocultural, economic and educational profiles of their families, complicating the task of assessing children's literacy skills (Jhingran, 2005). Since DALI allows independent, objective, skill-based assessment in different languages it allows for a fairer assessment of Indian students in both the regional language as well as in English. It is a standardised and validated battery for dyslexia assessment available in English, Hindi, Kannada, and Marathi using equivalent tests for classes 1-5. This allows for early, bilingual assessment of Indian students in English and the regional language.

Our study aimed at comparing curriculum-based assessments, the appropriate tests from NIMHANS SLD battery, and the skill-based DALI through an exploratory analysis on a small sample.

METHODS

Procedure

Children presenting for SLD assessment to the outpatient Child Guidance Clinic (CGC) at the Dept. of Psychiatry and Clinical Psychology of a tertiary care, free teaching hospital in Delhi were referred for study participation. Children (and their parents) who consented to participate were administered the Malin's Intelligence Scale for Indian Children (MISIC, Malin, 1969) and the Coloured Progressive Matrices (CPM, Raven, 1990) as tests of intellectual functioning before SLD assessment in order to exclude children with intellectual disability. NIMHANS SLD index, curriculum textbooks and DALI were thereafter administered by different psychologists who were blind to each other's assessment to prevent bias. All children were administered MISIC on day 1 (average of 1.5 hours per child), followed by 2 sessions (3 hours each) for testing on NIMHANS battery and curriculum-based assessments on two separate days: 1 session for English, another for Hindi. MISIC, NIMHANS battery and curriculum-based assessments were

administered by either VS or PG, both of whom are licensed clinical psychologists with extensive clinical experience in the assessment of SLD. After 2 weeks, CPM and DALI were administered in a single day by SS with a break of 20 minutes each between CPM and DALI, as well as between DALI English and DALI Hindi (total 3 hours). SS was trained in DALI administration by the test developers at NBRC. The entire assessment was carried out within a one-month period for each child. The study was approved by the Institution Ethics Committee of the hospital.

Sample

School going children from classes 1-5 were recruited in the study since norms for DALI are available for classes 1-5, while those for NIMHANS battery are available till class 7.

Children were enrolled in the study after written informed consent from the parents and assent from the children between August 2018 and September 2020. The inclusion criteria were school going children scoring 85 and above on MISIC, and standard score of 70 and above on CPM. Children with intellectual disability, epilepsy and/or neurological disorder were excluded from the study.

Instruments

Malin's Intelligence Scale for Indian Children (MISIC) (1969)

MISIC was developed in Nagpur by Dr. Arthur Malin as an intelligence test by adapting the Weshcler Intelligence Scale for Children (WISIC). It consists of 11 subsets of performance and verbal tests and takes about 2-2.5 hours to complete. The verbal scale includes the following tests: information, general comprehension, arithmetic, analogy and similarity, vocabulary and digit span. The performance scale includes the following tests: picture completion, block design, object assembly, coding and mazes. It is available in English, Hindi and Marathi. The children are tested depending on their regional language and the medium of instruction followed in their respective schools. However, since our sample consisted of children from English medium schools, they were tested in English. It is a reliable and valid test of intelligence for Indian children between 6 years to 15 years 11 months.

Coloured Progressive Matrices (CPM) (1990)

CPM is a non-verbal test of intelligence for children between 4-11 years (Raven, 1990). It uses visual patterns and shapes divided into three sets: A, AB, and B and takes approximately 15 minutes to administer. It contains 36 items (12 in each set) followed by 6 response options for each item. The assessee has to find the missing pattern by choosing one of 6 response choices. It is a culture free test and can be administered to children from diverse cultural and language backgrounds, and even to those with

language difficulties. CPM scores are converted into standard scores and percentile ranks.

NIMHANS Index for SLD (1991)

NIMHANS battery was developed by Kapur et al. (1992) on 100 children between 8-12 years of age (50 clinic children and 50 children with average to above average scholastic achievement) at the Department of Clinical Psychology at the National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore to assess SLD. It comprises of Level I (consisting of tests of Attention, Visual Language, Visuo-motor skills and Writing Skills), and Level II (consisting of tests of Attention, Language (i.e. Reading, Writing, Comprehension), Spelling, Perceptual Motor Abilities, Memory and Arithmetic). Norms have been developed for classes 1-7 and are used for SLD certification. Since the NIMHANS battery is available only in English till class 7, in prevalent clinical practice, sub tests of Language and Arithmetic (Literacy domains) are administered as curriculum-based assessments in English and in the regional language of the child (Hindi), while tests of Attention, Visuo-motor, Visual Memory, Visual Discrimination, Auditory Memory, and Auditory Discrimination are assessed from the NIMHANS battery in English only.

For clinical and certification purposes, children are diagnosed with SLD if they perform two grades below their current grade in both English and the regional language. Thus, the domains of Spelling, Reading, Writing and Comprehension in English and Hindi were assessed using current school textbooks of children in this study.

Dyslexia Assessment for Languages of India (DALI) (2015)

The Dyslexia Assessments for Languages of India (DALI) was developed by NBRC, Manesar as a 'skill-based' assessment for dyslexia in Indian students. It is a comprehensive assessment for children with or at risk for dyslexia in primary schools from classes 1-5 (Singh, 2015). It was standardized and validated in approximately 4000 children across the country and is available in English as well as in other regional languages (Hindi, Kannada, Marathi) with equivalent tests. DALI comprises of the following 10 equivalent tests in English and the native language that are administered by a trained psychologist: 'Picture Naming', 'Semantic Fluency', 'Verbal Fluency', 'Rhyming', 'Phoneme Replacement' (called 'Syllable Replacement' in the regional language), 'Letter Identification' (called 'Akshara Recognition' in the regional language), 'Word Reading', 'Nonword Reading', 'Reading Comprehension', 'Listening Comprehension' and Spelling/ Dictation. They have been further classified into 3 domains: (a) Semantic Retrieval (Picture Naming, Semantic Verbal Fluency); (b) Phonological Processing (Rhyme and Phoneme replacement); and (3) Literacy (Word Reading, Letter Identification, Listening and Reading Comprehension, Nonword Reading and Spelling). The individual child is scored on each test, and the raw scores are converted into standardised scores for English and the native language respectively, and then plotted on a graph. This allows us to gauge the child's scores on each of the three domains. If the child scores 2 SDs

below average in 50% or more of the tests in each domain, then he/she is considered to have performed 2 SDs below average in that particular domain. If the child scores 2 SDs below average in at least two out of the three domains in both English and the native language, then he/she is diagnosed with dyslexia. If the child scores 2 SD below average in at least two domains in only one language, then it is assumed that the child may have performed poorly due to lack of exposure to that language, and may not have dyslexia.

DALI is a dyslexia assessment battery and does not include tests for dyscalculia and dysgraphia.

Administration and Scoring

For the curriculum-based assessments as well as the NIMHANS battery, the performance of each child was assessed grade wise, wherein the child was assessed on his current grade/class, one grade below the current grade and 2 grades below the current grade. If the child performed with at least 40% accuracy in current grade in each individual domain, the performance was considered 'adequate'. If the child performed at less than 40% accuracy in one grade below the current grade (but performed with at least 40% accuracy in two grades below the current grade) in each individual domain, the performance was considered 'difficulty'. If the child performed with less than 40% accuracy in two grades below the current grade (after being assessed on the current grade, one grade below as well as 2 grades below) in each individual domain, then the performance was considered 'disability'.

DALI scores are not based on school grade/class but instead on standard scores. Raw scores on DALI were converted into standard scores provided in the manual. The scores were operationalized viz: 85–115 (i.e. average or above average) as *'adequate'*, 78-84 as '*difficulty'* (between 1 and 1.5SD), below 78 (i.e.1.5 SD below) as *'disability'*, on each individual domain to make them comparable to NIMHANS battery.

Data Analysis

To compare NIMHANS battery and DALI, the authors evaluated subtests in NIMHANS battery that were similar to those in DALI *('comparable domains'*). Subtests within NIMHANS battery and DALI that were distinct and could not be compared with each other were considered '*non-comparable domains'*.

Comparable domains between NIMHANS battery and DALI included Spelling, Reading, and Comprehension in English language as given in their respective manuals. However, the NIMHANS battery was developed using the Karnataka Board syllabus in 1990s, it is not strictly applicable to the Central Board of Secondary Education syllabus for current times. Hence, the child was tested using the school curriculum textbooks in English and

Hindi instead of the NIMHANS manualised for comparable/literacy domains of Spelling, Reading and Comprehension.

Non-comparable/non-literacy domains included tests of Attention, Visual Perception, Visual Memory and Auditory Memory (from NIMHANS battery manual) vs. Picture Naming, Verbal Fluency, Semantic Fluency, Rhyme and Phoneme (from DALI manual).

We excluded arithmetic and writing in NIMHANS battery from the final analysis since the current version of the DALI battery lacks tests for dyscalculia and dysgraphia.

For the purpose of comparison, the operationalised terms of 'adequate', 'difficulty' and 'disability' on each domain in NIMHANS battery, curriculum assessments and DALI were converted into ordinal data for analysis using SPSS version 23 (IBM SPSS Inc., 2016). Cohen's kappa (Cohen, 1960) was used to estimate agreement/concordance between the comparable/literacy domains of curriculum-based assessments and skill-based DALI. Kappa value is considered moderate in the range of $0.41 \leq \kappa \leq 0.60$ and substantial in the range of $0.61 \leq \kappa \leq 0.80$ (Landis & Koch, 1977). Significance was reported at threshold $p < 0.05$.

Spearman's rank order correlation (Spearman, 1904) was used to check for relationship between:

a) curriculum-based 'literacy' assessments with skill-based 'literacy' domains of DALI;
b) curriculum-based 'literacy' assessments with skill-based 'non-literacy' domains of DALI
c) 'Non-literacy' domains of NIMHANS battery with skill-based 'literacy' domains of DALI.
d) 'Non-literacy' domains in NIMHANS battery with skill-based 'non-literacy' domains of DALI.

Two tailed test of significance was reported at threshold $p<0.05$.

RESULTS

Sample Sociodemographic

A total of 17 children between 5-10 years agreed to participate in the study (males=15; females=2); refusals were due to the time, repeated visits and effort involved. Two children, both males, were excluded after the initial IQ assessment due to IQ score of less than 85 on MISIC and standard score of less than 70 on CPM respectively. Finally, 15 children meeting the inclusion criteria were enrolled (mean age= 8.4, SD=1.28) using convenience sampling method.

All children were studying in private Central Board of Secondary Education (CBSE) affiliated schools of Delhi with English as the medium of instruction. Hindi was the mother tongue of all children as well as the second language taught in school. All children were accompanied by their parents, but were not assisted by them during test administration. All children were referred for assessment by their teachers due to their academic difficulties. Out of these, 9 children out of 15 were diagnosed as SLD by psychiatrists in the OPD. Our sample children did not have any other co-morbidity as reported in their referrals to the clinical psychology team.

Concordance

Significant agreement was seen between curriculum-based assessments and skill-based DALI in English Spelling (κ=0.69), English Reading (κ=0.5), English Comprehension (κ=0.63) and Hindi Spelling (κ=0.49) (Table 1).

Table 1: Concordance for comparable domains between curriculum-based (school textbooks) and skill-based assessments (DALI) for dyslexia

Domain	Concordant (N)	Discordant (N)	Missing	Kappa coefficient	Significance
English Spelling	13 (86.67%)	2	0	0.69	0.000**
English Reading	11 (66.67%)	4	0	0.5	0.008**
English Comprehension	11 (80%)	3	1	0.63	0.004**
Hindi Spelling	12 (80%)	3	0	0.49	0.006**
Hindi Reading	*08 (53.33%)*	*7*	*0*	*0.22*	*0.17*
Hindi Comprehension	*08 (46.67%)*	*7*	*0*	*0.19*	*0.36*

** p < 0.01

Correlations

Significant correlations were found between curriculum-based assessments and DALI literacy domains in Spelling (both languages), English Reading and English Comprehension.

We checked for correlations across languages for each domain (e.g. curriculum-based English Spelling with DALI Hindi Spelling) to check for generalization of learning across

languages. Significant correlation was found in this small sample between (i) curriculum-based Hindi Spelling and DALI English Spelling; (ii) curriculum-based Hindi Comprehension and DALI English Comprehension; (iii) curriculum-based Hindi Reading and DALI English Reading; (iv) curriculum-based English Spelling and DALI Hindi Spelling (v) curriculum-based English Reading and DALI Hindi Reading. Curriculum-based Comprehension in neither Hindi nor English correlated significantly with DALI Hindi Comprehension (Table 2a).

Table 2a: Spearman's rank correlation between curriculum-based (school textbooks) and skill-based assessments (DALI) for dyslexia: Spelling, Reading and Comprehension

	School-Curriculum SpEng	**School-Curriculum CompEng**	**School-Curriculum ReadEng**	**School-Curriculum SpHin**	**School-Curriculum CompHin**	**School-Curriculum ReadHin**
DALI SpEng	0.83**	0.56*	0.64**	0.83**	NS	0.63*
DALI ComEng	0.63*	0.77**	NS	0.63*	0.55*	NS
DALI ReadEng	0.91**	0.67**	0.77**	0.91**	0.54*	0.75**
DALI SpHin	0.65**	NS	NS	0.65**	NS	NS
DALI CompHin	NS	NS	NS	NS	NS	NS
DALI ReadHin	0.9**	0.69**	0.77**	0.9**	0.54*	0.75**

** $p < 0.01$; * $p < 0.05$; NS= non-significant
E-English, H-Hindi; Sp=Spelling; Read=reading; Comp=Comprehension; SF=Semantic Fluency, VF=Verbal Fluency, PN=Picture Naming; VP=Visual Perceptual

Among the non-comparable/non-literacy domains of NIMHANS battery and non-comparable/non-literacy domains of DALI, significant correlation was found between NIMHANS Visual Perception and DALI Picture Naming (both languages), NIMHANS Auditory Memory with DALI Phoneme English, and NIMHANS Visual Memory with DALI Verbal Fluency English (Table 2b).

Curriculum-based English Comprehension correlated with DALI Semantic and Verbal Fluency. Curriculum-based Hindi Comprehension correlated with DALI Picture Naming

Table 2b: . Spearman's rank correlation between Non-Literacy Domains of NIMHANS battery vs DALI

	School-Curriculum SpEng	School-Curriculum CompEng	School-Curriculum ReadEng	School-Curriculum SpHin	School-Curriculum CompHin	School-Curriculum ReadHin	NIMHANS VP Eng	NIMHANS AM Eng	NIMHANS VM Eng
DALI SFEng	NS	0.62*	NS	NS	NS	NS	NS	NS	NS
DALI VFEng	NS	0.59*	NS	NS	NS	NS	NS	NS	0.56*
DALI PNEng	NS	NS	0.52*	NS	0.56*	0.52*	0.61*	NS	NS
DALI PNHin	NS	NS	NS	NS	NS	NS	0.57*	NS	NS
DALI RhyEng	NS	NS	0.60*	NS	NS	0.60*	NS	NS	NS
DALI RhyHin	NS	NS	0.56*	NS	NS	0.56*	NS	NS	NS
DALI PhonEng	NS	NS	NS	NS	NS	NS	NS	0.58*	NS

** $p < 0.01$; * $p < 0.05$; NS= non-significant

E-English, H-Hindi; Sp=Spelling; Read=reading; Comp=Comprehension; SF=Semantic Fluency, VF=Verbal Fluency, PN=Picture Naming; VP=Visual Perceptual

English. Curriculum-based Reading in English and Hindi correlated with DALI Rhyme (both languages) and DALI Picture Naming English (Table 2b).

DISCUSSION

NIMHANS SLD index is mandated as the only tool for SLD certification by the Government of India (Gazette of India 2018). However, it is a battery that was developed in 1991 on a smaller sample of clinic children and is available in English alone. As per Kishore et al. (2021), the RPWD Act has no standards for evaluating learning disabilities in vernacular languages, we feel that DALI may partially address this gap as it was developed and validated in Hindi, Marathi and Kannada as well (Singh 2015). We compared NIMHANS battery, and certain curriculum-based assessments in English and Hindi, with the DALI battery developed in 2015, which is an objective and a skill-based dyslexia assessment. This is the first pilot study to compare NIMHANS battery with a newer and more objective assessment tool DALI.

Our results showed significant agreement between curriculum-based assessment and skill-based DALI tests for English Spelling, Reading and Comprehension (termed 'Literacy' domains). Thus, objective skill-based assessments like DALI can be used as a measure of English Literacy for children of varied backgrounds in a multicultural set up like India. DALI's availability in different languages is an added advantage for Indian children who are typically taught three languages in school (Ramaa, 2000), making it necessary for Literacy to be assessed in all the languages the child learns in school.

In Hindi language tests, agreement was seen in Spelling alone for curriculum-based evaluation vs. skill-based DALI. The lack of agreement in Hindi Reading and Comprehension between curriculum and DALI assessments may be attributed to the difference in the nature of the test items. DALI assesses Reading through an objective measure of 'Word Reading' consisting of 50 words that should be readable by children of the same age across the country. But, in curriculum-based assessments, the children were assessed on reading through 'Paragraph Reading' from familiar school textbooks. This creates bias, either through possible familiarity due to repeated classroom exposure to textbook material or the inability to learn the specific text involved despite repeated exposure in class. DALI assesses comprehension for classes 1-2 on the one hand, and classes 3-5 on the other hand, through different test items. While classes 1-2 undergo assessment of comprehension through 'listening', classes 3-5 are assessed on 'reading' comprehension. This does not hold true for curriculum-based assessments, wherein Comprehension is assessed uniformly across all classes through 'Reading Comprehension'.

DALI does not have reading comprehension for classes 1-2 as it is assumed that such young children may not have developed skills for reading passages or long texts. Further, an extensive body of research shows that listening comprehension skills directly

influence reading comprehension (Catts, Fey, Zhang, & Tomblin, 1999; Hoover & Gough, 1990; Nation, Cocksey, Taylor, & Bishop, 2010; Rost & Hartmann, 1992; Sears & Keogh, 1993) and indirectly impact oral language and reading development (Kendeou, Van den Broek, White, & Lynch, 2009). Thus, listening comprehension has been well established as a requisite for literacy acquisition. Thus for children in classes 1 and 2, DALI includes listening comprehension as a necessary skill for evaluation. Curriculum-based assessments, however, test comprehension through reading passages only. This limitation primarily exists because NIMHANS battery and assessments for dyslexia are not typically conducted on young children of classes 1 and 2 in clinical settings. Most of the children who are referred for dyslexia testing are in the higher classes, and thus reading comprehension is given as one of the tests. However, research has shown both listening comprehension and reading comprehension correlate with each other, suggesting an overlap between the two apparently distinct constructs in students speaking more than one language (Schroeders, Wilhelm, & Bucholtz, 2010). Schroeders et al. (2010) suggest that while listening comprehension and reading comprehension may imply stimuli processing through different routes, the individual differences in these routes may also be correlated.

Another possible explanation for the lack of agreement in Hindi language tests may be due to forces of globalization that have made learning English a necessity (De Bree & Unsworth, 2014), resulting in an increased desire among Indians for English language acquisition to meet the demands of the globalized economy. Indians with knowledge of the English language have better income compared to those lacking it (Chakraborty & Bakshi, 2016). This translates as an overemphasis on English learning in Indian schools, often at the cost of reading and writing in the native language. All subjects, except the second or the third language are taught and assessed in English (e.g. Social Studies, Science). Thus, it is very likely that children may have acquired familiarity with only those Hindi texts taught in the classroom. This would mean limited familiarity and difficulty in reading in Hindi outside the classroom. Since DALI is curriculum-free, lack of concordance in Hindi Comprehension and Reading could be due to reading a familiar passage in the curriculum textbook versus reading an unfamiliar passage in DALI.

The Literacy domains in English and Hindi were significantly correlated in the curriculum-based assessments and skill-based DALI, the only exception being DALI Hindi Comprehension. The lack of relationship in Hindi Comprehension may again be attributed to the reasons mentioned above i.e., the difference in the nature of the test items between the two types of assessments, as well as the difference in the nature of test items in DALI between classes 1-2 and classes 3-5 respectively.

We found, in our small sample, that curriculum-based Comprehension in English correlated with DALI Semantic and Verbal Fluency in English. Curriculum-based Reading correlated with DALI 'Rhyme' in both English and Hindi. A significant relationship was also found between curriculum-based Reading and Comprehension on the one hand,

and DALI Picture Naming on the other hand. The results provide evidence for the role played by underlying cognitive processes measured by the non-literacy tests like phonological processing (i.e., making use of the sound structure of oral language when learning how to decode written language (Adams, 1990)) and fluency in Reading and Spelling (Caravolas, Volín, & Hulme, 2005; Gallagher Frith, & Snowling, 2000; Georgiou, Torppa, Manolitsis, Lyytinen, & Parrila, 2012).

Fluency tests tap into a child's semantic and lexical knowledge through the processes of search and retrieval (Sauzéon, Lestage, Raboutet, N'Kaoua, & Claverie, 2004) and are associated with measures of accuracy (i.e. errors and rule violations). Fluency is regarded as an essential skill in the classroom that may generalize across different classroom tasks including Spelling and language learning (Henry, Messer, & Nash, 2012; Unsworth, Spillers, & Brewer, 2011). Phonological abilities have been well-established primary skills that predict secondary comprehension and reading through impact on decoding abilities. Reading is a multifaceted process that draws on phonology (sound), semantics (meaning), orthography (spelling) and morphology (structure and relationship between words) (Ziegler & Goswami, 2005). Rhyme Test is a test of phonological awareness that has been found to predict reading through its impact on working memory (Knoop-van Campen, Segers, & Verhoeven, 2018) and is a predictor of poor reading in children with dyslexia (Boets et al., 2010; Gathercole & Baddeley, 2014). Stronger phonological skill enables children to decode words better by breaking down words into individual sounds, thereby enhancing reading ability (Grizzle & Simms, 2005). Thus, dyslexia batteries should incorporate tests that predict Spelling, Reading and Comprehension, in order to provide a holistic assessment of the child's Literacy profile.

The purpose of curriculum-based assessments is to provide educators with class' average academic performance which is available also through a school report card. Skill-based assessments on the other hand are designed to measure the knowledge, skills, and judgment required for competency in a given domain and provide information against norm-referenced tests. Reading, writing, and numeracy are basic literacy skills and are now regarded as basic life skills (UNESCO). When taught to learn to read and write, a child must learn rules and patterns that allow the application of these rules to any context and not just to familiar curricula. It is thus crucial that assessment of SLD assess the skill and its associated domains to enable diagnosis and effective remediation.

Indian education policy mandates the teaching of two or three languages in addition to English (Viswanatham, 2001), and schoolchildren learn to read and write in a minimum of two languages, one of which is typically English, and the other an Indian language (Koul & Devaki, 2001). The sequence and manner in which languages are taught, nevertheless, varies greatly (Meganathan, 2011; Viswanatham, 2001). An additional factor shaping literacy acquisition is the medium of instruction, which refers to the language through which children receive instruction in other school subjects. Children naturally receive several hours of exposure daily to the language that is the medium of

instruction, whereas other language(s) may be taught for an hour or less per day. Besides these variables within the school system, children's linguistic profiles vary considerably due to differences in the sociocultural, economic and educational profiles of their families, further complicating the task of assessing children's literacy skills (Jhingran, 2005). Finally, the greatest problem faced by educators and education support personnel has been the scarcity of assessment tools developed within and for the Indian context. As seen from the discussions above, information necessary to screen children in the classroom for dyslexia includes measures of letter-sound knowledge, word decoding, reading fluency, spelling and oral language. Teachers and educators are the best equipped to answer these, but there is a paucity of tests to screen children for dyslexia that can be completed by educators. To date, the only available tests are the DST-J in English normed on 450 children between 6.5 – 11.5 years (Fawcett and Nicolson, 2012) and the JST and MST which are part of DALI, normed on 4400 children available in four Indian languages English, Hindi, Marathi and Kannada (http://pib.nic.in/newsite/PrintRelease.aspx?relid=128722, http://14.139.62.11/DALI/details.php). Given the complicated multilingual-multiliterate scenario, more tests are urgently needed to be developed and normed to meet the needs of all children in India.

The need of the hour is to either upgrade the existing tools or develop new tools (with periodic review) for assessing SLD among multilingual Indian children (Kishore et al., 2021). We submit that SLD assessment should begin as early as possible in schools so that remedies can be instituted early. DALI presents a useful tool for the assessment of early literacy and related cognitive skills in the bilingual-biliterate context of Indian schools starting from age 5. It also provides norms and standards for the identification of children who might be at risk for dyslexia. Tests in the revised DALI-iLAB can be used to create a comprehensive profile of a bilingual-biliterate child in both languages enabling remediation to focus on building skills in the child's area(s) of weakness, while fostering the child's strengths. For the assessment of dyslexia alone, which is currently believed to be 80% of all SLD cases, it is possible to use DALI as an alternative to NIMHANS SLD battery. Since DALI does not have tests on dyscalculia and dysgraphia, a complete SLD assessment may not be possible. However, just like the NIMHANS battery, DALI is being upgraded for use till class 12 (for students upto 17 years of age) along with incorporating tests on dyscalculia and dysgraphia.

On the other hand, NIMHANS battery too is limited in its availability of norms: available till class 7 in English only. Currently, children of up to class 12 are assessed using the school textbooks of current grade, one grade below and two grades below in dyslexia, dyscalculia and dysgraphia for disability certification. However, the NIMHANS battery is now being upgraded for use in children upto 13 years of age with domains focusing on literacy as well as cognition that predict academic skills acquisition (eg planning, attention, etc.). The upgraded NIMHANS battery may have wider applicability than its predecessor since it is based on tests from different education boards of India (Kishore et al., 2021).

LIMITATIONS

A major limitation of the current study is its very small sample size and those only from English medium schools of Delhi affiliated to the CBSE board. However, it was difficult to recruit a larger sample due to the cumbersome process of lengthy and frequent assessment. Every child was required to come for three different sittings for the textbook assessment, NIMHANS battery, and one sitting for DALI, with each sitting ranging from 1.5-3 hours, and assessors being blind to each other. Moreover, it was difficult to recruit children from classes 1-5 as most children presenting for dyslexia assessment in our department were older and studying in higher classes. Curriculum-based tests are not only familiar to children but are provide information already available through school report cards. They are therefore limited in their ability to provide new information or information remediation. Skill-based assessments on the other hand, evaluate cognitive processes necessary for literacy development but also provide insights on sub-processes necessary for reading and thereby also inform the design of remedial intervention in the case of deficits.

CONCLUSION

Given the complex education system and disparate examination testing systems in India, it might be beneficial to have both skill and curriculum-based tests for SLD evaluation. DALI may be an objective, holistic and multilingual alternative battery to the NIMHANS SLD index as well as for curriculum-based assessments for dyslexia.

ACKNOWLEDGEMENTS

We would like to thank the study participants and their parents. We would also like to thank Ms. Nishtha Singh (M.Phil., Clinical Psychology, Dept. of Psychiatry, ABVIMS-Dr. RML Hospital, New Delhi) who assisted VS and PG in the administration of NIMHANS battery.

FINANCIAL

The salary of SS was supported by the Neurobiology of Dyslexia; integrating brain with behavior, DST project SR/CSRI/80/2016(C). The salary of TB was supported by the Fogarty International Center, NIH project 'Cross Fertilized Research Training for New Investigators in India and Egypt (D43 TW009114)'. However, these agencies had no role in the planning or execution, data analysis or publication of this manuscript.

CONFLICT OF INTEREST

The authors do not have any conflict of interest to declare.

Table comparing standard scores on DALI with curriculum-based assessments/NIMHANS categorizations into: adequate, difficulty, disability. *(Note: Table is cut over two pages)*

Participants	Age (yrs)	Comparable Domains: SPELLINGS		COMPREHENSION		READING	
		DALI	Curriculum-based	DALI	Curriculum-based	DALI	Curriculum-based
S1	9	Eng-69 Hin-69	Eng- Disability Hin- Disability	Eng- 69 Hin- 70	Eng- Disabilty Hin- Adeqaute	EWR- 69 ENWR-69 HWR- 73 HNWR-78	Eng- Disability Hin- Disability
S2	6	Eng-69 Hin-69	Eng-Difficulty Hin-Difficulty	Eng- 115 Hin- 115	Eng- Adequate Hin- Adequate	Eng- 80 Hin- 81	Eng-Adequate Hin- Adequate
S3	7	Eng-69 Hin-74	Eng- Disability Hin- Disability	Eng- 70 Hin- 115	Eng- problem Hin- Problem	Eng-69 Hin-69	Eng- Difficulty Hin-Difficulty
S4	10	Eng-69 Hin-69	Eng- Disability Hin- Disability	Eng-69 Hin-69	Eng- Difficulty Hin- Adequate	EWR- 69 ENWR-79 HWR- 70 HNWR-74	Eng- Disability Hin- Disability
S5	6	Eng-69 Hin-69	Eng-N Hin-NA	Eng- Missing Hin- 85	Eng- Difficulty Hin- Difficulty	Eng-69 Hin-69	Eng- Disability Hin- Difficulty
S6	8	Eng- 115 Hin- 110	Eng- Adequate Hin- Adequate	Eng- 100 Hin- 85	Eng- Adequate Hin- Adequate	EWR- 108 ENWR-106 HWR- 105 HNWR- 111	Eng- Adequate Hin- Adequate
S7	9	Eng- 100 Hin- 110	Eng- Adequate Hin- Adequate	Eng- 100 Hin- 70	Eng- Adequate Hin- Adequate	EWR- 93 ENWR- 85 HWR- 78 HNWR- 89	Eng- Adequate Hin- Adequate
S8	9	Eng-69 Hin-69	Eng- Disability Hin- Disability	Eng-69 Hin-69	Eng- Disability Hin- Disability	EWR- 69 ENWR-69 HWR- 69 HNWR-69	Eng- Disability Hin- Disability
S9	10	Eng-69 Hin-69	Eng- Disability Hin- Disability	Eng- 100 Hin- 69	Eng- Adequate Hin- Adequate	EWR- 69 ENWR-69 HWR- 69 HNWR-69	Eng- Disability Hin- Disability
S10	9	Eng-108 Hin-75	Eng- Adequate Hin- Adequate	Eng-100 Hin-85	Eng- Adequate Hin- Adequate	EWR- 104 ENWR-106 HWR- 81 HNWR-89	Eng- Adequate Hin- Adequate
S11	10	Eng-69 Hin-69	Eng- Disability Hin- Disability	Eng-69 Hin-69	Eng- Disability Hin- Disability	EWR- 69 ENWR-69 HWR- 70 HNWR-69	Eng- Disability Hin- Disability
S12	8	Eng-69 Hin-69	Eng- Disability Hin- Disability	Eng-100 Hin-115	Eng- Disability Hin- Disability	Eng- 69 Hin- 69	Eng- Disability Hin- Disability
S13	9	Eng-69 Hin-69	Eng- Disability Hin- Disability	Eng-100 Hin-100	Eng- Adequate Hin- Adequate	EWR- 70 ENWR-69 HWR- 69 HNWR-69	Eng- Difficulty Hin- Difficulty
S14	8	Eng-69 Hin-69	Eng-Disability Hin-Disability	Eng-69 Hin-69	Eng-Disability Hin-Disability	EWR- 69 ENWR-69 HWR- 69 HNWR-69	Eng-Disability Hin-Disability
S15	8	Eng-69 Hin-69	Eng-Disability Hin-Disability	Eng-69 Hin-69	Eng-Disability Hin-Disability	EWR- 69 ENWR-69 HWR- 70 HNWR-78	Eng- Adequate Hin- Adequate

*NA- Since the participant was in class 1 and could not be assessed on arithmetic for two grades below. EWR-English Word Reading, HWR-Hindi Word Reading, ENWR-English non-word reading, HNWR-Hindi Non -word reading

Note: The table depicts standard scores on all DALI tests. For curriculum-based tests and NIMHANS tests, scoring was done based on three grades, i.e. current grade and two grades below. If the child performed with at least 40% accuracy in current grade in each individual domain, the performance was considered '*adequate*'. If the child performed at less than 40% accuracy in one grade below the current grade (but performed with at least 40% accuracy in two grades below the current grade) in each individual domain, the performance was considered *'difficulty'*. If the child performed with less than 40% accuracy in two grades below the current grade (after being assessed on the current grade, one grade below as well as 2 grades below) in each individual domain, then the performance was considered *'disability'*. Very often, the subjective impressions and the clinical judgement of the psychologist determines the category of performance of the child, making curriculum based assessments clinically subjective. For the purpose of the study, in order to make DALI comparable, the scores on DALI were operationalized viz: 85–115 (i.e. average or above average) as '*adequate',* 78-84 as *'difficulty'* (between 1 and 1.5SD), below 78 (i.e.1.5 SD below) as *'disability'*, on each individual domain.

Table comparing standard scores on DALI with curriculum-based assessments/NIMHANS categorizations into: adequate, difficulty, disability. *(Note: Table is cut over two pages)*

		Non Comparable Domains											
Partic-ipants	Age (yrs)	Semantic fluency	Verbal fluency	Picture Naming	Rhyme	Pho-neme	Attention	Visual perceptual	Visual Memory	Auditory Memory	Copying	Expressive Writing	Arithmetic
		DALI	DALI	DALI	DALI	DALI	NIMHANS	NIMHANS	NIMHANS	NIMHANS	NIMHANS	NIMHANS	NIMHANS
S1	9	Eng- 70 Hin- 94	Eng- 83 Hin- 69	Eng- 88 Hin- 74	Eng- 69 Hin- 70	Eng- 93 Hin- 93	Difficulty	Adequate	Difficulty	Adequate	Eng- Disability Hin- Difficulty	Eng- Disability Hin- Disability	Disability
S2	6	Eng- 90 Hin- 100	Eng- 85 Hin- 70	Eng- 89 Hin- 99	Eng- 85 Hin- 100	Eng- 69 Hin- 69	Missing	Adequate	Adequate	Difficulty	Eng-Difficulty	Eng-Difficulty	NA*
S3	7	Eng- 75 Hin- 93	Eng- 95 Hin- 74	Eng- 93 Hin- 99	Eng-108 Hin- 100	Eng- 78 Hin- 93	Difficulty	Adequate	Adequate	Adequate	Eng-Adequate Hin- Adequate	Eng-Adequate Hin- Adequate	Disability
S4	10	Eng- 78 Hin- 88	Eng- 80 Hin- 69	Eng- 69 Hin- 75	Eng- 70 Hin- 70	Eng-108 Hin- 100	Difficulty	Inadequate	Adequate	Adequate	Eng- Difficulty Hin- Difficulty	Eng- Disability Hin- Disability	Disability
S5	6	Eng-82 Hin-70	Eng- 76 Hin- 69	Eng- 82 Hin- 86	Missing	Missing	Missing	Adequate	Difficulty	Adequate	Eng-Adequate	Eng-Difficulty	Adequate
S6	8	Eng-108 Hin- 118	Eng-108 Hin- 91	Eng-84 Hin- 75	Eng-115 Hin- 100	Eng-115 Hin- 108	Difficulty	Difficulty	Missing	Adequate	Adequate	Eng-Adequate Hin- Adequate	Adequate
S7	9	Eng-88 Hin- 121	Eng-87 Hin- 69	Eng-92 Hin- 85	Eng-100 Hin- 78	Eng-100 Hin- 115	Difficulty	Adequate	Adequate	Adequate	Eng-Adequate Hin- Adequate	Eng-Adequate Hin- Adequate	Adequate
S8	9	Eng-69 Hin- 106	Eng-69 Hin- 69	Eng-71 Hin- 90	Eng-69 Hin- 78	Eng-69 Hin- 69	Difficulty	Difficulty	Adequate	Adequate	Eng-Adequate Hin- Adequate	Eng- Disability Hin- Disability	Difficulty
S9	10	Eng-85 Hin- 106	Eng-91 Hin- 70	Eng-75 Hin- 69	Eng-100 Hin- 78	Eng-108 Hin- 85	Difficulty	Difficulty	Adequate	Adequate	Eng-Adequate Hin- Adequate	Eng- Disability Hin- Disability	Adequate
S10	9	Eng-100 Hin- 94	Eng-85 Hin- 69	Eng-96 Hin- 69	Eng-115 Hin- 108	Eng-115 Hin- 115	Difficulty	Severe Difficulty	Adequate	Adequate	Eng- Disability Hin- Disability	Eng- Disability Hin- Disability	Adequate
S11	10	Eng-81 Hin- 79	Eng-85 Hin- 69	Eng-69 Hin- 79	Eng-70 Hin- 69	Eng-100 Hin- 78	Difficulty	Difficulty	Adequate	Adequate	Eng- Disability Hin- Disability	Eng- Disability Hin- Disability	Difficulty
S12	8	Eng-85 Hin- 108	Eng-91 Hin- 73	Eng-82 Hin- 86	Eng-93 Hin- 100	Eng-115 Hin- 85	Adequate	Adequate	Adequate	Adequate	Eng- Disability Hin- Disability	Eng- Disability Hin- Disability	Disability
S13	9	Eng-106 Hin- 97	Eng-111 Hin- 76	Eng-101 Hin- 87	Eng-100 Hin- 100	Eng-93 Hin- 69	Difficulty	Severe Difficulty	Adequate	Adequate	Eng- Difficulty Hin- Difficulty	Eng- Disability Hin- Disability	Difficulty
S14	8	Eng-85 Hin- 112	Eng-75 Hin- 73	Eng-71 Hin- 84	Eng-85 Hin- 100	Eng-70 Hin- 85	Difficulty	Missing	Missing	Missing	Missing	Missing	Missing
S15	8	Eng-70 Hin- 103	Eng-84 Hin- 78	Eng-71 Hin- 69	Eng-85 Hin- 93	Eng-100 Hin- 70	Difficulty	Severe Difficulty	Adequate	Adequate	Eng- Difficulty Hin- Difficulty	Eng- Disability Hin- Disability	Adequate

Table comparing DALI with curriculum-based assessments.

Participants	Age (in years)	SPELLINGS		COMPREHENSION		READING		SPELLINGS		COMPREHENSION		READING	
		DALI Eng	*Curriculum-based Eng*	*DALI Eng*	*Curriculum-based Eng*	*DALI Eng*	*Curriculum-based Eng*	*DALI Hin*	*Curriculum-based Hin*	*DALI Hin*	*Curriculum-based Hin*	*DALI Hin*	*Curriculum-based Hin*
S1	9	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Adequate*	Disability	Disability
S2	6	Disability	Difficulty*	Adequate	Adequate	Difficulty	Adequate*	Disability	Difficulty*	Adequate	Adequate	Difficulty	Adequate*
S3	7	Disability	Disability	Disability	Difficulty*	Disability	Difficulty*	Disability	Disability	Adequate	Difficulty	Disability	Difficulty*
S4	10	Disability	Disability	Disability	Difficulty*	Disability	Disability	Disability	Disability	Disability	Adequate*	Disability	Disability
S5	6	Disability	Difficulty*	Missing	Difficulty	Disability	Disability	Disability	Difficulty	Adequate	Difficulty	Disability	Difficulty*
S6	8	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate
S7	9	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Disability	Adequate*	Difficulty	Adequate*
S8	9	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability
S9	10	Disability	Disability	Adequate	Adequate	Disability	Disability	Disability	Disability*	Disability	Adequate*	Disability	Disability
S10	9	Adequate	Adequate	Adequate	Adequate	Adequate	Adequate	Disability	Adequate*	Adequate	Adequate	Difficulty	Adequate*
S11	10	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability
S12	8	Disability	Disability	Adequate	Disability	Disability	Disability	Disability	Disability	Adequate	Disability	Disability	Disability
S13	9	Disability	Disability	Adequate	Adequate	Disability	Difficulty*	Disability	Disability	Adequate	Adequate	Disability	Difficulty*
S14	8	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability	Disability
S15	8	Disability	Disability	Disability	Disability	Disability	Adequate*	Disability	Disability	Disability	Disability	Disability	Adequate*

In order to make comparisons between DALI and curriculum-based assessments, DALI standard scores were operationalized into adequate (85-115), difficulty (78-84), and disability (<78).

*Test domains where scores were higher on curriculum-based assessments when compared with DALI.

REFERENCES

Ahmad, F. (2015). Exploring the invisible: issues in identification and assessment of students with learning disabilities in India. Transcience: *A Journal of Global Studies, 6*(1), 91–107.

Boets, B., De Smedt, B., Cleuren, L., Vandewalle, E., Wouters, J., & Ghesquiére, P. (2010). Towards a further characterization of phonological and literacy problems in Dutch-speaking children with dyslexia. *British Journal of Developmental Psychology*. https://doi.org/10.1348/026151010X485223

Caravolas, M., Volín, J., & Hulme, C. (2005). Phoneme awareness is a key component of alphabetic literacy skills in consistent and inconsistent orthographies: Evidence from Czech and English children. *Journal of Experimental Child Psychology*. https://doi.org/10.1016/j.jecp.2005.04.003

Catts, H. W., Fey, M. E., Zhang, X., & Tomblin, J. B. (1999). Language Basis of Reading and Reading Disabilities: *Evidence From a Longitudinal Investigation. Scientific Studies of Reading, 3*(4). https://doi.org/10.1207/s1532799xssr0304_2

Chakraborty, T., & Bakshi, S. K. (2016). English language premium: Evidence from a policy experiment in India. *Economics of Education Review*. https://doi.org/10.1016/j.econedurev.2015.10.004

Cohen, J. (1960). A Coefficient of Agreement for Nominal Scales. *Educational and Psychological Measurement.* https://doi.org/10.1177/001316446002000104

De Bree, E., & Unsworth, S. (2014). Dutch and English literacy and language outcomes of dyslexic students in regular and bilingual secondary education. Dutch *Journal of Applied Linguistics, 3*(1), 62–81. https://doi.org/10.1075/dujal.3.1.04bre

Devaki, L.; Koul, O. N. (2001). Medium of Instruction Across Levels of Education in India, in: Daswani, C. J. (Ed.), Language Education in Multilingual India, UNESCO,New Delh, pp. 104-116

Fawcett, A., & Nicolson, R. (2012). *Dyslexia Screening Test Junior* (DST-J). Pearson

Gallagher, A., Frith, U., & Snowling, M. J. (2000). Precursors of literacy delay among children at genetic risk of dyslexia. *Journal of Child Psychology and Psychiatry and Allied Disciplines.* https://doi.org/10.1111/1469-7610.00601

Gathercole, S. E., & Baddeley, A. D. (2014). Working Memory and Language. In *Working Memory and Language*. https://doi.org/10.4324/9781315804682

Georgiou, G. K., Torppa, M., Manolitsis, G., Lyytinen, H., & Parrila, R. (2012). Longitudinal predictors of reading and spelling across languages varying in orthographic consistency. *Reading and Writing*. https://doi.org/10.1007/s11145-010-9271-x

Goswami, U. (2010). Learning difficulties: Future challenges. In *Mental capital and wellbeing*.

Grizzle, K. L., & Simms, M. D. (2005). Early language development and language learning disabilities. In Pediatrics in review / *American Academy of Pediatrics* (Vol. 26, Issue 8, pp. 274–283). https://doi.org/10.1542/pir.26-8-274

Henry, L. A., Messer, D. J., & Nash, G. (2012). Executive functioning in children with specific language impairment. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. https://doi.org/10.1111/j.1469-7610.2011.02430.x

Hoover, W. A., & Tunmer, W. E. (2018). The Simple View of Reading: Three Assessments of Its Adequacy. *Remedial and Special Education, 39*(5). https://doi.org/10.1177/0741932518773154

IBM SPSS Inc. (2016). SPSS Statistics for Windows. IBM Corp. Released 2012. https://doi.org/10.1364/OFC.2014.M2H.4

Jhingran, D.(2005).*Language Disadvantage: The Learning Challenge in Primary Education*. APH Publishing, New Delhi

John, A., Sadasivan, A., Sukumaran, B., District, C., David, N. (2020). *Indian Association of Clinical Psychologists Practice Guidelines for the Assessment and Intervention of Specific Learning Disabilities.*

John, T. (2020). *Practical Guidelines for Disability Certification in Menta Hea*lth, first edition, self published

Joshi, R. M., Nakamura, P. R., & Singh, N. C. (2017). Reading Research and Practice: Indian Perspective. *New Directions for Child and Adolescent Development, 2017*(158), 43–53. https://doi.org/10.1002/cad.20222

Kapur M., John, A., Rozario, J., Oommen, A., Uma, H. (2002). Assessment of specific learning disabilities, in: Hirisave, U., Oommen, A., Kapur, M. (eds), *Psychological Assessment of Children in the clinical Setting*, Vinayaka Offset Printers, Bangalore.

Karande, S., D'souza, S., Gogtay, N., Shiledar, M., & Sholapurwala, R. (2019). Economic burden of specific learning disability: A prevalence-based cost of illness study of its direct, indirect, and intangible costs. *Journal of Postgraduate Medicine*. https://doi.org/10.4103/jpgm.JPGM-413-18

Karande, S., & Venkataraman, R. (2012). Self-perceived health-related quality of life of Indian children with specific learning disability. *Journal of Postgraduate Medicine*. https://doi.org/10.4103/0022-3859.105442

Karande, Sunil, Bhosrekar, K., Kulkarni, M., & Thakker, A. (2009). Health-related quality of life of children with newly diagnosed specific learning disability. *Journal of Tropical Pediatrics*. https://doi.org/10.1093/tropej/fmn099

Karande, Sunil, & Kulkarni, M. (2005). Specific learning disability: The invisible handicap. In *Indian Pediatrics.*

Karande, Sunil, Sholapurwala, R., & Kulkarni, M. (2011). Managing specific learning disability in schools in India. *Indian Pediatrics*. https://doi.org/10.1007/s13312-011-0090-1

Kendeou, P., van den Broek, P., White, M. J., & Lynch, J. S. (2009). Predicting Reading Comprehension in Early Elementary School: The Independent Contributions of Oral Language and Decoding Skills. *Journal of Educational Psychology, 101*(4). https://doi.org/10.1037/a0015956

Kishore, M. T., Maru, R., Seshadri, S. P., Kumar, D., Sagar, J. K. V., Jacob, P., & Murugappan, N. P. (2021). Specific learning disability in the context of current diagnostic systems and policies in India: Implications for assessment and certification. *Asian Journal of Psychiatry, 55*, 102506.

Knoop-van Campen, C. A. N., Segers, E., & Verhoeven, L. (2018). How phonological awareness mediates the relation between working memory and word reading efficiency in children with dyslexia. *Dyslexia.* https://doi.org/10.1002/dys.1583

Kohli, A., Sharma, S., & Padhy, S. (2018). Specific learning disabilities: Issues that remain unanswered. In *Indian Journal of Psychological Medicine.* https://doi.org/10.4103/IJPSYM.IJPSYM_86_18

Lagae, L. (2008). Learning Disabilities: Definitions, Epidemiology, Diagnosis, and Intervention Strategies. In *Pediatric Clinics of North America*. https://doi.org/10.1016/j.pcl.2008.08.001

Landis, J. R., & Koch, G. G. (1977). The Measurement of Observer Agreement for Categorical Data. *Biometrics*. https://doi.org/10.2307/2529310

Malin, A. J. (1969). *Manual of Malin's Intelligence Scale for Indian Children* (MISIC), Indian Psychological Corporation, Lucknow.

Meganathan, R. (2011). Language Policy in education and the role of English in India: From library language to language of empowerment. in: H. Coleman (Ed.), *Dreams and Realities: Developing Countries and the English Language.* British Council, London.

Nation, K., Cocksey, J., Taylor, J. S. H., & Bishop, D. V. M. (2010). A longitudinal investigation of early reading and language skills in children with poor reading comprehension. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 51*(9). https://doi.org/10.1111/j.1469-7610.2010.02254.x

Ramaa, S. (2000). Two decades of research on learning disabilities in India. *Dyslexia*. https://doi.org/10.1002/1099-0909(200010/12)6:4<268::aid-dys177>3.3.co;2-1

Raven J., (2012). *Coloured Progressive Matrices and Crichton Vocabulary Scale*, India edition, Pearson Inc.

Rost, D. H., & Hartmann, A. (1992). Reading, hearing, understanding. *Zeitschrift Für Psychologie Mit Zeitschrift Für Angewandte Psychologie, 200*(4)

Sauzéon, H., Lestage, P., Raboutet, C., N'Kaoua, B., & Claverie, B. (2004). Verbal fluency output in children aged 7-16 as a function of the production criterion: Qualitative analysis of clustering, switching processes, and semantic network exploitation. *Brain and Language*. https://doi.org/10.1016/S0093-934X(03)00367-5

Schroeders, U., Wilhelm, O., & Bucholtz, N. (2010). Reading, listening, and viewing comprehension in English as a foreign language: One or more constructs? *Intelligence.*

Sears, S., & Keogh, B. (1993). Predicting reading performance using the slingerland procedures. *Annals of Dyslexia, 43*(1). https://doi.org/10.1007/BF02928175

Singh, N. (2015) *iLAB Language Assessment Battery Manual*, National Brain Research Centre.

Singh, S., Sawani, V., Deokate, M., Panchal, S., Subramanyam, A. A., Shah, H. R., & Kamath, R. M. (2017). Specific learning disability: a 5 year study from India. *International Journal of Contemporary Pediatrics*. https://doi.org/10.18203/2349-3291.ijcp20171687

Spearman, C. (1904). The Proof and Measurement of Association between Two Things. The *American Journal of Psychology.* https://doi.org/10.2307/1412159

The Gazette of India Extraordinary. (2018). IV.36 Rights of Persons with Disabilities. Elgar *Encyclopedia of International Economic Law*, DI, 654–656. https://doi.org/10.4337/9781784713546.330

Unsworth, N., Spillers, G. J., & Brewer, G. A. (2011). Variation in verbal fluency: A latent variable analysis of clustering, switching, and overall performance. Quarterly *Journal of Experimental Psychology*. https://doi.org/10.1080/17470218.2010.505292

Viswanatham, K. (2001). The Eighth Schedule and The Three Language Formula. In Daswani, C.J. (Ed.), *Language Education in Multilingual India*. New Delhi: UNESCO. p. 299-333.

Ziegler, J. C., & Goswami, U. (2005). Reading acquisition, developmental dyslexia, and skilled reading across languages: A psycholinguistic grain size theory. In *Psychological Bulletin*. https://doi.org/10.1037/0033-2909.131.1.3

Asia Pacific Journal of Developmental Differences
Vol. 9, No. 1, January 2022, pp. 65—81
DOI: 10.3850/S2345734122000128

Home-Based Psychoeducational Strategies for Supporting Children with Specific Learning Disabilities during School Closures

Julia Ai Cheng Lee[1*]

1. Universiti Malaysia Sarawak

Abstract

Specific learning disabilities (SLDs) refer to a diverse academically related disabilities manifested by significant difficulties in listening, speaking, reading, handwriting, spelling, writing, reasoning and/or mathematics. With the long school closures and the lack of face-to-face teacher presence during the Covid-19 pandemic, it can be challenging for parents to support their children with SLDs during home-based learning. One of the biggest challenges during home-based learning is homework completion by children with SLDs; another challenge is the competition one can observe between doing schoolwork and playing games on technology gadgets. Thus, the focus of this article is to draw from a range of extant literature regarding evidenced based prescriptive strategies for the psychoeducational support of children with SLDs, many of whom have self-regulation challenges, which include difficulty in shifting attention and sustaining mental effort. The prescriptive strategies aim to provide useful research-to-practice information to parents and caregivers on strategies for improving home-based education for exceptional learners with SLDs during the long school closures. These prescriptive strategies can be applied in the daily home-based support of children with SLDs for their academic success and wellbeing.

Keywords: psychoeducational support, specific learning disabilities, children, parents, school closures, home-based learning, Covid-19 pandemic

* *Correspondence to:*
Julia Ai Cheng, Lee, 1Universiti Malaysia Sarawak, 94300, Kota Samarahan, Sarawak, Malaysia. Email: aclee@unimas.my
orcid.org/0000-0001-9149-3848

As a result of the Covid-19 pandemic, children all around the world are experiencing home-based learning and they are given various kinds of school work through the internet by their teachers. With this sudden disruption to the status quo of schooling, the Covid-19 pandemic poses a challenging time for teachers, parents, and caregivers because of the sudden need to learn various e-learning tools quickly and to facilitate the home-based online learning experiences of children (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021). Parents, in particular, have to play the role of both the parent and facilitator of the learning process from home. Many parents are worried about their children falling behind and not being able to manage their children's home-based learning process (Lardieri, 2020).

One of the biggest challenges during this time is the competition one can observe between doing schoolwork and playing games on technology gadgets. Technology gadgets such as tablets, iPads, and mobile phones can be distracting especially if a child does not have good self-regulation. Conversely, homework and schoolwork may seem boring to children. Furthermore, there are issues that may relate to internet access, computers, laptops, or mobile computing gadgets, shared access of these technology gadgets with siblings, and allowing time for working parents to also work from home during home-based learning. Some of the reported parental challenges with regards to home-based learning for children with specific learning disabilities (SLDs) during the pandemic include the establishment of routines, completion of homework by the children, insufficient support from the teachers, and time spent by parents on assisting children with learning disabilities (Soriano-Ferrer et al., 2021). Many parents and children with special needs including specific learning disabilities are feeling overwhelmed and are struggling to cope with the burden of home-based learning (Asbury et al., 2020).

Thus, this article draws from a broad range of extant literature (e.g., psychology, special education, child psychology, and child psychiatry) on evidenced based prescriptive strategies for the psychoeducational support of children with SLDs, many of whom have self-regulation challenges, which includes difficulty in shifting attention and sustaining mental effort (American Psychiatric Association, 2013; Grigorenko et al., 2020; Lichtinger & Kaplan, 2015). Parents and caregivers will become more aware of the strategies they could use proactively during this difficult time when access to face-to-face professional therapy and intervention may be disrupted. Being equipped with skill sets such as providing corrective feedback and using environmental strategies is important for helping parents and caregivers to enhance the coping skills and wellbeing of children with SLDs while ensuring academic success during this difficult time (Clarke, 2020).

Specific Learning Disabilities

Specific learning disabilities refer to a heterogeneous group of disabilities manifested by significant difficulties in the acquisition and use of listening, speaking, reading, handwriting, spelling, writing, reasoning and/or mathematical abilities (American

Psychiatric Association, 2013; Dominguez & Carugno, 2020; Grigorenko et al., 2020; McDowell, 2018; Royal College of Psychiatrists, 2015; Swanson, 2001). Thus, academic deficits are the hallmark of SLDs (Grigorenko et al., 2020; Pennington, 2009). The common SLDs are dyslexia, which occurs in the domain of literacy and is manifested in reading and spelling difficulties; dyscalculia, which occurs in the domain of mathematics; dysgraphia, which occurs in the domain of handwriting and is evident from the distorted and illegible handwriting; and non-verbal learning disabilities, which occurs in the domain of handwriting, mathematics, and organization (Dominguez & Carugno, 2020; McDowell, 2018).

SLDs result from weaknesses in one or more processes related to thinking and learning, including (but not limited to) language processing, memory, attention, phonological processing, processing speed, and executive functioning (e.g., response inhibition, response control, working memory, and planning) (American Psychiatric Association, 2013; Cirino et al., 2017; Denckla & Mahone, 2018; National Institute of Child Health and Development, 2018a; Papanastasiou, 2017). According to the American Psychiatric Association (2013), the diagnosis of SLDs takes place when there are specific deficits related to the perception or processing of information in an accurate and efficient manner. As per the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013), the following are the diagnostic criteria of SLDs: 1) Difficulties processing instructions and learning skills in one or more areas for at least 6 months despite having received relevant intervention. The areas of difficulties include difficulties in word reading, difficulties to comprehend what is read, difficulties in spelling, difficulties in written expression, difficulties in mastering number facts or calculations, and/or difficulties in mathematical reasoning; 2) The academic skills are substantially lower than the expected chronological age resulting in significant interference in academic performance or daily living; 3) Difficulties are manifested during school-age years but becomes fully evident when academic demands increases (e.g., timed tests; lengthy reading and writing tasks); and 4) Aberrations from typical academic performance are not better elucidated by intellectual disabilities, sensory disorders, neurological disorders, psychosocial adversity, language incompetency, or inadequate instruction (Dominguez & Carugno, 2020; Grigorenko et al., 2020).

SLD is a common disorder with a prevalence rate of 5% and 15% among school-age children (American Psychiatric Association, 2013). The diagnosis and interventions for children with SLDs are often more complex than they seem. This is because children with SLDs may also have attention-deficit/hyperactivity disorder (ADHD) (American Psychiatric Association, 2013; Denckla & Mahone, 2018; Ferrin et al., 2016). The main symptoms of ADHD are hyperactivity, impulsivity, and/or inattention (Ferrin et al., 2016). Mounting evidence suggests that comorbidity issues may be present where children with SLDs may also have ADHD behaviors (Castro et al., 2020; DuPaul et al., 2013; Margari et al., 2013). The percentage of co-occurrence between SLDs and ADHD has been reported to have a comorbidity rate of between 33% and 41.5% (DuPaul et al., 2013; Margari et al., 2013)

while a recent synthesis of 50 years of scientific evidence states that the comorbidity between specific word reading difficulties and ADHD is between 25% and 50% (Grigorenko et al., 2020). Other studies have also reported that children's difficulties in reading and mathematics are positively related with their hyperactive behaviors (Castro et al., 2020). Overall, these percentages highlight the magnitude of the challenges faced by parents and caregivers in providing the necessary support to children with SLDs during home-based learning.

Psychoeducational Support Strategies for Children with SLDs

Children with SLDs who have been referred to qualified professionals for psychoeducational assessment typically require psychoeducational intervention to help them how to learn and to overcome their learning problems (Hoffman & DuPaul, 2000; National Institute of Child Health and Development, 2018a). Psychoeducation refers to the integration of psychotherapeutic and educational intervention focusing on the didactic communication of information and guidance of coping skills for patients and families (Dahl et al., 2020). Parental awareness and training on psychoeducational support have been reported to have promising effects on influencing parental perceptions regarding their child's difficulties and improving parenting skills such as recognizing the particular pattern of difficulties experienced by their child, having access to specific explanations regarding the behavioral and learning challenges faced by their child, empowering parents to break negative parent–child interactions, and influencing developmental outcomes (Daley et al., 2014).

During home-based learning, parents may experience increasing challenges in managing their child with SLDs. Recent research has reported parenting-related exhaustion and distress experienced by parents during home-based learning (Soriano-Ferrer et al., 2021). Thus, it is important for parents and caregivers to be equipped with effective strategies to help children with SLDs adapt to home-based learning. There are evidenced based approaches from the fields of educational psychology, special education, child psychology, and child psychiatry that are helpful for assisting parents and caregivers to make more informed decisions and applying strategies during home-based learning (Barkley, 2013; Betker, 2017; Bryan & Burstein, 2004; Dahl et al., 2020; Daley et al., 2018; Hoffman & DuPaul, 2000; Kim & Fineup, 2021; National Institute of Child Health and Development, 2018a; Nielsen et al., 2018). It is of utmost importance to use the suitable strategies so that children with SLDs are able to learn effectively during this difficult time and parents and caregivers can proactively prevent burnout and excessive stress. Listed below are several psychoeducational strategies for supporting children with SLDs during home-based learning.

Implement Routines and Structure

It is important to prepare and implement routines and structure for children with SLDs (Betker, 2017; Maciver et al., 2019). Routines, sequence of activities, and transitions within the routines are crucial (Betker, 2017; Whiting, 2020). Routines are particularly important for children with SLDs, including children with ADHD (American Psychiatric Association, 2013). Thus, bedtime, afternoon naps, meal times, and various times for studying, doing homework, having free time for relaxation and exercise, and learning new skills such as cooking and baking should be planned in the routine. Well planned and predictable daily schedules are important to provide the structure, which in turn ensure that the children feel safe and secure. In addition, parents and caregivers will have some free time to themselves and the space to make plans for the week. The schedule should be posted in a visible and easily accessible area so that the child is more time aware of the daily routines. Overall, having routines and structure improve efficiency and daily functioning during home-based learning.

Reduce Noise and Visual Distractions

Children with SLDs who also have issues with ADHD have difficulty focusing on the correct thing (Betker, 2017). Thus, it is important to minimize auditory and visual distractions so that children with SLDs can focus on the task at hand. The working space should be a corner of the home that is free from distraction. In addition, the house and working space should be as quiet as possible. It is best to position the study table away from the window so that the child is not distracted by movements outside (Betker, 2017). Ideally, the study area is not in the sitting room where there is a lot of "traffic", distraction, and noise from, say, the television set (Betker, 2017). The stationaries that are used regularly should be organised properly to avoid too much time wasted looking for misplaced items. Modifying the child's environment helps ensure success (Betker, 2017).

Make Mental Information Physical

Children with SLDs may also experience other issues which disadvantage them. Examples of these issues are self-regulation deficits such as difficulties in focusing, staying on task, and keeping track of time. Therefore, it is important to externalize the child's learning processes in visible form by providing visual and verbal cues (Betker, 2017; Furlong et al., 2016). Children with SLDs often times cannot hold things in mind. This is related to weak working memory. Thus, there is a need to substitute for poor working memory. Parents and caregivers can use external forms of information such as checklists, post-it notes, signs, symbols, charts, and reminders (Barkley, 2013; Betker, 2017; Denton et al., 2020). Other examples include putting up visual cues such as visual reminders, using verbal cues such as questions to remind the child on what needs to be done (e.g., "What are you supposed to be doing now?"), and non-verbal cues such as hand signal. These cues alert the children on what needs to be done at a particular point in time

(Betker, 2017). Making mental information physical is a proactive approach parents and caregivers can adopt for supporting the learning process of children with SLDs.

Make Time Real and Concrete through Clocks and Timers

Time management is a common problem among children with SLDs (Lerner & Johns, 2012; Newhall, 2008; Smith, 2002). When children with SLDs are doing homework using technological gadgets and virtual technologies during home-based learning, they may lose focus easily because they may have inhibition/self-control problems and the games that await them are far more exciting than completing their homework. Thus, children with SLDs who have self-regulation problems need something outside of themselves to signal the passage of the passing time (Barkley, 2013; Newhall, 2008). Parents and caregivers could use cooking timers or digital timers that are within the visual field of the child with SLDs. A kitchen timer, which buzzes when time is up, may also serve as a behavior management mechanism to help the child to be more time aware. The clock, which is within the visual field of the child, then helps him/her to become more aware of the passing time (Betker, 2017; Newhall, 2008).

Break Up Lengthy Tasks, Homework, and Assignments

Children with SLDs and self-regulation deficits have limited sense of the future. Telling or nagging at a child to complete an essay by a certain date or in 3 days' time is not going to work. An alternative approach to helping children to stay on task is to allocate a certain time to complete a small chunk of the homework each day (Barkley, 2013; Bryan et al., 2001). Therefore, parents and caregivers must be proactive in assisting the child to chunk the tasks into smaller doable parts for the child and in training the child to monitor his/her own progress using strategies such as checklists or graphing homework completion (Betker, 2017; Bryan et al., 2001). For example, read x number of pages per day or write 10 sentences or 15 sentences a day and upon completion of an assigned task, to record it in a visual graph. It is more productive for the parent and caregiver to break the "task" into chunks or smaller parts so that the child is able to complete smaller chunks on a regular basis until the entire task gets done. Being proactive rather than reactive is the key to productivity in facilitating the learning process of children with SLDs.

Provide Extrinsic Motivation

Extrinsic motivation refers to the willingness to engage in an activity for the sake of external rewards or punishment avoidance (Zisimopoulos & Galanaki, 2009). Conversely, intrinsic motivation refers to an individual's inner desire to engage in activities for the sake of internal rewards such as enjoyment or interest (Daniel & Cooc, 2018). Children with SLDs lack the intrinsic motivation to initiate academic tasks by themselves (Zisimopoulos & Galanaki, 2009). They are dependent on the environment for motivation.

Therefore, children with SLDs often times require the external motivation from their parents and caregivers (Lerner & Johns, 2012).

Parents and caregivers could create the extrinsic motivation for the children with SLDs; that is to provide positive reinforcements for desired behaviors (Hoffman & DuPaul, 2000). For example, tokens such as stickers and stars can be used to reward the child for the work completed (Ivy et al., 2017). In addition, giving the child recognition for a good job done, the attention he/she desires such as a simple give me five, a hug, thumbs up, or the satisfaction of knowing that the answer is correct are common reinforcers (Barkley, 2013). Positive and immediate reinforcements are the most effective in fostering the desired behavior (Hoffman & DuPaul, 2000; Lerner & Johns, 2012). Parents may want to creatively form a "redemption store" where contingent on attaining a target behavior or the completion of tasks, the child may exchange the token with something of his/her preference (Ivy et al., 2017; Kim & Fineup, 2021). For example, after a child reads five pages, she receives two tokens that are exchangeable for toys or an outing when the situation gets better.

Monitor and Regulate Children's Screen Time

Game-based learning for enhancing subject matter content knowledge and skills can enhance learners' cognitive, behavioral, affective, and sociocultural engagement (Plaas et al., 2015) including attention among children with SLDs and ADHD (García-Redondo et al., 2019). Extrinsic reinforcements are aplenty in digital games (Alsawaier, 2018; Westera, 2015). For example, video games provide constant extrinsic motivations through reinforcements such as points, tokens, and continuous reinforcements to the children. Thus, video games are far more attractive and entertaining to the children. Every few seconds during the game, there is a reward being given to the player.

During the Covid-19 pandemic, screen time use among children has increased (Hammons et al., 2021; Hartshorne et al., 2021; ParentsTogether, 2020). Furthermore, with the increasing screen time use during home confinement, children, out of boredom and loneliness, are susceptible to excessive video gaming (Zhu et al., 2021). The susceptibility of children to addiction to gaming calls for more parental involvement and monitoring to curb the time spent on gaming and to prevent excessive gaming (Donati et al., 2021). Donati and colleagues found that parents who engaged in parent-child discussions and employed rules (i.e., controlled the types and content of the video games), reinforcement, and modeling (i.e., spending less time on gaming themselves) can protect their child from excessive gaming. While these studies have been conducted on the general population and not specifically on children with SLDs, findings from these studies can inform parents of children with SLDs about the importance of parental involvement in regulating the use of video games and curbing the negative effects of excessive video gaming.

Enhance Parental Involvement and Teacher Facilitation during Homework Completion

Children with SLDs tend to struggle with homework completion due to practices and characteristics that interfere with the task (Bryan & Burstein, 2004). Examples of the challenges faced by children with SLDs include lack of motivation, distractibility, and taking longer time to start and longer time to complete the homework. During the Covid-19 pandemic, children are spending a lot of time online completing homework or assignments at home, but without the necessary intervention, the completion of the assignments may be problematic for children with SLDs (Kim & Fineup, 2021). Parental involvement during homework completion among children with and without special needs has been demonstrated to influence student outcomes including attitudes towards homework, self-perception towards personal competence, and self-regulatory skills (Kim & Fineup, 2021; see also Hoover-Dempsey et al., 2001).

The quality of parental involvement and strong family-school partnerships also play a mediating role in student achievement and well-being (Dettmers et al., 2019). A recent study on homework completion among children with SLDs with Individualized Education Plans (IEPs) demonstrated that purposeful instructional support and facilitation by teachers can enhance online learning engagement and daily completion of instructional activities during the school closures (Kim & Fineup, 2021). Children with SLDs received individual intervention components on reading in addition to whole class online sessions, which comprised class-wide postings of the daily schedule on the Google Classroom homepage, morning meeting questions, and written feedback for work completed (Kim & Fineup, 2021). The following day, the teachers provided verbal prompts to encourage the children to finish any incomplete components of the work from the previous day. If there were 3 or more missed components for four consecutive days, the head teacher emailed the parents to facilitate the completion of the daily assignments. A checklist of tasks was provided to the children with SLDs using sharescreen on Google Meet and the children were informed that they would earn virtual rewards such as playing a game with the teacher or act as the teacher for morning announcement if the tasks were completed. Every morning, the children with SLDs were required to stay online after the other students had logged off and the teacher would run through the checklist of daily tasks. This study showed that active facilitation by the teachers using daily task analysis and virtual rewards, and the strong family-school partnership are necessary for increasing children's engagement in online learning and for facilitating their well-being during remote teaching-learning on online platforms.

Externalize Mental Problem Solving

Children with SLDs have difficulty holding information in their minds. Mental manipulations are challenging for them unlike other typically developing peers. This means that solving problems using mental calculation and making estimations mentally is challenging for them. For example, children with mathematics difficulties find it more

difficult to determine whether 6 is more than 4 compared to whether a group of 6 marbles is more than 4 marbles (Powell & Fuchs, 2012). Therefore, parents/caregivers should provide children with SLDs number lines and manipulatives (Barnes et al., 2016; Bryant et al., 2008; Soares et al., 2018) so that the children with SLDs can grasp mathematics concepts by using concrete materials (i.e., manipulatives) first before progressing to the more abstract representations (i.e., numbers and symbols) (Powell & Fuchs, 2012). LEGO bricks and colored chips are great manipulatives for learning mathematics and have been shown to be effective in helping struggling learners (Altakhayneh, 2020; Lewis & Lynn, 2018). For example, colored chips may be used to help children understand and appreciate the concept of quantity. At the basic level of understanding quantity such as "Which one is more?" and "Which one is less?" two groups of colored chips may be used to differentiate the concept of quantity between 4 (e.g., 4 orange chips) and 9 (e.g., 9 green chips).

Real food stuff in the kitchen also provides real and contextualized methods of externalizing mental problem solving because the real world and authentic approach can enable children with mathematics difficulties connect meaningfully through everyday experiences with mathematics (Baker et al., 2002; Lewis & Lynn, 2018; Shin & Bryant, 2015). For example, during a baking session, the window of instructional opportunity is readily available for the adult to help the child to discover fractions at home through the use of physical materials such as measuring cups and spoons (Australian Psychological Society, 2020; Kaminski & Sloutsky, 2020; Siegler et al., 2010), which fosters multisensory learning in children with specific learning disabilities (Stern, 2011).

Build Academic Skills

For children with reading disabilities (including dyslexia), explicit, systematic (step-by-step), and multisensory approaches should be used to improve the letter-sound correspondence, reading at the word and sentence level, writing skills, and reading comprehension (Farrell & Sherman, 2011; National Institute of Child Health and Development, 2018b). Children who struggle with word reading benefit from systematic phonics instruction that fosters their alphabetic skills and decoding skills (National Reading Panel, 2000; Rose, 2009; Wanzek et al., 2018). In addition, intervention that targets the five core reading componential skills recommended by the National Reading Panel (2000) namely, phonological awareness, phonics, vocabulary, fluency, and reading comprehension, including spelling and handwriting, which are able to improve students' reading outcomes, could be used to complement other forms of learning support for struggling readers (Al Otaiba et al., 2018; Alqahtani, 2020; Jamshidifarsani et al., 2019). There are many assistive technologies that parents can explore to ameliorate their child's reading difficulties such as speech-to-text and text-to-speech software (Svensson et al., 2021; The Dyslexia Association UK, 2021).

For children with difficulties in mathematics, visuals with colours, verbalizations, memory aids, repeated practice, and corrective feedback are able to help children understand math concepts (Barnes et al., 2016; Furlong et al., 2016; Johnson et al., 2021; National Institute of Child Health and Development, 2018b). A structured multisensory approach to teaching children mathematics is especially important for children with SLDs because they typically struggle with multiple difficulties including language, memory associations, and attention issues (Stern, 2011). Thus, children with mathematics difficulties should be taught mathematics concepts using concrete representations and visual representations including manipulatives (Barnes et al., 2016) and the approaches discussed in the previous section on externalizing mental problem solving.

Visualize and Talk about Future Rewards

A child with SLDs who also has ADHD has difficulty focusing on rewards coming in the future (Furukawa et al., 2014, 2017). Before and after demanding tasks, teach the child with SLDs to visualize his/her ability to complete the task and discuss the future rewards in relation to the tasks. A child with SLDs need to see "what is it in it" for him/her when carrying out tasks. Therefore, parents and caregivers should facilitate the child's learning process in understanding the purpose of engagement with the task and seeing "what is it in it" for him/her (Lichtinger & Kaplan, 2015). The child with SLDs needs a reason for completing his/her school work. Help him/her to identify the point of the task, his/her highest priorities, goals, and values (Raskind et al., 2003). During the lockdown, there is a lot of flexibility for the child and his parents/caregivers to discover the child's passion. In turn, passion leads to career ideas and career ideas can motivate the child to identify and discover his/her priorities (Raskind et al., 2003).

Strengthen Self-Esteem and Self-Efficacy

Children with SLDs may experience low self-esteem and poor self-efficacy (Livingston et al., 2018). Self-esteem refers to the core beliefs about oneself, which develops from life experiences (MacMaster et al., 2002). Children with low self-esteem have many negative beliefs about themselves (MacMaster et al., 2002). Self-efficacy refers to the belief an individual has about his/her own capacity to execute behaviors necessary to produce specific outcomes (MacMaster et al., 2002). Low self-esteem and low self-efficacy are associated with internalizing behaviors such as anxiety and depression, which when left unattended will demonstrate worsening symptoms (Giovagnoli et al., 2020). Therefore, it is important to "catch" the child with SLDs doing a good job, provide praise for effort and accomplishment, and give specific feedback regarding a particular task that has been completed (Betker, 2017). This will enhance the child's sense of self-efficacy. In addition, encourage the child to use positive self-talk and statements such as "I can do this" so that it becomes what they believe about themselves and their ability (Denton et al., 2020). Positive statements such as "Yes, I can!" "Nothing is impossible." "I believe that I can. I am a smart boy." "I am a smart girl." I will never give up." will enhance their

self-esteem. Helping children with SLDs to build their personal resources such as hope, self-efficacy and optimism is related to academic success (Al-Yagon & Margalit, 2018; Cavioni et al., 2017; Sainio et al., 2019). Thus, fostering self-esteem and academic self-efficacy is one of the ways to address the negative consequences of having SLDs (Livingston et al., 2018).

Incorporate Physical Activities

It is important for children with SLDs to engage in physical activities to ensure that they build their physical strength, health, and mental wellbeing, improve their executive functions (Barkley, 2013; Grassmann et al., 2017; Huang et al., 2020; Miks & McIlwaine, 2020), and reduce their inattention (Reynolds & Nicolson, 2006). Physical activities are linked to behavior engagement and enhanced learning (Harvey et al, 2018). Children with SLDs benefit from short bursts of studying with movement breaks in between tasks because these movement breaks help them to focus (Betker, 2017; Nielsen et al., 2018). Physical activities may include walking, running, bike riding, playing, basketball, and skateboarding (Betker, 2017). During the long home confinement, children are likely to engage in sedentary behaviors such as watching television and playing video games (Donati et al., 2021). Thus, parents can encourage children to participate in physical and alternative activities such as board games and playing an instrument instead of excessive sedentary screen time (Donati et al., 2021; Hammons et al., 2021). Positive and healthy use of 'exergames' aimed at non-sedentary activities for stimulating healthy habits can foster home-based physical activity (Benzing & Schmidt, 2018; Donati et al., 2021; Rüth & Kaspar, 2021).

CONCLUSION

This present research-to-practice article has expounded on the challenges experienced by children with SLDs and evidenced based psychoeducational support strategies that parents and caregivers can apply at home during home-based learning. Given that the children's academic learning and wellbeing are paramount, it is important for parents and caregivers to take on the proactive role in providing home-based psychoeducational support to cope with the demands of managing the needs of children with SLDs. By re-engineering the surrounding environment and applying suitable psychoeducational strategies for supporting children with SLDs, the children's learning experience will become more positive and optimal during home-based learning.

REFERENCES

Al Otaiba, S., Rouse, A. G., & Baker, K. (2018). Elementary grade intervention approaches to treat specific learning disabilities, including dyslexia. *Language Speech and Hearing Services in Schools, 49*(4), 829–. doi:10.1044/2018_LSHSS-DYSLC-18-0022

Alqahtani, S. S. (2020). Technology-based interventions for children with reading difficulties: a literature review from 2010 to 2020. *Educational Technology Research and Development, 68*, 3495–3525. doi:10.1007/s11423-020-09859-1

Alsawaier, R. S. (2018). The effect of gamification on motivation and engagement. International *Journal of Information and Learning Technology, 35*(1), 56-79. https://doi.org/10.1108/IJILT-02-2017-0009

Altakhayneh, B. (2020). The impact of using the LEGO education program on mathematics achievement of different levels of elementary students. *European Journal of Educational Research, 9*(2), 603-610. https://doi.org/10.12973/eujer.9.2.603

Al-Yagon, M., & Margalit, M. (2018). Hope and coping in individuals with specific learning disorder. In M. W. Gallagher & S. J. Lopez (Eds.), *The Oxford Handbook of Hope* (pp. 1-20). DOI: 10.1093/oxfordhb/9780199399314.013.29

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders*. Arlington, VA: American Psychiatric Association.

Asbury, K., Fox, L., Deniz, E., Code, A., & Toseeb, U. (2020). How is Covid-19 affecting the mental health of children with special educational needs and disabilities and their families? *Journal of Autism and Developmental Disorders, 51*, 1772-1780. doi:10.1007/s10803-020-04577-2

Australian Psychological Society. (2020). Maths tips for children with learning difficulties and disabilities: Support and strategies for e-learning environments. https://www.psychology.org.au/getmedia/8325e962-75e9-47ef-9629-c570060688f3/APS-CCN-IS-LD-Primary-School-Math-tips-P1.pdf

Baker, S., Gersten, R., & Lee, D. (2002). A synthesis of empirical research on teaching mathematics to low-achieving students. *The Elementary School Journal, 103*(1), 51-73.

Barkley, R. A. (2013). *Taking charge of ADHD: The complete authoritative guide for parents*. New York, NY: Guilford Press.

Barnes, M. A., Klein, A., Swank, P., Starkey, P., McCandliss, B., Flynn, K., Zucker, T., Huang, C.-W., Fall, A.-M., & Roberts, G. (2016) Effects of tutorial interventions in mathematics and attention for low-performing preschool children, *Journal of Research on Educational Effectiveness, 9* (4), 577-606. DOI: 10.1080/19345747.2016.1191575

Benzing, V., & Schmidt, M. (2018). Exergaming for Children and Adolescents: Strengths, Weaknesses, Opportunities and Threats. *Journal of Clinical Medicine, 7*(11), 422. https://doi.org/10.3390/jcm7110422

Betker, C. (2017) Environmental strategies for managing attention deficit hyperactivity disorder. *Journal of Childhood & Developmental Disorders,* 3(4), 24. DOI: 10.4172/2472-1786.100062

Bryan, T., & Burstein, K. (2004) Improving homework completion and academic performance: Lessons from special education. *Theory into Practice, 43*(3), 213-219, DOI: 10.1207/s15430421tip4303_7

Bryan, T., Burstein, K., & Bryan, J. (2001) Students with learning disabilities: Homework problems and promising practices. *Educational Psychologist, 36*(3), 167-180, DOI: 10.1207/S15326985EP3603_3

Bryant, B. R., Bryant, D. P., Kethley, C., Kim, S. A., Pool, C., & Seo, Y.-J. (2008). Preventing mathematics difficulties in the primary grades: The critical features of instruction in

textbooks as part of the equation. *Learning Disability Quarterly, 31*(1), 21–35. https://doi.org/10.2307/30035523

Castro, E., Cotov, M., Brovedani, P., Coppola, G., Meoni, T., Papini, M., Terlizzi, T., Vernucci, C., Pecini, C., & Muratori, P. (2020). Associations between learning and behavioral difficulties in second-grade children. *Children (Basel, Switzerland), 7*(9), 112. https://doi.org/10.3390/children 7090112

Cavioni, V., Grazzani, I., & Ornaghi, V. (2017). Social and emotional learning for children with learning disability: Implications for inclusion. *International Journal of Emotional Education, 9* (2), 100-109.

Cirino, P. T., Miciak, J., Gerst, E., Barnes, M. A., Vaughn, S., Child, A., & Huston-Warren, E. (2017). Executive function, self-regulated learning, and reading comprehension: A training study. *Journal of Learning Disabilities, 50*(4), 450–467. https://doi.org/10.1177/0022219415618497

Clarke, T. (2020). Children's wellbeing and their academic achievement: The dangerous discourse of 'trade-offs' in education. *Theory and Research in Education, 18*(3), 263-294. https://doi.org/10.1177/1477878520980197

Dahl, V., Ramakrishnan, A., Spears, A. P., Jorge, A., Lu, J., Bigio, N. A., Chacko, A. (2020). Psychoeducation interventions for parents and teachers of children and adolescents with ADHD: A systematic review of the literature. *Journal of Developmental and Physical Disabilities, 32*, 257–292. https://doi.org/10.1007/s10882-019-09691-3

Daley, D., Van Der Oord, S., Ferrin, M., Cortese, S., Danckaerts, M., Doepfner, M., Van den Hoofdakker, B. J., Coghill, D., Thompson, M., Asherson, P., Banaschewski, T., Brandeis, D., Buitelaar, J., Dittmann, R. W., Hollis, C., Holtmann, M., Konofal, E., Lecendreux, M., Rothenberger, A., Santosh, P., ... Sonuga-Barke, E. J. (2018). Practitioner Review: Current best practice in the use of parent training and other behavioural interventions in the treatment of children and adolescents with attention deficit hyperactivity disorder. *Journal of Child Psychology and Psychiatry, 59*(9), 932-947. doi: 10.1111/jcpp.12825

Daley, D., van der Oord, S., Ferrin, M., Danckaerts, M., Doepfner, M., Cortese, S., . . . ADHD Guidelines Group. (2014). Behavioral interventions in attention-deficit/hyperactivity disorder: A meta-analysis of randomized controlled trials across multiple outcome domains. *Journal of the American Academy of Child & Adolescent Psychiatry, 53*, 835-847, 847. e1-847.e5.

Daniel, J. R., & Cooc, N. (2018). Teachers' perceptions of academic intrinsic motivation for students with disabilities. *The Journal of Special Education, 52*(2), 101-112 .doi:10.1177/0022466918765276

Denckla, M. B., & Mahone, E. M. (2018). Bringing together the definition of attention deficit/hyperactivity disorder and learning disabilities (pp. 5- 24). In L. Meltzer (Ed.*). Executive function in Education: From Theory to Practice.* New York, NY: Guilford Press.

Denton, C. A., Montroy, J. J., Zucker, T. A., & Cannon, G. (2020). Designing an intervention in reading and self-regulation for students with significant reading difficulties, including dyslexia. *Learning Disability Quarterly*. doi:10.1177/0731948719899479

Dettmers, S., Yotyodying, S., & Jonkmann, K. (2019). Antecedents and outcomes of parental homework involvement: How do family-school partnerships affect parental homework involvement and student outcomes? *Frontiers in Psychology, 10*, 1048. doi: 10.3389/fpsyg.2019.01048

Dominguez, O., & Carugno, P. (2020). *Learning disability*. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK554371/?report=printable

Donati, M. A., Guido, C. A., De Meo, G., Spalice, A., Sanson, F., Beccari, C., & Primi, C. (2021). Gaming among children and adolescents during the COVID-19 lockdown: The Role of

parents in time spent on video games and gaming disorder symptoms. International *Journal of Environmental Research and Public Health, 18*(12), 6642. https://doi.org/10.3390/ijerph18126642

DuPaul, G. J., Gormley, M. J., & Laracy, S. D. (2013). Comorbidity of LD and ADHD: implications of DSM-5 for assessment and treatment. *Journal of Learning Disabilities, 46*, 43–51. 10.1177/0022219412464351

Farrell. M. L., & Sherman, G. F. (2011). Multisensory structure language education. In Ed. Judith R. Birsh (Ed.), *Multisensory teaching of basic language skills* (pp. 25-47). Baltimore, MA: Paul H. Brookes Publishing.

Ferrin, M., Perez-Ayala, V., El-Abd, S., Lax-Pericall, T., Jacobs, B., Bilbow, A., & Taylor, E. (2016). A randomized controlled trial evaluating the efficacy of a psychoeducation program for families of children and adolescents with ADHD in the United Kingdom: Results After a 6-Month Follow-Up. *Journal of Attention Disorders*, 1-12. doi:10.1177/1087054715626509

Furlong, M., McLoughlin, F., McGilloway, S., & Geary, D. (2016). Interventions to improve mathematical performance for children with mathematical learning difficulties (MLD). *Cochrane Database of Systematic Reviews, 4.* Art. No.: CD012130. DOI: 10.1002/14651858.CD012130.

Furukawa, E., Bado, P., Tripp, G., Mattos, P., Wickens, J. R., Bramati, I. E., et al. (2014) Abnormal striatal BOLD responses to reward anticipation and reward delivery in ADHD. *PLoS ONE, 9* (2): e89129. https://doi.org/10.1371/journal.pone.0089129

Furukawa, E., Bado, P., Tripp, G., Mattos, P., & Moll, J. (2017). Focusing is hard! Brain responses to reward in attention deficit hyperactivity disorder. *Frontiers for Young Minds, 5*, 18. doi: 10.3389/frym.2017.00018

García-Redondo, P., García, T., Areces, D., Núñez, J. C., & Rodríguez, C. (2019). Serious games and their effect improving attention in students with learning disabilities. International *Journal of Environmental Research and Public Health, 16*(14), 2480. https://doi.org/10.3390/ijerph16142480

Giovagnoli, S., Mandolesi, L., Magri, S., Gualtieri, L., Fabbri, D., Tossani, E., & Benassi, M. (2020). Internalizing symptoms in developmental dyslexia: a comparison between primary and secondary school. *Frontiers in Psychology, 11*. doi: 10.3389/fpsyg.2020.00461

Grassmann, V., Alves, M. V., Santos-Galduróz, R. F., & Galduróz, J. C. (2017). Possible cognitive benefits of acute physical exercise in children with ADHD. *Journal of Attention Disorders, 21* (5), 367–371. https://doi.org/10.1177/1087054714526041

Grigorenko, E. L., Compton, D. L., Fuchs, L. S., Wagner, R. K., Willcutt, E. G., & Fletcher, J. M. (2020). Understanding, educating, and supporting children with specific learning disabilities: 50 years of science and practice. *American Psychologist, 75*(1), 37–51. http://dx.doi.org/10.1037/amp0000452

Hammons, A. J., Villegas, E., & Robart, R. (2021). "It's been negative for us just all the way across the board": Focus group study exploring parent perceptions of child screen time during the Covid-19 pandemic. *JMIR Pediatrics and Parenting, 4*(2), e29411. doi: 10.2196/29411

Hartshorne, J. K., Huang, Y. T., Lucio Paredes, P. M., Oppenheimer, K., Robbins, P. T., & Velasco, M. D. (2021). Screen time as an index of family distress. Current *Research in Behavioral Sciences, 2,* 100023. https://doi.org/10.1016/j.crbeha.2021.100023.

Harvey, S. P., Lambourne, K., Greene, J. L., Gibson, C. A., Lee, J., & Donnelly, J. E. (2018). The effects of physical activity on learning behaviors in elementary school children: A randomized controlled trial. *Contemporary School Psychology, 22,* 303–312. https://doi.org/10.1007/s40688-017-0143-0

Hoffman, J. A., & DuPaul, G. J. (2000). Psychoeducational interventions for children and adolescents with attention-deficit/hyperactivity disorder. *Child and Adolescent Psychiatric Clinics of North America, 9*(3), 647-661.

Hoover-Dempsey, K. V., Battiato, A. C., Walker, J. M. T., Reed, R. P., DeJong, J. M., & Jones, K. P. (2001). Parental involvement in homework. *Educational Psychologist, 36*(3), 195–209. doi:10.1207/s15326985ep3603_5

Huang, C.-J., Tu, H.-Y., Hsueh, M.-C., Chiu, Y.-H., Huang, M.-Y., & Chou, C.-C. (2020). Effects of acute aerobic exercise on executive function in children with and without learning disability: A randomized controlled trial. *Adapted Physical Activity Quarterly, 37*(4), 404–422. https://doi.org/10.1123/apaq.2019-0108

Ivy, J. W., Meindl, J. N., Overley, E., & Robson, K. M. (2017). Token economy: A systematic review of procedural descriptions. *Behavior Modification, 41*(5), 708-737. doi:10.1177/0145445517699559

Jamshidifarsani, H., Garbaya, S., Lim, T., Blazevic, P., & Ritchie, J. M. (2019). Technology-based reading intervention programs for elementary grades: An analytical review. *Computers and Education.* https://doi.org/10.1016/j.compedu.2018.10.003

Johnson, E. S. Clohessy, A. B.; Chakravarthy, P. (2021). A self-regulated learner framework for students with learning disabilities and math anxiety. *Intervention in School and Clinic, 56*(3), 163-171. doi:10.1177/1053451220942203

Kaminski, J. A. & Sloutsky, & Vladimir, M. (2020). The use and effectiveness of colorful, contextualized, student-made material for elementary mathematics instruction. *International Journal of STEM Education, 7*(1), 6– doi:10.1186/s40594-019-0199-7

Kim, J.Y., & Fineup, D. M. (2021). Increasing access to online learning for students with disabilities during the COVID-19 pandemic. *Journal of Special Education, 1-9*. https://doi.org/10.1177/0022466921998067

Lardieri, A. (2020, October 29). Most parents worry students will fall behind due to the pandemic. *U.S. News & World Report.* https://www.usnews.com/news/education-news/articles/2020-10-29/most-parents-worry-students-will-fall-behind-due-to-coronavirus-survey-finds

Lerner, J. W., & Johns, B. (2012). *Learning disabilities and related mild disabilities: Characteristics, teaching strategies, and new directions*. Canada: Wadsworth.

Lewis, K., & Lynn, D. (2018). Against the odds: Insights from a statistician with dyscalculia. *Education Sciences, 8*(2), 63. https://doi.org/10.3390/educsci8020063

Lichtinger, E., & Kaplan, A. (2015). Employing a case study approach to capture motivation and self-regulation of young students with learning disabilities in authentic educational contexts. *Metacognition and Learning, 10*(1), 119–149. doi:10.1007/s11409-014-9131-1

Livingston, E. M., Siegel, L. S., & Ribary, U. (2018). Developmental dyslexia: emotional impact and consequences. *Australian Journal of Learning Difficulties, 23*(2), 107-135, DOI:10.1080/19404158.2018.1479975

Maciver, D., Rutherford, M., Arakelyan, S., Kramer, J. M., Richmond, J., Todorova, L., et al. (2019). Participation of children with disabilities in school: A realist systematic review of psychosocial and environmental factors. *PLoS ONE, 1*4(1): e0210511. https://doi.org/10.1371/journal.pone.0210511

MacMaster, K., Donovan, L. A., & MacIntyre, P. D. (2002). The effects of being diagnosed with a learning disability on children's self-esteem. *Child Study Journal, 32*(2), 101+. https://link.gale.com/apps/doc/A94591678/AONE?u=anon~2e45d4a0&sid=googleScholar&xid=8cf235d5

Margari, L., Buttiglione, M., Craig, F., Cristella, A., de Giambattista, C., Matera, E., Operto, F., & Simone, M. (2013). Neuropsychopathological comorbidities in learning disorders. *BMC Neurology, 13*, 198. https://doi.org/10.1186/1471-2377-13-198

McDowell, J. (2018). Specific learning disability. *Journal of Pediatrics and Child Health, 54*, 1077–1083. doi:10.1111/jpc.14168

Miks, J., & McIlwaine, J. (2020). Keeping the world's children learning through COVID-19. https://www.unicef.org/coronavirus/keeping-worlds-children-learning-through-covid-19

National Institute of Child Health and Development. (2018a, September 11). What are the treatments for learning disabilities? https://www.nichd.nih.gov/health/topics/learning/conditioninfo/treatment

National Institute of Child Health and Development. (2018b, September 11). What some signs of learning disabilities? https://www.nichd.nih.gov/health/topics/learning/conditioninfo/signs

National Reading Panel. (2000). Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction (National Institute of Health Pub. No. 00-4754). Washington, DC: National Institute of Child Health and Human Development.

Newhall, P. W. (2008). Teaching time management to students with learning disabilities. Adapted from Study Skills: Research-Based Teaching Strategies. Prides Crossing, MA: Landmark School, 28-31. http://www.ldonline.org/article/23676/

Nielsen, K., Henderson, S., Barnett, A. L., Abbott, R. D., & Berninger, V. (2018). Movement issues identified in Movement ABC2 checklist parent ratings for students with persisting dysgraphia, dyslexia, and OWL LD and typical literacy learners. Learning *Disabilities: A Multidisciplinary Journal, 23*(1), 10–23. https://doi.org/10.18666/LDMJ-2018-V23-I1-8449

Papanastasiou, F. (2017). Executive functions and their role in learning disabilities. *Journal of Psychology and Brain Studies, 1*(3), 17.

ParentsTogether. (2020). Survey shows parents alarmed as kids' screen time skyrockets during COVID-19 crisis. https://parents-together.org/survey-shows-parents-alarmed-as-kids-screen-time-skyrockets-during-covid-19-crisis/.

Pennington, B. F. (2009). *Diagnosing learning disorders: a neuropsychological framework.* New York, NY: Guilford Press.

Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. *Educational Psychologist, 50*(4), 258–283. doi:10.1080/00461520.2015.1122533

Powell, S. R., & Fuchs, L. S. (2012). Early numerical competencies and students with mathematics difficulty. Focus *on Exceptional Children, 44*(5), 1-16.

Raskind, M. H., Goldberg, R. J., Higgins, E. L.; & Herman, K. L. (2003). Life *success for children with learning disabilities: A parent guide*. Pasadena, CA: Frostig Center

Reynolds, D., & Nicolson, R. I. (2007). Follow-up of an exercise-based treatment for children with reading difficulties. *Dyslexia, 13*(2), 78–96. doi:10.1002/dys.331

Rose, J. (2009). Identifying and teaching children and young people with dyslexia and literacy difficulties. *Department for Children, Schools and Families* [DSCF], DCSF-00659-2009. http://www.thedyslexia-spldtrust.org.uk/media/downloads/inline/the-rose-report.1294933674.pdf

Royal College of Psychiatrists. (2015). Specific learning disabilities: For parents and carers. https://www.rcpsych.ac.uk/mental-health/parents-and-young-people/information-for-parents-and-carers/specific-learning-disabilities-for-parents-and-carers

Rüth, M., & Kaspar, K. (2021) Educational and social exergaming: A perspective on physical, social, and educational benefits and pitfalls of exergaming at home during the COVID-19 pandemic and afterwards. *Frontiers in Psychology, 12*, 644036. doi: 10.3389/fpsyg.2021.644036

Sainio, P. J., Eklund, K. M., Ahonen, T. P. S., & Kiuru, N. H. (2019). The role of learning difficulties in adolescents' academic emotions and academic achievement. *Journal of Learning Disabilities, 52(*4), 287-298. doi:10.1177/0022219419841567

Shin, M., & Bryant, D. P. (2015). Fraction interventions for students struggling to learn mathematics: A research synthesis. *Remedial and Special Education, 36*(6), 374–387. doi:10.1177/0741932515572910

Siegler, R., Carpenter, T., Fennell, F., Geary, D., Lewis, J., Okamoto, Y., Thompson, L., & Wray, J. (2010). Developing effective fractions instruction for kindergarten through 8th grade: A practice guide (NCEE #2010-4039). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from whatworks.ed.gov/ publications/practiceguides.

Smith S. L. (2002). What do parents of children with learning disabilities, ADHD, and related disorders deal with?. *Pediatric Nursing, 28*(3), 254–257.

Soares, N., Evans, T., & Patel, D. R. (2018). Specific learning disability in mathematics: a comprehensive review. *Translational Pediatrics, 7*(1), 48–62. doi:10.21037/tp.2017.08.03

Soriano-Ferrer, M., Morte-Soriano, M. R., Begeny, J, & Piedra-Martínez, E. (2021) Psychoeducational challenges in Spanish children with dyslexia and their parents' stress during the Covid-19 pandemic. *Frontiers in Psychology, 12*, 648000. doi: 10.3389/fpsyg.2021.648000

Stern. M. B. (2011). Multisensory mathematics instruction. In Ed. Judith R. Birsh (Ed.), *Multisensory teaching of basic language skills* (pp. 631-655). Baltimore, MA: Paul H. Brookes Publishing.

Swanson, L. H. (2001). Searching for the best model for instructing students with learning disabilities. *Focus on Exceptional Children, 34*(2), DOI: 10.17161/foec.v34i2.6785

Svensson, I., Nordström, T., Lindeblad, E., Gustafson, S., Björn, M., Sand, C., Almgren/Bäck, G., & Nilsson, S. (2021) Effects of assistive technology for students with reading and writing disabilities. Disability and Rehabilitation: *Assistive Technology, 16*(2), 196-208, DOI: 10.1080/17483107.2019.1646821

The Dyslexia Association UK. (2021). Assistive technology. https://www.dyslexia.uk.net/services/assistive-technology/

United Nations Educational, Scientific and Cultural Organization. (2021). Adverse consequences of school closures. https://en.unesco.org/covid19/educationresponse/consequences

Wanzek, J., Stevens, E. A., Williams, K. J., Scammacca, N., Vaughn, S., & Sargent, K., (2018). Current evidence on the effects of intensive early reading interventions. *Journal of Learning Disabilities, 51*(6): 612–624. doi:10.1177/0022219418775110

Whiting, K. (2020). How to stay creative and keep your family sane during lockdown – from one of the world's best teachers. https://www.weforum.org/agenda/2020/04/coronavirus-education-homeschooling-teaching-creativity/

Zhu, S., Zhuang, Y., Lee, P., Li, J. C., & Wong, P. W. C. (2021). Leisure and problem gaming behaviors among children and adolescents during school closures caused by Covid-19 in Hong Kong: Quantitative cross-sectional survey study. *JMIR Serious Games, 9*(2), e26808. doi: 10.2196/26808

Zisimopoulos, D. A., & Galanaki, E. P. (2009). Academic intrinsic motivation and perceived academic competence in Greek elementary students with and without learning disabilities. *Learning Disabilities Research & Practice, 24*(1), 33–43. doi:10.1111/j.1540-5826.2008.01275.x

Asia Pacific Journal of Developmental Differences
Vol. 9, No. 1, January 2022, pp. 83— 118
DOI: 10.3850/S2345734122000134

Motivation and Vocational Decision of Secondary School Students with Dyslexia

Joanne Tan Shi Huey[1]

1. *Dyslexia Association of Singapore*

ABSTRACT

This study investigated the vocational decisions of adolescent students with dyslexia. The study aimed to examine the possible relationship between motivation and vocational decision of secondary 3 and 4 students with dyslexia and to explore other possible influences which may contribute to vocational decision-making of this particular group of students. A mixed model research design was employed using both a paper-pen questionnaire and phone-call interviews. Statistical analysis revealed that both intrinsic and extrinsic motivation types were not significantly related to decision making. However, the participants who had a clear indication of their vocational decisions were found to have high motivational levels, meeting all three needs of competence, relatedness and autonomy through the interview sessions. Of the seven identified influences that were thought to affect vocational decisions, social media was found to be the least important factor while family was found to be the most important factor.

In addition to providing rich data from their personal perspectives, the interviews revealed an unexpected factor on the concerns regarding the working environment. The implications for future research highlight the very individual responses elicited from this group of dyslexic students in Singapore, prompting educators, practitioners and parents of this target group to understand the vast individual differences of these students instead of searching for a pattern.

Keywords: jobs, vocations, decision-making, Singapore, teens, students, dyslexia, adolescence, motivation, Self-Determination Theory (SDT)

**Correspondence to:*
Joanne Tan Shi Huey, Senior Educational Therapist, Dyslexia Association of Singapore Email: Joanne.tan@das.org.sg

INTRODUCTION

The Problem - Challenges faced by children with dyslexia

Dyslexia is a learning disorder characterised by difficulties in reading and spelling (American Psychiatric Association, 2013). Children with dyslexia display phonological deficits, including difficulties in decoding, letter naming, letter reversals, reading accuracy, reading fluency, vocabulary acquisition, comprehension and written expressions (Snowling & Hulme, 2012; Kasirer & Mashal, 2017; Razuk, et al., 2018; Brooks, Berninger, & Abbott, 2011; Morken & Helland, 2013). Underlying these difficulties are factors including visual- perceptual difficulties, inefficient working memory and deficits in executive functions (Altemeier, Abbott & Berninger, 2008; Brooks, Berninger, & Abbott, 2011; Boyle & Jindal-Snape, 2012). Hence, especially in a school context, dyslexia could lead to negative impacts on academic achievements to a significant extent. As a result, some children with dyslexia reported low self- esteem and overall psychological wellbeing which may even lead to behavioural issues (Alesi, Rappo & Pepi, 2012; Jordan & Dyer, 2017; Terras, Thompson & Minnis, 2009; Chan, et al., 2003). Other researchers, however, attribute behavioural issues to the comorbidity with disorders such as ADHD (Germanò, Gagliano and Curatolo, 2010).

Nevertheless, dyslexia is a language-based learning disorder which could manifest in various languages across the world and is thus widely-studied (Bonifacci, et al, 2017; Palladino, et al, 2016; Suárez-Coalla and Cuetos, 2017).

Specific Challenge: Motivation and Vocation

Adolescence is a vulnerable stage fraught with challenges (Burke, Brennan & Roney, 2010), because they are required to make numerous decisions daily as well as major vocational decisions (Santrock, 2006). Decision-making is a process which requires adequate maturity and cognitive abilities to compare choices, make decisions and face consequences (Özkamali, et al., 2014; Sharma, 2014) vulnerable to motivation and influences, such as peers, educators, parents, media and self (Santrock, 2006; Li, Hou and Jia, 2015; Gehrau, Brüggemann and Handrup, 2016).

Decision-making uses executive functions in the brain responsible for organisation, planning and making decisions (Stuss and Knight, 2013). An individual with weak executive functions may face difficulties with making decisions. Although this fits the profile of dyslexic learners, further research is needed to establish this for dyslexic learners in Singapore.

Studies have found associations between adolescents' career indecisions and various individual factors such as personal interest and self-concept and interpersonal factors such as media and parents (Gehrau et al., 2016; Polk, 2015; Pellerone, 2015; Crisan and

Turda, 2015; Marcionetti, 2014; Kuzucu & Şimşek, 2013; Emmanuelle, 2009). However, this does not include the possible effects of dyslexia. Therefore, it is not certain whether dyslexia serves as a mediating factor to vocational decisions or contributes to indecisions

LITERATURE REVIEW

This study investigates the relationship between motivation and vocational decision of upper secondary students with dyslexia. Secondly, it explores other possible influences on vocational decision-making of this particular group of students. Questions arising;

1) What are the factors affecting vocational decision in adolescents?
2) How does vocational decision in adolescents relate to motivation?
3) How does vocational decision relate to motivation for this particular group of students?
4) What other influences affect vocational decisions for this particular group of students?

Drawing on past research studies and journals, this literature review presents a preliminary overview of adolescents with dyslexia in the local context.

Guided by theoretical frameworks, the study addresses identified research questions by testing some of the tentative claims and filling research gaps in this field.

Theories linking vocational decisions and motivation

Focusing on emotional wellbeing, motivation cannot be studied without relating to self-esteem. Empirical evidence points towards low self- esteem of students with dyslexia (Alesi et al., 2012; Jordan and Dyer, 2017; Carawan et al., 2016). For this study, two theories had been selected to be discussed and compared, namely, the Social Cognitive Career Theory (SCCT) and the Self- determination Theory (SDT).

Social Cognitive Career Theory

Extending Bandura's theory, which highlighted the impact of interpersonal interactions on behaviour and thoughts, the Social Cognitive Career Theory (SCCT) postulates that an individual's interest or decision on a career is directly influenced by a combination of personal, cognitive and contextual factors (Lent et al., 1994). Researchers have used the SCCT to highlight the importance of parental support in career development (Ginevra et al., 2015; Raque-Bogdan et al., 2013) because it is adaptable and applicable across different constructs.

Self-determination Theory

The Self-Determination Theory (SDT) postulates that the decisions and behaviour of an individual are closely guided by his level of motivation (Deci and Ryan, 1985).

However, human thoughts and cognitive abilities are complex and rarely driven by a single motivation. The SDT acknowledges this by proposing a continuum of varying degrees of motivation. One end of the spectrum lies amotivation, lack of motivation, or simply a lack of interest or intention. This is followed by external motivation, being controlled or pressurised by others.

Intrinsic motivation, by contrast, refers to being autonomous or able to internalise behaviour independently. The SDT maintains that intrinsic motivation promotes an ideal goal-directed behaviour (Deci and Ryan, 1985).

According to SDT, both types of motivation drive an individual towards meeting three basic needs, competence, autonomy and relatedness. Competence refers to an individual's need to build knowledge and develop skills to gain mastery in performing important tasks. Autonomy refers to the need to be in control over his own behaviour and thoughts. Lastly, relatedness refers to the need to build a sense of belongingness and feeling connected with other individuals. Where these three needs are strongly met, the individual is said to be highly intrinsically motivated and self-determined to pursue the task of interest (Deci and Ryan, 1985; Vallerand,2000).

The SDT theory has been well-validated and applied to the organisational environment of working adults, for example, finding that salary or financial benefits did not enhance the intrinsic motivation of bank employees, but intrinsic motivation from managerial support within the organisation (Olafsen et al., 2015). Studies of graduates or students before entering the workforce, (Chiesa and colleagues,2016), examined the career decision-making self- efficacy of students. The SDT was also widely used to investigate the motivation and self-regulation of behaviours or thoughts in individuals, for learning, behavioural intervention and weight loss intervention (Ünlü and Dettweiler, 2015; Webber et al., 2010; Duffy and Azevedo, 2015; Yardley et al., 2016; De Bilde et al., 2011).

Comparing SDT and SCCT, the SDT better fits the purpose of this research and was selected as the guiding framework. The SCCT adopts the concept that a decision is driven by the individual's self-efficacy and his outcome expectation whereas the SDT attributes the decision to the level of motivation of each individual. A dyslexic student might not be exposed to possible outcome expectations and might lack the cognitive ability required for ongoing feedback and adjustments. Moreover, struggling with dyslexia may result in low self- esteem in general. Thus, employing the SCCT, which is highly dependent on self- efficacy, is perceived to be less applicable to the context of the current study.

By contrast, a dyslexic student responds well to positive energy and is driven by motivation. Comparing the elements in both theories, self-efficacy can be similar to competence and outcome expectation can be seen as autonomy.

The sense of relatedness, in this case, has taken a backseat by being part of the background learning experience of individuals in the SCCT. More importantly, these are seen as merely factors affecting the choice in the SCCT whereas the SDT places these as individualised needs and drives. In fact, promoting self-determination has been the focus for students with special needs (Wehmeyer, 2004). Therefore, with a straightforward framework, the SDT is a more comprehensive theory in understanding and examining the potential connection between motivation and the decision-making of individuals.

Factors affecting vocational decision in adolescents

Decision-making, associated with career and choice, can be an overwhelming and complex process for adolescents who are exploring the world and gradually gaining autonomy from their parents (Olle and Fouad, 2014). Despite exposure and accessibility to various sources of information they may not possess full maturity and cognitive abilities to use this information to make an informed decision. On top of the natural developmental process, dyslexia adds a layer of complexity for these adolescents, with possible impacts on decision-making.

Central to SDT are the three basic human's needs: competence, autonomy and relatedness, integrated to examine their influence on these students. Competence would be represented by individual school results, which if seen as important would motivate him and help him in choosing a career. Autonomy would be represented by their choices when ranking the identified factors. Relatedness would be represented by factors such as peers and family members. If all three needs were met, it implies that the student is strongly self- determined. Factors identified as affecting their vocational decision are discussed in detail below.

Peers and role of friendship

Friendship plays a vital role in the development and formation of an identity (Sullivan, 1953, as cited in Jones et al., 2014). Many school-aged adolescents are spending more time with friends compared to family members (Jones et al., 2014). Which increases the tendency to value peer opinions (Brown and Larson, 2009, as cited in Jones et al., 2014; Scalici & Schulz, 2014). Peer influence can impact on smoking, alcohol consumption, impulsivity and risk- taking, body dissatisfaction, internet abuse and other delinquent behaviours (Zimmermann, 2010; Yu et al., 2013; Webb & Zimmer-Gembeck, 2013; Jones and Magee, 2014; Centifanti et al., 2014; Scalici and Schulz, 2014; Al-Zalabani and Kasim, 2015; Litt, Stock and Gibbons, 2015; Ballarotto et al., 2018; Hormenu et al., 2018). Less studies examined the positive effects of peer influence, including career choice,

school involvement, academic achievement, protection from bullying, overall health and well-being and other prosocial behaviours (Robnett and Leaper, 2012; Chow et al., 2015; Williams and Anthony, 2015; Meuwese et al., 2017; Barcaccia et al., 2018). This is consistent with Jones and colleagues' finding (2014) that peer influence plays a significant impact on youths, in both positive and negative ways.

However, it is important to note that this might differ for youths with dyslexia, who may be socially anxious, possess low self-esteem or even be depressed (Thaler et al., 2010; Undheim and Wichstrom, 2011). They may be less vulnerable to peer influence than typical adolescents, however, a recent study has found that adolescents with dyslexia do not have a negative self- image (Lindeblad et al., 2016), but can be as sociable and dependent on friendships as their typical peers, which could be a positive effect of increased awareness of dyslexia. Although more research is warranted, this partially supports the strong factor of peer influence in decision-making for adolescents with dyslexia, as with typical adolescents.

Parents and family members

Parents and family members provide each child with the first point of contact to the social world by creating an environment where learning starts and influences a child's life. (Sharma, 2014; Harris and Goodall, 2008; Gonzalez-DeHass et al., 2005). In a study by Liu and colleagues (2015), parental influence on career choice of children can be intentional or unintentional , with expectations, responses to the child's career curiosity and encouragement of independent career decision making. Other studies have also recognized the influence parents have on adolescents in vocational decision making (Katz et al., 2018; Lim and You, 2017; Marcionetti & Rossier, 2017; Fouad et al., 2016; Kim et al., 2016; Wang et al., 2016; Sharma, 2014; Slaten and Baskin, 2014; Sovet and Metz, 2014; Olle and Fouad, 2014; Metheny and Mcwhirter, 2013; Nawaz and Gilani 2011; Pappas and Kounenou, 2011). However, as a child grows into an independent adolescent, time spent with parents tends to be less (Jones et al., 2014), a trend found in local youths. Specifically, a survey in Singapore by the National Youth Council (NYC, 2014) showed that most youths spend less than 10 hours with family or relatives in a week. Despite this, 70% of youths in Singapore noted that strong family relationships are an important life goal to work towards (NYC, 2016). Parental guidance, support and involvement remain as important factors affecting various decisions of adolescents.

For children with dyslexia, many parents participate in their learning and academic process since diagnosis and intervention cannot be implemented without parents' acknowledgement and consent (DAS, 2018). With growing awareness of dyslexia, teachers would inform parents if their child shows any signs of learning difficulties during classroom interactions and hopefully engage early intervention.

This means that dyslexic children tend to receive strong parental support, both directly by

supportive reading activities and indirectly by engaging intervention programmes and thus may create a close bond (Griffiths et al., 2004). In particular, strong parental support was found to be evident in the experience of dyslexic students (Brante, 2013). Parents' influence and opinions may hold a great value in the eyes of dyslexic adolescents during decision-making opportunities including future careers.

Social media and the internet

According to the National Youth Council of Singapore (NYC, 2014), a high percentage of youths use the internet daily for both social interactions and information seeking. This trend has been studied worldwide, including UK, Korea, Japan, China, Spain (El Asam et al., 2018; Casaló and Escario, 2018; Mihara et al., 2016; Li et al., 2018; Seok et al., 2018), as this caters to developmental tasks through exploring the world and finding their self-identity (Borca et al., 2015). However, Ballarotto and colleagues (2018), noted the lack of maturity in self-regulation allowed many youths to be vulnerable to excessive internet use. This leads to a negative impact in terms of maladaptive internet abuse, and media exposure with smoking, substance use, negative body image, aggression and violence and dangerous driving behaviours (Villanti et al., 2011; Al-Sayyari and Al- Buhairan, 2018; Rousseau and Eggermont, 2018; Wiedeman et al., 2015; Wright and Silberman, 2018). Heavy use of the internet has the potential to alter mindsets and change behaviour in this age group.

Dyslexic learners may be less familiar with media and internet use, because of their reading difficulties, and less dependent on them. On the contrary, the use of digital technology and ICT tools for intervention (Vasalou et al., 2017; De Avelar et al., 2015), as a coping mechanism or for compensatory strategies (Zikl et al., 2015) mean that dyslexic youths may be equally heavy users of the internet and thus vulnerable to the influences from them.

Beacham and Alty (2006), established the effect of digital media on the learning of dyslexic learners more than a decade ago. This further supports the idea that the internet and media, which adolescents are familiar with and well-exposed to, can influence individual thoughts and thus decision-making.

School factors- teachers and academic achievements

In the local secondary school curriculum, some schools set aside teacher- student bonding time on a weekly or daily basis, usually at the start of the day. This can increase understanding, support and guidance at an individual level. Class teachers also conduct the Education and Career Guidance programme (ECG) according to local syllabus, enhancing the bond through career exploration in a classroom setting (MOE, 2012). It is hoped that these platforms allow form teachers to connect better and thus offer guidance to individual students.

For examinable subjects, teachers may emphasise on academic achievements too much, leading to academic stress in students in Singapore (Huan et al., 2008). Teachers have required curricula to follow and performance targets to meet, and there is a positive link between career opportunities or success and academic achievements. Such association is not unique to the local context and has been widely studied (Negru-Subtirica and Pop, 2016; Beigi et al., 2018; Kool et al., 2016; Sawitri & Dewi, 2015). Most job applications request certificates and qualifications in a relevant field. Furthermore, some courses in specific fields have a minimum grade as a requirement. This further highlights the importance of education. In fact, Das and Tripathy (2016) had even come up with a system to predict future careers based on students' results, which further validated this relationship.

For dyslexic students, academic performance may not necessarily be aligned with their capabilities. Although Crisp and colleagues (2012) found no significant difference between dyslexics and non-dyslexics in answering examination questions, Pluck (2018) found that reading ability is a significant predictor of academic achievement. Therefore, dyslexics are disadvantaged due to their difficulties in reading, causing them to score lower than their typical peers. Locally, parents are also concerned about the results for their children, which reinforces its importance. Some parents adopt the idea of helping children realise their academic ability through examination results.

Students internalise these ideas and believe that their future is dependent on their academic achievements. Consequently, at upper secondary level, some students feel restricted to pursue their career in vocational institutes. In essence, at both individual and societal levels, academic achievements are important with regards to career choice.

Personal interest

Interest is the driving force behind an individual's attention, behaviour and decision. AnbuSelvan and colleagues (2013) revealed that, among the identified specific factors affecting students in choosing dentistry as a career, self-interest was the most common reason. Similar results were also found in career choices in the specific fields of nursing and engineering (Liaw et al., 2017; Mishkin et al., 2016), as an influential factor in career decision making.

At this point, it is important to note that factors influencing the complex process of decision making are often interlinked. For example, in a study by Taskinen and colleagues (2013), school factors played a vital role in students' interest in science subjects, which in turn, relates to their interest in science-related career. In another example, Krass and Miller (2018) explained that interest in teaching as a career was brought about by different motivation factors. Although children with learning difficulties may face greater challenges academically and may tend to exhibit less interest in professional careers, learners with dyslexia base their careers on their interest, among

other factors (Diakogiorgi and Tsiligirian, 2016). In essence, previous research recognised personal interest as a contributing factor affecting the career choices of adolescents with or without dyslexia.

Prospective salary of the future job

In terms of employment, it is not surprising that adolescents take into consideration the prospective salary before deciding on a career choice (Ogoweeo, 2010; Xia, 2016). With a strong association between education and the labour market, some individuals start planning for their future by enrolling into a relevant course that would bring them a higher income (Strapp et al., 2018). According to Xu (2013), individuals such as college majors are higher paid, highlighting the importance of choosing courses.

Specifically, it was found that increasing the expected wage range in nursing attracted more students applying for nursing courses (Schweri and Hartog, 2017). Furthermore, other than monetary benefits, a study conducted by Bryson and colleagues (2011) revealed that higher salary improved employee performance. This relationship was also supported by another study, which found that insufficient salary led to job dissatisfaction (Murawski and King, 2011). More importantly, recent research shows a link between recruitment and higher salary, Faberman and Menzio, 2018). These studies provide proof that monetary returns affect career choice starting at college level, before working age.

However, a high percentage of students, 90%, found that they need additional support such as career guidance to determine their career goals, despite being enrolled in a specific field of study (Kiran and Karaca, 2018). As such, students may be enrolled in a specialised field without clear career plans. This further testifies to the confusion of identity and future vocational outcomes of adolescents. For adolescents with dyslexia, there were limited studies investigating the extent of prospective salary and their career choice, thus it warrants more investigations on this particular group of students.

Other influences affecting Vocational decisions of adolescents with dyslexia

In the context of dyslexia, many subscribe to the belief that dyslexics struggle with language but tend to be artistic in nature and may be considered creative. However, Martinelli and Schembri (2014) reported that the creativity of dyslexics is debatable with no significant differences in their study. This is also consistent with a recent review conducted by Šimčíková, (2018). It is thus uncertain whether local dyslexic adolescents would think creatively about factors other than those listed above, which would have the potential of affecting their vocational decisions.

Additionally, the study provides a platform to gain deeper understanding about support for students with dyslexia. According to Singer (2008), students with dyslexia depend strongly on parental support, based on high academic demand and peer pressure at

school. This makes them more dependent on their support, however, there is no evidence that all dyslexic students have supportive parents or family members. Other sources of support for coping with dyslexia may be identified through the current research.

METHOD

Participants

Participants were recruited via the Dyslexia association of Singapore, a nation-wide organisation providing intervention for students with dyslexia, via educational therapists who worked directly with the students. A sample of 41 students studying at local schools took part, with the inclusion criteria of school level (Secondary 3 or 4) and diagnosis of dyslexia. To ensure anonymity, no information with regard to gender, specific age and school names were collected. 8 students agreed to participate in a follow- up interview session, and 6 students (14.6%) were available to contribute data.

Measures

There were two measures used in this research; a questionnaire and interview. In view of the specific needs and nature of the study, as well as the unique profile of the participants, questions were newly-designed by the researcher with consultations with the appointed supervisor, instead of utilising a standardised test or lengthy personality tests. The questionnaire was two pages long with 4 main questions, each with simple and clear instructions. It aimed to assess the vocational decidedness of students, their motivation type, whether they are intrinsically or extrinsically motivated. (see appendix for questionnaire).

During the administration, the questionnaires were printed and given out to participants by their direct therapist. Statistical or numerical data gathered from the questionnaire would allow the researcher to interpret and analyse them, while results gathered through open-ended questions would provide richer information for researchers to gain insights of the participants (Heiman, 2013).

The interview session served as a follow-up from the questionnaire, to gain deeper understanding of the questions presented in the written questionnaire through eliciting further elaborations and personal opinions (Auerbach & Silverstein, 2003). It could also allow researcher to gain more information to support the data gathered and to capture any other points for discussion which might have been missed out by the researcher. For those who indicated their keenness to participate in phone-call interviews, the researcher contacted them in person and recorded the conversation before transcribing them in verbatim.

Data analysis

The data collected through paper questionnaires was used for quantitative analysis, to investigate the potential relationship between decidedness and motivation. The first question, on decidedness, divided the sample into two groups, with t-tests to examine and identify any significant differences (Creswell & Creswell, 2017). An assessment of frequency would provide statistical understanding of the importance of factors, gathered through the ranking question. This would provide information on the discussion and understanding of their trend of thoughts.

For the structured questions and the interview questions, a coding process would be performed to extract common themes. It is important to maintain an open mind in order not to be biased when analysing data collected. As explained by Auerbach & Silverstein (2003), the coding process consists of several steps. Firstly, the researcher has to refer to the main research concern and theory in order to select relevant text from the transcripts. These relevant texts could reveal repeating ideas with or without exact words and phrases. These repeating ideas are then organised into categories called themes. Some themes for the current research which may surface could be the importance of friendship and family. Additionally, dyslexic students typically suffer academically and are low in confidence. They may not have any ideas on their future vocations and may not reveal motivation at all.

Hence, another possible theme may be the sense of inferiority. While it is possible that these themes would be apparent from the interview sessions, the researcher was also open to new themes that might be analysed through the transcripts. Themes would then be grouped into more abstract concepts which are consistent with the specific theoretical framework. From there, the researcher can create a theoretical narrative and present the subject's personal views in terms of the identified construct. This coding process would be conducted on both channels, similar questions and across other questions.

After analysing both quantitative and qualitative databases separately, the researcher will then compare the results and discuss if they agree or disagree, integrating the two different aspects of the research procedure (Creswell and Creswell, 2017).

RESULTS

The purpose of the current study was to investigate the possible relationship between motivation and vocational decisions of adolescent students who struggle with dyslexia. Moreover, the study also sought to explore possible influences affecting the vocational related decisions of this particular group of students. In order to reach these aims, the researcher had decided on a mixed model research design which consisted of both qualitative and quantitative aspects of the research methods. There were two main instruments, the paper and pen questionnaire and the interview questions.

The questionnaire included closed-ended questions, Likert- scale questions, ranking questions and structured open-ended questions while the interview questions were all open-ended. 41 participants completed the questionnaire and 6 participants contributed to the phone-call interview conducted by the researcher.

Intrinsic and Extrinsic Motivation

Catering to the specific group of subjects, the researcher had designed her own questionnaire with her assigned supervisor's input. Data for Cronbach Alpha was used to analyse the internal consistency of these constructs. The intrinsic motivation subscale consisted of 2 items ($\alpha = 0.606$) and the extrinsic motivation subscale consisted of 2 items ($\alpha = 0.075$). This indicates that both items under the intrinsic motivation subscale are more reliable than that of the extrinsic motivation subscale although both subscales showed positive reliability within respective constructs.

Data collection from the entire group of participants (n=41) shed some light on their intrinsic and extrinsic motivation levels. Across the entire group, most of the participants were highly intrinsically motivated when measured by satisfaction (M=4.415) and enjoyment (M= 4.073). According to the scale, a score of 1 referred to being least motivated and 5 being the most motivated. Hence, this result showed that students with dyslexia are highly intrinsically motivated, suggesting that satisfaction and enjoyment are important aspects that could determine their future career path.

However, the results from the questionnaire were not as straightforward for the Item 2 under this scale, number of working hours. If an individual were to be extrinsically motivated, he would not be keen in a job when required to work for long hours. With a lower average under this scale (M=2.659), participants seemed to be less extrinsically motivated.

One group had chosen 'undecided' about their future career (N=20), while another group had chosen 'decided' about their future career (N=21). Results from t-tests revealed that the Undecided group (M=4.125, SD= 0.604) and the Decided group (M=4.357, SD= 0.824) did not differ significantly on measures of intrinsic motivation, $t(39) = 1.025$, p = n.s. satisfaction, $t(39) = 0.478$, p = n.s., and enjoyment, $t(39) = 1.242$, p = n.s.

Similarly, t-tests analysis also revealed that the Undecided group (M=3.45, SD=.484) and the Decided group (M=3.404, SD= 0.768) did not differ significantly on measures of extrinsic motivation, $t(39) = 0.767$, p = n.s, expected salary, $t(39) = 0.835$, p = n.s., and number of working hours, $t(39) = 0.348$, p = n.s.

Factors affecting decidedness

To further investigate the drive behind an adolescent's decision, the researcher had

identified seven factors and allowed participants to rank them in accordance with importance, with 1 being the most important and 7 being the least importance.

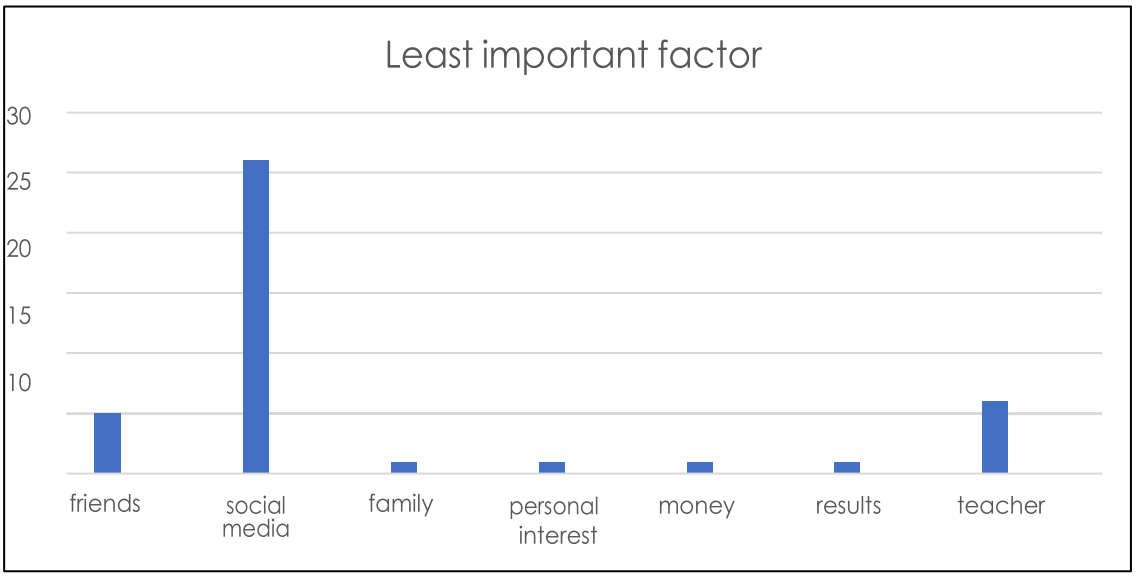

Figure 1. Results of factors ranked as least important

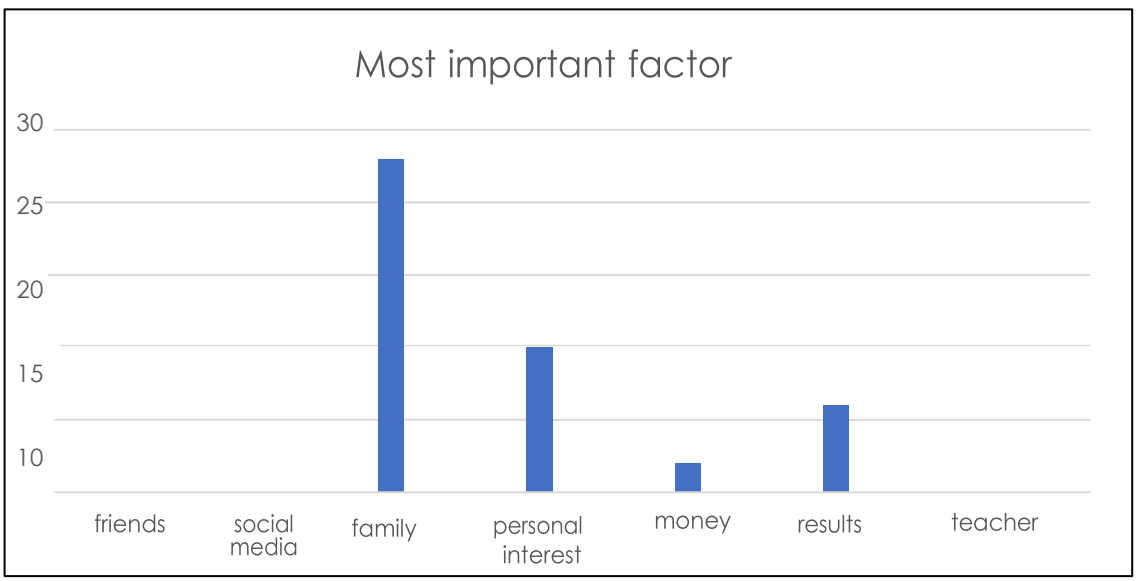

Figure 2. Results of factors ranked as most important

DISCUSSION

The first question addressed in this study was whether motivation influenced decisions in this group of adolescent dyslexics. Both types of motivation, intrinsic and extrinsic were found to be insignificantly related to decision making. This means that motivation type did not predict decision making. However, only two items for each subscale may not be sufficient to gather accurate data of an individual's true reflection. Moreover, questions were counterbalanced to avoid response bias, which may have caused confusion when the statement for extrinsic motivation showed a double negative; *I don't mind that my future job requires me to work for long hours.* Despite this, none of the participants raised this confusion and went ahead with completing the questions on their own.

Assuming accuracy of data collection, the lack of significant differences found across the sample implies that students' vocational decisions are not driven by a single type of motivation. This is consistent with previous research which states that decision-making is a difficult and complicated process (Özkamali, et al, 2014; Sharma, 2014).

Hence it does not agree with the SDT in that decidedness is directly associated with intrinsic motivation (Deci and Ryan, 1985). One possible reason is that these students are both intrinsically and extrinsically motivated to make their decisions, in a balanced manner.

Across the entire group, most participants revealed themselves to be extrinsically motivated when measured by expected salary of a career (M=4.195). This means that most of these students are likely to undertake a career path with the aim of getting a higher pay. However, the importance of salary was also asked during the phone-call interview. Students 1, 2 and 5 shared that salary is *'not very important'*, explaining that their future jobs must include aspects of their interests which they would enjoy. With most interview respondents revealing that salary was not important, they did not show strong congruence with the data from the questionnaire. For Students 4 and 6, on the other hand, salary is *'quite important'* as money is needed to pay bills and purchase items. Interestingly, Student 3 gave a more neutral stand with

> '*I can't answer that question. (It is) important, at the same time not important.' (Student 3)*

However, when probed further, he struggled to express himself:

> *'Er… due to… (pause)… I have no reason for that. I really have no reason.' (Student 3)*

These responses highlighted the complexity of answering questions, and the difficulties of a dyslexic learner in expressing themselves. Essentially, students are aware that money is important but it is not the sole factor, with most students scoring 4 out of 5 for this item.

By contrast, the data on working hours could be the result of lack of understanding of the complex wording in the questionnaire, yielding inaccurate data. However, a low motivation value of this scale could also suggest that students are genuinely neutral in this aspect; the length of working hours does not affect their decision on future vocations. More investigation is warranted to form a clearer indication of the importance of extrinsic motivation for dyslexic students.

Factors influencing decisions

Friends

For many adolescents, the amount of time spent with their peers is increasingly more than others, including family (Jones et al., 2014). This gave rise to the likelihood of students valuing peer opinions (Scalici and Schulz, 2014). Although some researchers found that students with learning differences exhibit social issues that will affect friendships, others had found that dyslexic learners do not depict themselves as low in esteem (Thaler et al., 2010; Undheim and Wichstrom, 2011; Lindeblad et al., 2016). Hence, this led the researcher to believe that these students would value friendship and their opinions as strongly as typical adolescents. Indeed, during the interview, Student 3 shared that

> *'friends give very good advice' (Student 3)*

And Student 5 explained that what,

> *'friends suggested helps to clear your doubts and your own decision in making a better future for you'. (Student 5)*

Other than self-development and growth, another student felt that friends are important for their social needs; Student 4:

> *'sometimes, they will like have the same interest and all (want) to go to the same job together, then you can stay close friends. Not so lonely in a job.' (Student 4)*

These interview citations agreed with previous literature on the importance of the role of friends.

However, collated data revealed that friends are not an important factor for a dyslexic student when making a vocational decision. As seen in Figure 2, the majority of the respondents (27%) ranked friends as the second least important factor. It showed that not all adolescents with dyslexia share the same opinions of friends when deciding on a future career.

Personal Interest

Studies have shown that undergraduates attributed their career choice mainly to personal interest (AnbuSelvan et al., 2013; Liaw et al., 2017; Mishkin et al., 2016). However, other researchers found that interest was only one of the factors, among others, influencing adolescents in their career decisions (Taskinen et al., 2013; Krass and Miller, 2018; Diakogiorgi & Tsiligirian, 2016). In the current study, 25 participants (61%) in the questionnaire ranked personal interest in the two most important factors and in the interviews, 4 out of 6 mentioned personal interests that were noteworthy. Student 5 noted that an individual

> *'should consider taking up courses to learn more in-depth to his own interest' (Student 5),*

because if his job was not in accordance with his interest,

> *'he won't really be very happy with it. And usually… he might have regrets in the future'. (Student 5)*

This excerpt not only showed the strong link between job satisfaction and personal interest, but also the significance of this factor in leading to future regrets. Similarly, Student 2 shared that his future plans,

> '*actually depends on my interest'. (Student 2)*

When comparing salary and interest in vocational decisions, he shared that,

> '*the salary.. is.. not really important because I think the most important is if I enjoy the job I am doing, I would rather do it than to get salary. Because if you give me something that pays more and I don't like to do it, I don't think I would like to work.' (Student 2)*

Student 3 also shared that exploring personal interests can,

> *'help in finding a job that is close to me' and 'something that I may like in the future, so that I don't need to change job'. (Student3)*

Although Student 4 felt that friends were the most determining factor in choosing a job, he added that interest was required to keep the friendship intact,

> '*sometimes we don't have the interest in the same jobs that they have. So they change just like that'. (Student 4)*

Moreover, he had stated clearly that he would not choose a job that he was not interested in. It is evident that these students felt that personal interest is an important factor and helps in motivating them in their jobs in the long run. Hence, it could be concluded that the current research agreed with previous studies that personal interest played a significant role in adolescents' decisions regarding their future careers and having dyslexia did not affect this trend.

Prospective Salary

In this practical world, it is not surprising that individuals are motivated by the salary offered in a job (Schweri and Hartog, 2017; Faberman and of studies that could potentially earn a higher income (Ogoweeo, 2010; Xia, 2016; Strapp et al., 2018), others found that significant number of students were enrolled in specific courses without clear career goals (Kiran and Karaca, 2018). Hence, previous research was rather inconclusive.

From the current research, only 2 participants (0.05%) ranked salary as the most important factor and only 1 participant (0.03%) ranked as the least important factor. The majority of the participants were neutral about this factor, with 29 participants (71%) ranking it from 3 to 5.

This is also reflected from the findings from the interview sessions. While Student 6 acknowledged the indispensability of money, explaining that salary is

> *'quite important to me. Because (it is) used to find your own physical like stuffs all and house', (Student 6)*

Student 5 explained why it is not the most important factor,

> *'salary is not really important to me. It's about our job satisfaction or our own satisfaction to work in our specific job, or career. Usually when we are satisfied with how we work, then you know, usually, the money doesn't really come into play because we don't really need the money, we just like to do the work, help benefit the country or the company itself.*
>
> *And money is just a side thing and it does only benefit us personally, it can help our family support, and it helps to.. er… keep up with the … the world, you know, like buying the latest technology and stuffs like that. But it doesn't really help in a way because* usually, without *our passion towards our career, then the salary… then we just looking at salary itself, it doesn't really… it doesn't bring the … it just gives us a doubt whether we really like our job or not. Usually like that. Sometimes we have to like what we do.' (Student 5)*

It is clearly expressed in this extract that money is one of the many factors but is not the most important. Despite its indispensable nature, students felt that what motivates them in the long run is not money. Thus, this is congruent to the finding from the questionnaire, as well as previous research.

Academic Results

Many studies have established the strong positive link between academic performance and career opportunities (Negru-Subtirica and Pop, 2016; Beigi et al., 2018; Kool et al., 2016; Sawitri and Dewi, 2015). However, dyslexic students are disadvantaged due to their difficulties in reading (Pluck, 2018). Hence, this might affect their thoughts about basing their future career plans on academic achievements. For this matter, Student 5 related that,

> *'in terms of results, like… if imagine that… erm… we were struggling in our Secondary school education, we weren't really doing well, then it comes to tertiary education, everything like.. every project that we do in, er… we keep flunking or … really don't, we just barely pass our grades. It doesn't really help in showing that we are prepared to face the future, like the career that we want to pursue. And I think this will affect us in a way like it affects our own passion in a way because like… can I really … then you will have some doubts like can I really do it?' (Student 5)*

From this, it is evident that academic results affected the self-esteem of dyslexic learners by creating self- doubts. This also highlights the widely accepted relationship between academic performance and their future plans.

The data collected from the questionnaire indicated that most participants (9 of 41, 22%) ranked the importance of academic results in deciding on a future career as neutral (4 of 7). There is a smaller range and wider spread in results here, although similar to the findings for the salary factor. Unlike some other factors, this reflects that students had very individual thoughts and did not show any observable trend or patterns. Such differing data was also received from the interview sessions. Student 1 felt that 'results' is the most important factor affecting his vocational decision. However, he explained that results will determine the salary scale. Hence, it is rather clear that salary was the main important factor for him. Similarly, Student 3 mentioned that results is the most important factor, but added that

> *'study is more important then you can find your .. find a task .. your best job for personal interest'. (Student 3)*

This shows that interest was more important to him. Putting them together, these excerpts explained the complexity of the ranking question as this factor, results, is closely intertwined with other factors.

Teachers

Other than academic performance, teachers represent another school- related factor that could potentially influence an adolescent student's vocational decision. Teachers not only conduct programmes in career exploration, but also emphasise the importance of scoring well in examinations which could lead to better career opportunities (MOE, 2012; Negru-Subtirica and Pop, 2016; Sawitri and Dewi, 2015). They provide guidance and directions towards future career choices. In the current study, the researcher sought to explore the influence of teachers on adolescents with dyslexia.

Only 2 students in the interviews explicitly discussed the role of teachers. According to Student 5, while other people in his life such as teachers, friends and family members could provide suggestions, his future career path is ultimately his own decision. These suggestions only served as an assurance to create a clearer picture of his future. Hence, he acknowledged the roles of these factors but did not feel that teachers (or others) play an important role. Student 3 felt that school teachers, among other factors, affected him the least in making a vocational decision. He noted that despite having the same teachers throughout the years, school teachers did not know him well and,

> *'some comments are negative some are positive, it depends on the perspectives of the viewer'. (Student 3)*

Both students acknowledged that school teachers provided comments and suggestions to guide them in their future but they are not the most important factor in their decisions.

The compiled data from the questionnaire revealed a fairly even spread of ranking choices when asked about the importance of teachers in influencing career choices, with no obvious clusters or trends observed. This means that some students found that teachers represent a strong influence while others found them a weak influence. Hence, similar to school results, it shows that individual students had different thoughts on this factor.

Social Media

With the current technological advances and reliance on media and the internet, it was expected that all adolescents would find social media a strong influence on various aspects of their lives. However, 26 participants (63%) found social media the least important factor in vocational decision making by ranking it 7th out of 7 on the questionnaire. This finding contradicts previous research which has established the trend of dependence and reliance on the internet and media for social and information seeking (El Asam et al., 2018; Casaló and Escario, 2018; Mihara et al., 2016; Li et al., 2018; Seok et al., 2018).

None of the 41 participants ranked social media as the most important influencing factor. There was a concentrated cluster at the bottom of the scale, all 41 responses ranked this factor 4th or below (out of 7). This trend was highly supported by the results from the interview sessions.

Social media as the least important factor on vocational decision making was highlighted by a few students in the interview. Students 4 and 6 shared that they seldom used, or do not use social media. This lack of exposure to social media is consequently a weak influence on their vocational choices.

Additionally, this also proved to be different from the general assumption that adolescents are currently highly influenced by the social media and internet. This highlights that overgeneralising from trends could be a mistake.

Another noteworthy point was brought up by Student 2, who shared that,

> *'social media could .. be fake news and .. they are always in the internet, they don't really know your personal interest … So they wont affect me at all.' (Student 2)*

This implies that the information on the internet and social media is too generic, may not be trusted and is not personalised, making it less applicable and relatable according to individual needs. It also highlights the importance of personal interest and further proved the individuality of students. This was also supported by Student 1,

> *'people use social media to see what people say about, about some jobs, but, I don't care about such stuffs'. (Student 1)*

Interestingly, Student 5, who had the longest interview session, did not mention the influence of social media at all, perhaps because other factors had stronger impact than this. Essentially, collated data from the current study contradicts previous trends and research and suggests that social media was a weak influence on vocational decisions for this particular group of students.

Parents

A frequency distribution analysis revealed that the majority of the participants, 23 of 41 (56%), felt that family were the most important factor affecting their decisions regarding their future by ranking the factor as 1st of 7 (see Figure 1). This finding is consistent with previous literature, stating that family members have a strong influence in adolescence on vocational decision- making (Katz et al., 2018; Lim & You, 2017; Sharma, 2014; Slaten and Baskin, 2014; Olle and Fouad, 2014; Metheny and McWhirter, 2013; Pappas and Kounenou, 2011). There was also a noticeable cluster of participants who ranked family as their top 3 in importance. At the other extreme, there was only 1 participant (0.03%)

who ranked family as the least important factor. Perhaps this response was from Student 5, who noted during the interview that his parents were the least important factor for him.

This observed trend was supported by the data gathered from the interview sessions. A few students noted that family or parents were the most important factor in influencing their decisions about future careers. Student 5 explained that he would consider points such as whether the job benefits his family in terms of financial support. Despite acknowledging the impact of his future on his family, he stated that parents would affect him the least in his vocational decision. Student 5 explained that,

> *'I think parents doesn't really block our passion or helps to change our own decisions in a way. They will be…they will be hundred percent…they will always be supporting our backs because usually they will just say to pursue your passion instead of not doing anything.' (Student 5)*

Although this means that family members were his least important factor, it was explained in a positive manner and this suggests that there is trust between his parents and him and thus he had the freedom to choose a career of his choice, with full parental support. It did not imply that this was not an important factor, as could have been gathered from the quantitative data. In another note, Student 2 explained that,

> *'because they will be supporting me and then they do equip me with confidence to either continue or think about it.' (Student 2)*

This suggests that adolescents do look up to their parents for emotional support as well as skills and information, thus being regarded as most important. Students 3 and 6 also shared similar ideas, that,

> *'some of them have more knowledge than you, and you would want to listen to them' and that 'they give you great advice'. (Student 3 and 6)*

In essence, students interviewed had explained that they regard parents and family members as important factors affecting their decisions because of their support, knowledge and trust.

While findings from previous researchers also indicated the high importance of peer relationships and friendship during the adolescent stage (Jones et al., 2014; Scalici and Schulz, 2014), this was not found in the current research.

There were no participants who found their peers the most important factor affecting their vocational decision. Similarly the factor on social media suggests that this specific group of students do not tend to follow generalised trends. Both factors are social aspects of the students' personal lives, which led the researcher to believe that this could

reflect overall low self-esteem, possibly related to their diagnosis of dyslexia. However, more investigations are warranted before establishing this relationship further.

Interview Session

According to the Self-Determination Theory (SDT), decision is driven by motivation and an individual is said to be motivated if he has met the three basic needs, competence, autonomy and relatedness (Deci and Ryan, 1985). Although the relation between decidedness and motivation was not established from the quantitative data, the information collected from the verbal interviews could offer some insights.

Of 6 participants interviewed, 3 of them (50%) expressed clear directions in their future career plans. To further examine the motivation behind such strong decidedness, the researcher looked at specific indications of the three needs. Student 2 expressed his interest in pastry and bakery, he has been,

> *'focusing on cooking and making designs' (Student 2)*

and this was his interest. This implied that he has acquired some competence in the field and had the autonomy to choose according to his personal interest. In terms of relatedness, he shared that parents would affect his decisions most

> *'because they will be supporting me and then they do equip me with confidence to either continue or think about it'. (Student 2)*

Student 4 shared that he had shortlisted three specific fields of studies to choose from, and his ultimate decision depends on

> *'which one more fun, not so hard'. (Student 4)*

An element of fun suggests personal preference and autonomy whereas being difficult to manage suggests competence level. In essence, he has control over which field he chose and it should be tasks that he is competent in. Additionally, he emphasised the role of friendship in his career decision making, that he might choose a career if he has friends in so that he,

> *'will not feel so lonely' (Student 4)*

and would ask his friends for advice in directions. This implies his high need of relatedness. Student 5 has decided on pursuing electrical engineering. He felt that he has prepared for this by being competent in related subjects in school, such as Maths and Science. This was his own decision stemming from his personal interest and passion in technology. More importantly, he felt that his parents would always support him in any

decisions he makes because they will not,

> '*block our passion or helps to change our own decisions in a way'. (Student 5)*

These makes it evident that his motivation was clearly supported by having met all three basic needs, competence, relatedness and autonomy.

For the remaining three participants, they felt that it was important to start planning ahead but had no plans or directions yet. Two of them explained that receiving their results at the end of the year would help in determining their eligible courses to study, and thus a future career direction. Hence, it suggests that a lack of competence acted as a barrier towards their decidedness. Interestingly, Student 5 felt that his results on the stronger subjects would help in providing a direction. He explained that,

> *'looking at subjects that he is excelling in, he would likely consider maybe taking up like other courses' (Student 5)*

when given a scenario of a student needing advice. Instead of seeing competence as a restrictive factor limiting choices of courses, Student 5 looked at it in a positive note. This reflects differences in self-esteem and attitudes.

However, there is insufficient information to establish a concrete link between these constructs and decidedness. Referring back to the current study's aim of investigating the possible relation between motivation and decidedness, the data from these interviews implies that students who had decided on their future plans were highly motivated. Although it did not provide specific aspects of motivation, intrinsic or extrinsic, it supports the SDT that decisions are driven by motivation through meeting basic needs (Deci and Ryan, 1985).

Factors affecting vocational decisions that were identified by the researcher included friends, social media, family, personal interest, money, results and teacher. Having discussed these individually in the previous section, the following part aims to answer the next research question, what other influences affect vocational decision for this particular group of students?

When verbally asked about other concerns they had regarding choosing a potential career, students shared various points which provided rich and meaningful data for the current research. Student 2 highlighted the point on safety, explaining that

> *'because when doing jobs right, there will be always accidents, so I always make sure that my working environment is in a safe environment, not too cram, not too messy. So that in order for me to do my job, I don't have to injure myself and go hospital and such'. (Student 2)*

Student 4 spoke about the working environment, that he

> *'don't want it to be too hot. If not, I can't focus'. (Student 4)*

Student 6 expressed his concern about distance from home,

> *'because I am a lazy people who don't like to travel to some place'* [and the job location must be] *'not too far from my house'. (Student 6)*

Offering a different perspective, Student 5 spoke about the job objectives,

> *'like what kind of objectives we have to meet? Does it really fit our passion? Does it fit our own interest? And then we will, you know, think about it and then eventually will select this job as our own passion' (Student 5)*

so that individuals who are working can create 'meaningful experiences' on a daily basis at work. In essence, other concerns shared by these participants, other than Student 5, fall into a main category of environmental concerns. This theme was derived from three main codes; working condition, distance from home and safety. Although this theme was not identified by the researcher prior to the study, it revealed an emerging theme that could have been explored further.

Another interesting theme which emerged from the coding process was knowledge and skills. Firstly, all 6 participants agreed that school programmes, such as class activities and excursions to various Polytechnics and ITEs, helped to expose them to courses of potential interest. For example, Student 2 shared that,

> *'my school has er, actually asked us to go the internet, to check on what kind of course are there and what they will teach you and after that, after you graduate, what kind of job scope you will be in'. (Student 2)*

This acknowledged that his school has engaged him in preparations for the future. Similarly, Student 4 shared that he had picked up interest in 3D modelling course from the school visits when he was given opportunities to see projects being done on the spot. Student 6 also found these school efforts useful, as

> '*how it works and this all.' (Student 6)*

In terms of usefulness of school programmes, Student 5 provided an in-depth view,

> *'they do help in like suggesting what kind of career that you would like to pursue in the future. And the different aspects on what kind of things you should prepare for this specific course or career that you are looking at from the polytechnics' perspective.*

> *Usually our schools, schools like the Secondary that I am actually in, usually helps to not focus only on studies but actually spark the light within us like what kind of jobs do you like to pursue. And like to really focus on what … to focus on that goals specifically, so that you know, our own thoughts and mind is more fixated on the goal and rather like, we don't flunk or do anything else other than think about how can we reach that goal faster or even further … to go beyond the goal.' (Student 5)*

He found that school efforts not only exposed him to various courses that were available, but also encouraged him to discover his personal goals. This implies that he had formed personal connections with information gathered and identified with them. Putting these together, it seemed to suggest that students acquired knowledge and skills from their schools regarding future plans.

In fact, there could have been too much emphasis on career guidance from the school's perspective that led many students to feel that academic performance would be the determining factor in their future career path.

The point on skills and knowledge was also brought up by Student 5 who felt that primary and secondary education provided the foundation in the working world,

> '*interviewers will usually look at based on results and it does matter in terms of our own knowledge that results actually have to be important in a way because every time if they see a gradual decline they wouldn't want someone like me to actually be part of the company. They want someone who can actually bring up the company's name or benefit the company in the same time'. (Student 5)*

This led to the understanding that academic performance allowed employers to pick those who possessed better skills and knowledge as a form of being prepared for the job. Most of the participants mentioned the use of internet, while Students 3 and 6 shared that family members could offer great advice and knowledge. Generally, these students shared various sources of getting required knowledge and skills but explained that these are important in making a vocational decision.

In summary, these coded themes extracted from the interview sessions provided a fresh angle to view the whole issue of vocational decisions, as depicted in Figure 3.

From the data analysis, the researcher found that understanding motivation in terms of intrinsic and extrinsic motivation was too broad. Students tend to discuss and share more about specific and clear aspects such as interest/passion, academic results and personal goals. Although these seemed to fall under intrinsic motivation, information is lacking to ascertain that these students were intrinsically motivated.

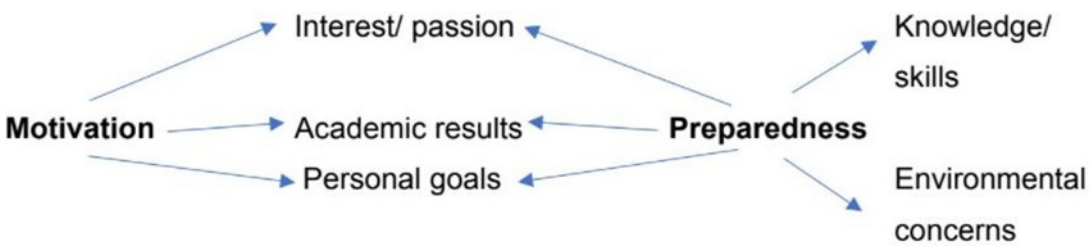

Figure 3. Relation and themes gathered from interview sessions

More importantly, rather than looking at factors that could influence their decisions, the collated themes could be put together to form a broad theme on preparedness. Students seemed to be more or less prepared for future vocations according to their relevant knowledge and skills, the working environment, personal interest, academic performance, as well as personal goals. Of these, personal interest, academic performance and personal goals helped to motivate them towards preparation for the vocational decisions. Hence, placing students according to the two types of motivation seemed too broad and the 7 identified factors were too narrow in understanding their decision-making process.

CONCLUSION AND IMPLICATIONS

Essentially, the practitioners supporting career guidance should be more alert to these various personal differences than to adopt one strategy. This means that instead of focusing on finding a general pattern for the majority or to group the minority, future researchers should put in more attention in investigating the vast differences in these students. Decidedness of a dyslexic adolescent on his future vocation largely depends individual motivation and preparedness.

LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH

The current research had some limitations. Firstly, it involved a small sample size because the recruitment was subjected to both parental and student consent. On top of this, the follow-up interview was made optional and received an even smaller number of signed consents. Hence, the results from the study has limitations on its generalisability.

Secondly, the background of the study was based on local context, with students attending local schools and factors that were localised such as school teachers and academic performance. The discussion and yielded results may not be applicable across various countries and nations as education systems differ. Lastly, the factors influencing the vocational decisions of these students were not exhaustive. Although the researcher had identified some from past literature and extracted some from the verbal interviews,

there could be other factors that were missed out. One of the six participants interviewed took a significantly longer time to share his thoughts and provided rich and meaningful data for the researcher, while some others were rather unresponsive and provided very short one-worded responses. Hence, this could have skewed the data collected.

Generally, the research had provided a few important implications. School programmes targeting career guidance and courses of studies were helpful in exposing them to plan ahead. However, not all students had a clear direction despite this. More research is warranted to investigate the underlying reasons and effectiveness of these efforts. Secondly, researchers working with dyslexic participants need to be mindful of the complexity of questions given, as well as openness to receive differing thoughts. For example, a student who stated that parents were his least important factor influencing his thoughts. Instead of implying that the thoughts of his parents did not matter at all, he explained that he had full trust in his parental support of his desired choice. Lastly, investigations in career guidance of dyslexic students should understand that these students are very individual and motivated in different ways. Despite the researcher's aim to find general patterns of their thoughts, the data revealed that they generally do not follow patterns.

REFERENCES

Al-Sayyari, A., & Al-Buhairan, F. (2018). Relationship of media exposure to substance use among adolescents in Saudi Arabia: results from a national study. *Drug & Alcohol Dependence.*

Al-Zalabani, A., & Kasim, K. (2015). Prevalence and predictors of adolescents' cigarette smoking in Madinah, Saudi Arabia: a school-based cross-sectional study. *BMC Public Health*, ISSN 1471-2458.

Alesi, M., Rappo, G., & Pepi, A. (2012). Self-esteem at school and self-handicapping in childhood: comparison of groups with learning disabilities. *Psychological reports, 111*(3), 952-962.

Ali, S. R., & Saunders, J. L. (2006). College expectations of rural Appalachian youth: An exploration of social cognitive career theory factors. *The Career development quarterly, 55*(1), 38-51.

Altemeier, L. E., Abbott, R. D., & Berninger, V. W. (2008). Executive functions for reading and writing in typical literacy development and dyslexia. *Journal of clinical and experimental neuropsychology, 30*(5), 588-606.

American Psychiatric Association, A. P., & American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (Vol. 10). Washington, DC: American psychiatric association.

AnbuSelvan, G. P. J., Gokulnathan, S., PrabuRajan, V., RajaRaman, G., Kumar, S. S., & Thagavelu, A. (2013). A study among dental students regarding the factors influenced dental students to choose dentistry as career. *Journal of pharmacy & bioallied sciences, 5*(Suppl 1), S36.

Auerbach, C. F., & Silverstein, L. B. (2003). *An introduction to coding and analysis: Qualitative data*. New York, NY: New York University.

Ballarotto, G., Volpi, B., Marzilli, E., & Tambelli, R. (2018). Adolescent Internet Abuse: A Study on the Role of Attachment to Parents and Peers in a Large Community Sample. *BioMed Research International.*

Barcaccia, B., Pallini, S., Baiocco, R., Salvati, M., Saliani, A. M., & Schneider, B. H. (2018). Forgiveness and friendship protect adolescent victims of bullying from emotional

maladjustment. *Psicothema, 30*(4), pp. 427-433.
Beacham, N. A., & Alty, J. L. (2006). An investigation into the effects that digital media can have on the learning outcomes of individuals who have dyslexia. *Computers & Education, 47*(1), 74- 93.
Beigi, M., Shirmohammadi, M., & Arthur, M. (2018). Intelligent career success: The case of distinguished academics. *Journal of Vocational Behavior, 107*, 261-275.
Bonifacci, P., Canducci, E., Gravagna, G., & Palladino, P. (2017). English as a Foreign Language in Bilingual Language-minority Children, Children with Dyslexia and Monolingual Typical Readers. *Dyslexia, 23*(2), pp.181-206.
Borca, G., Bina, M., Keller, P. S., Gilbert, L. R., & Begotti, T. (2015). Internet use and developmental tasks: Adolescents' point of view. *Computers in Human Behavior, 52*, 49-58.
Boyle, C., & Jindal-Snape, D. (2012). Visual-perceptual difficulties and the impact on children's learning: are teachers missing the page? *Support for Learning, 27*(4), pp.166-171.
Brante, W. E. (2013). 'I don't know what it is to be able to read': how students with dyslexia experience their reading impairment. *Support for learning, 28*(2), 79-86.
Brooks, A. D., Berninger, V. W., & Abbott, R. D. (2011). Letter naming and letter writing reversals in children with dyslexia: Momentary inefficiency in the phonological and orthographic loops of working memory. *Developmental neuropsychology, 36*(7), pp.847-868.
Brown, B. B., & Larson, J. (2009). *Peer relationships in adolescence. Handbook of adolescent psychology.* pp. 74–103. Hoboken, NJ: Wiley.
Bryson, A., Buraimo, B., & Simmons, R. (2011). Do salaries improve worker performance?. *Labour Economics, 18*(4), 424-433.
Burke, K., Brennan, L., & Roney, S. (2010). A randomised controlled trial of the efficacy of the ABCD Parenting Young Adolescents Program: rationale and methodology. *Child and adolescent psychiatry and mental health, 4*(1), p.22.
Carawan, L. W., Nalavany, B. A., & Jenkins, C. (2016). Emotional experience with dyslexia and self-esteem: the protective role of perceived family support in late adulthood. *Aging & mental health, 20*(3), 284-294.
Casaló, L. V., & Escario, J. J. (2018). Predictors of excessive Internet use among adolescents in Spain: The relevance of the relationship between parents and their children. Computers *in Human Behavior.*
Centifanti, L. C. M., Modecki, K. L., MacLellan, S., & Gowling, H. (2014). Driving Under the Influence of Risky Peers: An Experimental Study of Adolescent Risk Taking. *Journal of Research on Adolescence, 26*(1), pp. 207–222.
Chan, D. W., Ho, C. S. H., Tsang, S. M., Lee, S. H., & Chung, K. K., (2003). Reading-related behavioral characteristics of Chinese children with dyslexia: The use of the teachers' behavior checklist in Hong Kong. *Annals of Dyslexia, 53*(1), pp.300-323.
Chiesa, R., Massei, F., & Guglielmi, D. (2016). Career decision-making self-efficacy change in Italian high school students. *Journal of Counseling & Development, 94*(2), 210-224.
Chow, C. M., Tan, C. C., & Buhrmester, D. (2015). Interdependence of depressive symptoms, school involvement, and academic performance between adolescent friends: A dyadic analysis. *British Journal of Educational Psychology, 85*, pp. 316–331.
Creswell, J. W. (2012). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). Thousand Oaks, CA: Sage.
Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
Crișan, C., & Turda, S., (2015). The connection between the level of career indecision and the perceived self-efficacy on the career decision-making among teenagers. *Procedia-Social*

and Behavioral Sciences, 209, 154-160

Crisp, V., Johnson, M., & Novaković, N. (2012). The effects of features of examination questions on the performance of students with dyslexia. *British Educational Research Journal, 38*(5), 813-839.

Das, T. K., & Tripathy, A. K. (2016). Student Performance Drives Career: A Case Study. International *Journal of Recent Research Aspects, 3*(4), 19-22.

De Avelar, L. O., Rezende, G. C., & Freire, A. P. (2015). WebHelpDyslexia: A browser extension to adapt web content for people with dyslexia. *Procedia Computer Science, 67*, 150-159.

De Bilde, J., Vansteenkiste, M., & Lens, W. (2011). Understanding the association between future time perspective and self-regulated learning through the lens of self-determination theory. *Learning and instruction, 21*(3), 332-344.

Deci, E., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.

Diakogiorgi, K., & Tsiligirian, E. (2016). Parents' and School Career Counsellors' Evaluations of the Occupational Competence of Children With Dyslexia. *The European Journal of Counselling Psychology, 4*(1).

Dika, S. L., Alvarez, J., Santos, J., & Suárez, O. M. (2016). A Social Cognitive Approach to Understanding Engineering Career Interest and Expectations among Underrepresented Students in School-Based Clubs. *Journal of STEM Education: Innovations & Research, 17*(1).

Duffy, M. C., & Azevedo, R. (2015). Motivation matters: Interactions between achievement goals and agent scaffolding for self-regulated learning within an intelligent tutoring system. *Computers in Human Behavior, 52*, 338-348.

Dyslexia Association of Singapore, DAS. (2018). *Assessment process.* Extracted from https:// www.das.org.sg/services/assessments/assessment- process.html.

El Asam, A., Samara, M., & Terry, P. (2018). Problematic internet use and mental health among British children and adolescents. *Addictive Behaviors.*

Emmanuelle, V., (2009). Inter-relationships among attachment to mother and father, self- esteem, and career indecision. *Journal of Vocational Behavior, 75*(2), pp. 91-99

Faberman, R. J., & Menzio, G. (2018). Evidence on the Relationship between Recruiting and the Starting Wage. *Labour Economics, 50*, 67-79.

Fouad, N. A., Kim, S. Y., Ghosh, A., Chang, W. H., & Figueiredo, C. (2016). Family influence on career decision making: Validation in India and the United States. *Journal of Career Assessment, 24*(1), 197-212.

Gehrau, V., Brüggemann, T., & Handrup, J. (2016). Media and occupational aspirations: The effect of television on career aspirations of adolescents. *Journal of Broadcasting & Electronic Media, 60*(3), pp.465-483.

Germanò, E., Gagliano, A., & Curatolo, P., (2010). Comorbidity of ADHD and dyslexia. *Developmental neuropsychology, 35*(5), pp.475-493.

Ginevra, M. C., Nota, L., & Ferrari, L. (2015). Parental support in adolescents' career development: Parents' and children's perceptions. *The Career Development Quarterly, 63*(1), 2-15.

Gonzalez, L. M. (2015). Barriers to college access for Latino/a adolescents: A comparison of theoretical frameworks. *Journal of Latinos and Education, 14*(4), 320-335.

Gonzalez-DeHass, A. R., Willems, P. P., & Holbein, M. F. D. (2005). Examining the relationship between parental involvement and student motivation. *Educational psychology review, 17* (2), 99-123.

Griffiths, C. B., Norwich, B., & Burden, B. (2004). Parental agency, identity and knowledge: mothers of children with dyslexia. *Oxford review of education, 30*(3), 417-433.

Harris, A., & Goodall, J. (2008). Do parents know they matter? Engaging all parents in Learning.

Educational research, 50(3), 277-289.
Heiman, G. (2013). *Basic statistics for the behavioural sciences*. Cengage Learning.
Hormenu, T., Hagan Jnr, J. E., & Schack, T. (2018). Predictors of alcohol consumption among in-school adolescents in the Central Region of Ghana: *A* baseline information for developing cognitive-behavioural interventions. *PLoS ONE 13*(11): e0207093.
Huan, V. S., See, Y. L., Ang, R. P., & Har, C. W. (2008). The impact of adolescent concerns on their academic stress. *Educational Review, 60*(2), 169-178.
Jones, R. M., Vaterlaus, J. M., Jackson, M. A., & Morrill, T. B. (2014). Friendship characteristics, psychosocial development, and adolescent identity formation. *Personal Relationships, 21*, pp. 51–67.
Jones, S. C., & Magee, C. A. (2014). The role of family, friends and peers in Australian adolescent's alcohol consumption. *Drug and Alcohol Review, 33*, pp. 304–313.
Jordan, J. A., & Dyer, K., (2017). Psychological Well-being Trajectories of Individuals with Dyslexia Aged 3–11 Years. *Dyslexia, 23*(2), pp.161-180.
Kasirer, A., & Mashal, N., (2017). Comprehension and generation of metaphoric language in children, adolescents, and adults with dyslexia. *Dyslexia, 23*(2), pp.99-118.
Kass, E., & Miller, E. C. (2018). Career choice among academically excellent students: Choosing teaching career as a corrective experience. *Teaching and Teacher Education, 73*, 90-98.
Katz, I., Cohen, R., Green-Cohen, M., & Morsiano-davidpur, S. (2018). Parental support for adolescents' autonomy while making a first career decision. *Learning and Individual Differences, 65*, 12-19.
Kim, S. Y., Ahn, T., & Fouad, N. (2016). Family influence on Korean students' career decisions: A social cognitive perspective. *Journal of Career Assessment, 24*(3), 513-526.
Kiran, B., & Karaca, E. G. (2018). Factors affecting career plans of faculty of pharmacy students in Ege University and their evaluations about career symposium. *Marmara Pharmaceutical Journal, 22*(1).
Kool, A., Mainhard, M. T., Jaarsma, A. D. C., Brekelmans, M., & van Beukelen, P. (2016). Academic success and early career outcomes: Can honors alumni be distinguished from non-honors alumni?. *High Ability Studies, 27*(2), 179-192.
Kuzucu, Y., & Şimşek, Ö. F., (2013). Self-determined choices and consequences: The relationship between basic psychological needs satisfactions and aggression in late adolescents. *The Journal of general psychology, 140*(2), pp.110-129.
Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of vocational behavior, 45*(1), 79-122.
Li, G., Hou, G., Yang, D., Jian, H., & Wang, W. (2018). Relationship between anxiety, depression, sex, obesity, and internet addiction in Chinese adolescents: A short- term longitudinal study. *Addictive Behaviors.*
Li, X., Hou, Z. J., & Jia, Y. (2015). The influence of social comparison on career decision- making: Vocational identity as a moderator and regret as a mediator. *Journal of Vocational Behavior, 86*, pp.10-19.
Liaw, S. Y., Wu, L. T., Chow, Y. L., Lim, S., & Tan, K. K. (2017). Career choice and perceptions of nursing among healthcare students in higher educational institutions. *Nurse education today, 52*, 66-72.
Lim, S. A., & You, S. (2017). Long-Term Effect of Parents' Support on Adolescents' Career Maturity. *Journal of Career Development*, 0894845317731866.
Lindeblad, E., Svensson, I., & Gustafson, S. (2016). Self-Concepts and Psychological Well-Being Assessed by Beck Youth Inventory Among Pupils with Reading Difficulties. Reading

Psychology, 37, pp. 449–469.

Litt, D. M., Stock, M. L., & Gibbons, F. X. (2015). Adolescent alcohol use: Social comparison orientation moderates the impact of friend and sibling behaviour. *British Journal of Health Psychology, 20*, pp. 514–533.

Liu, J., McMahon, M., & Watson, M. (2015). Parental influence on child career development in mainland China: A qualitative study. *The Career Development Quarterly, 63*(1), 74-87.

Marcionetti, J. (2014). Factors affecting teenagers' career indecision in southern Switzerland. *Procedia-Social and Behavioral Sciences, 112*, 158-166

Marcionetti, J., & Rossier, J. (2017). The Mediating Impact of Parental Support on the Relationship Between Personality and Career Indecision in Adolescents. Journal *of Career Assessment, 25*(4), 601-615.

Martinelli, V., & Schembri, J. (2014). Dyslexia, spatial awareness and creativity in adolescent boys. *The Psychology of Education Review, 38*(2), 19-47.

Metheny, J., & McWhirter, E. H. (2013). Contributions of social status and family support to college students' career decision self-efficacy and outcome expectations. *Journal of Career Assessment, 21*(3), 378-394.

Meuwese, R., Cillessen, A. H. N., & Guroglu, B. (2017). Friends in high places: A dyadic perspective on peer status as predictor of friendship quality and the mediating role of empathy and prosocial behaviour. *Social Development, 26*, pp. 503–519.

Mihara, S., Osaki, Y., Nakayama, H., Sakuma, H., Ikeda, M., Itani, O., Kaneita, Y., Kanda, H., Ohida, T., & Higuchi, S. (2016). Internet use and problematic Internet use among adolescents in Japan: a nationwide representative survey. *Addictive behaviors reports, 4,* 58-64.

Ministry of Education Singapore, MOE. (2012). *Education and Career Guidance* (ECG) Syllabus Secondary. Extracted from https://www.moe.gov.sg/education/syllabuses/character-citizenship- education/

Mishkin, H., Wangrowicz, N., Dori, D., & Dori, Y. J. (2016). Career choice of undergraduate engineering students. *Procedia-Social and Behavioral Sciences, 228*, 222-228.

Morken, F., & Helland, T., (2013). Writing in dyslexia: product and process. *Dyslexia, 19*(3), pp.131-148.

Morris, C. A. W., Shoffner, M. F., & Newsome, D. W. (2009). Career counseling for women preparing to leave abusive relationships: A social cognitive career theory approach. *The Career Development Quarterly, 58*(1), 44-53.

Murawski, M. M., & King, B. J. (2011). Influence of salary on faculty recruitment and retention: current pharmacy faculty salaries relative to past faculty, community practitioners, and new hires. *Currents in Pharmacy Teaching and Learning, 3*(4), 267-282.

National Youth Council, NYC. (2016). *A snapshot of our Singaporean Youth: National Youth Survey 2016.* Extracted from https://www.nyc.gov.sg/en/initiatives/resources/national-youth-survey/.

National Youth Council, NYC. (2014). *The State of Youth in Singapore 2014*. Extracted from https:// www.nyc.gov.sg/en/initiatives/resources/national- youth-survey/.

Nawaz, S., & Gilani, N. (2011). Relationship of parental and peer attachment bonds with career decision-making self-efficacy among adolescents and post- adolescents. *Journal of Behavioural Sciences, 21*(1), 33.

Negru-Subtirica, O., & Pop, E. I. (2016). Longitudinal links between career adaptability and academic achievement in adolescence. *Journal of Vocational Behavior, 93*, 163-170.

Ogowewo, B. O. (2010). Factors Influencing Career Choice Among Secondary School Students: Implications for Career Guidance. *International Journal of Interdisciplinary social sciences, 5*(2).

Olafsen, A. H., Halvari, H., Forest, J., & Deci, E. L. (2015). Show them the money? The role of pay, managerial need support, and justice in a self-determination theory model of intrinsic work motivation. *Scandinavian journal of psychology, 56*(4), 447- 457.

Olle, C. D., & Fouad, N. A. (2015). Parental support, critical consciousness, and agency in career decision making for urban students. *Journal of Career Assessment, 23*(4), 533-544.

Özkamali, E., Cesuroğlu, Ş.G., Hamamci, Z., Buğa, A. and Çekiç, A., (2014). The investigation of relationships between vocational maturity and irrational career beliefs. *Procedia-Social and Behavioral Sciences, 116*, pp.3072-3074.

Palladino, P., Cismondo, D., Ferrari, M., Ballagamba, I., & Cornoldi, C. (2016). L2 spelling errors in Italian children with dyslexia. *Dyslexia, 22*(2), pp.158-172.

Pappas, T. S., & Kounenou, K. (2011). Career decision making of Greek post-secondary vocational students: The impact of parents and career decision making self- efficacy. *Procedia-Social and Behavioral Sciences, 15*, 3410-3414.

Pellerone, M., (2015). Influence of identity, congruence of interest and coping strategy on decision making. *Procedia-Social and Behavioral Sciences, 191*, 1344-1348

Pluck, G. (2018). Lexical reading ability predicts academic achievement at university level. *Cognition, Brain, Behavior, 22*(3).

Polk, D. M. (2015). What are they hearing? The impact of perceptions of parental communication on youth. *Community, Work & Family, 18*(1), 41-57

Poon, K., & Ho, C. S. H., (2014). Contrasting deficits on executive functions in Chinese delinquent adolescents with attention deficit and hyperactivity disorder symptoms and/or reading disability. *Research in developmental disabilities, 35*(11), pp.3046-3056.

Raque-Bogdan, T. L., Klingaman, E. A., Martin, H. M., & Lucas, M. S. (2013). Career- related parent support and career barriers: An investigation of contextual variables. *The Career Development Quarterly, 61*(4), 339-353.

Razuk, M., Barela, J. A., Peyre, H., Gerard, C. L., & Bucci, M. P. (2018). Eye movements and postural control in dyslexic children performing different visual tasks. *PLoS ONE, 13*(5), p.e0198001.

Reiter, A., Tucha, O., & Lange, K. W. (2005). Executive functions in children with dyslexia. *Dyslexia, 11*(2), pp.116-131.

Robnett, R. D. & Leaper, C. (2012). Friendship Groups, Personal Motivation, and Gender in Relation to High School Students' STEM Career Interest. *Journal of Research on Adolescence, 23*(4), pp. 652–664.

Rogers, M. E., & Creed, P. A. (2011). A longitudinal examination of adolescent career planning and exploration using a social cognitive career theory framework. *Journal of adolescence, 34*(1), 163-172.

Rousseau, A., & Eggermont, S. (2018). Media ideals and early adolescents' body image: Selective avoidance or selective exposure?. *Body image, 26*, 50-59.

Santrock, J. W., (2006). *Life-Span Development*. New York: McGraw-Hill

Saldaña, J. (2015). *The coding manual for qualitative researchers.* Sage.

Sawitri, D. R., & Dewi, K. S. (2015). Academic fit, adolescent-parent career congruence, and career exploration in university students. *Procedia Environmental Sciences, 23*, 105-109.

Scalici, F., & Schulz, P. J. (2014). Influence of Perceived Parent and Peer Endorsement on Adolescent Smoking Intentions: Parents Have More Say, But Their Influence Wanes as Kids Get Older. *PLoS ONE 9*(7): e101275. doi:10.1371/journal.pone.0101275

Schweri, J., & Hartog, J. (2017). Do wage expectations predict college enrollment? Evidence from healthcare. *Journal of Economic Behavior & Organization, 141*, 135-150.

Seok, H. J., Lee, J. M., Park, C. Y., & Park, J. Y. (2018). Understanding internet gaming addiction

among South Korean adolescents through photovoice. Children *and Youth Services Review, 94*, 35-42.

Sharma, V., (2014). Career decision-making of adolescents in relation to their family environment: An empirical study. *Indian Journal of Health and Wellbeing, 5*(6), 702- 706.

Šimčíková, K. (2018). *Creativ*ity in Dyslexic Individuals. *The Educational Review, USA, 2*(9), 458-467.

Singer, E. (2008). Coping with academic failure, a study of Dutch children with dyslexia. *Dyslexia, 14*(4), 314-333.

Slaten, C. D., & Baskin, T. W. (2014). Examining the impact of peer and family belongingness on the career decision-making difficulties of young adults: A path analytic approach. *Journal of Career Assessment, 22*(1), 59-74.

Snowling, M. J., & Hulme, C., (2012). Annual Research Review: The nature and classification of reading disorders–a commentary on proposals for DSM-5. *Journal of Child Psychology and Psychiatry, 53*(5), pp.593-607.

Sovet, L., & Metz, A. J. (2014). Parenting styles and career decision-making among French and Korean adolescents. *Journal of Vocational Behavior, 84*(3), 345- 355.

Strapp, C. M., Drapela, D. J., Henderson, C. I., Nasciemento, E., & Roscoe, L. J. (2018). Psychology Students' Expectations Regarding Educational Requirements and Salary for Desired Careers. *Teaching of Psychology, 45*(1), 6-13.

Stuss, D. T., & Knight, R. T. (eds.) (2013). *Principles of frontal lobe function*. Oxford University Press.

Suárez-Coalla, P., & Cuetos, F. (2017). Formation of Orthographic Representations in Spanish Dyslexic Children: The Role of Syllable Complexity and Frequency. *Dyslexia, 23*(1), pp.88-96.

Sullivan, H. S. (1953). *The interpersonal theory of psychiatry.* New York, NY: Norton.

Taskinen, P. H., Schütte, K., & Prenzel, M. (2013). Adolescents' motivation to select an academic science-related career: the role of school factors, individual interest, and science self-concept. *Educational Research and Evaluation, 19*(8), 717-733.

Terras, M. M., Thompson, L. C., & Minnis, H. (2009). Dyslexia and psycho-social functioning: An exploratory study of the role of self-esteem and understanding. *Dyslexia, 15*(4), pp.304-327.

Thaler, N. S., Kazemi, E., & Wood, J. J. (2010). Measuring Anxiety in Youth with Learning Disabilities: Reliability and Validity of the Multidimensional Anxiety Scale for Children (MASC). *Child Psychiatry & Human Development, 41*, pp. 501–514.

Undheim, A. M., & Wichstrom, L. (2011). Emotional and Behavioral Problems Among School Adolescents with and Without Reading Difficulties as Measured by the Youth Self-Report: A One-Year Follow-Up Study. *Scandinavian Journal of Educational Research, 55*(3), pp. 291–305.

Ünlü, A., & Dettweiler, U. (2015). Motivation internalization and simplex structure in self-determination theory. *Psychological reports, 117*(3), 675-691.

Vallerand, R. J. (2000). Deci and Ryan's self-determination theory: A view from the hierarchical model of intrinsic and extrinsic motivation. *Psychological Inquiry, 11*(4), 312-318.

Vasalou, A., Khaled, R., Holmes, W., & Gooch, D. (2017). Digital games-based learning for children with dyslexia: A social constructivist perspective on engagement and learning during group game-play. *Computers & Education, 114*, 175-192.

Vasalou, A., Khaled, R., Holmes, W., & Gooch, D. (2017). Digital games-based learning for children with dyslexia: A social constructivist perspective on engagement and learning during group game-play. *Computers & Education, 114*, 175-192.

Villanti, A., Boulay, M., & Juon, H. S. (2011). Peer, parent and media influences on adolescent smoking by developmental stage. *Addictive behaviors, 36*(1-2), 133-136.

Wang, Y., Deng, C., & Yang, X. (2016). Family economic status and parental involvement:

Influences of parental expectation and perceived barriers. School *Psychology International, 37*(5), 536- 553.

Webb, H. J., & Zimmer-Gembeck, M. J. (2013). The Role of Friends and Peers in Adolescent Body Dissatisfaction: A Review and Critique of 15 Years of Research. *Journal of Research on Adolescence, 24*(4), pp. 564–590.

Webber, K. H., Tate, D. F., Ward, D. S., & Bowling, J. M. (2010). Motivation and its relationship to adherence to self-monitoring and weight loss in a 16-week Internet behavioral weight loss intervention. *Journal of nutrition education and behavior, 42*(3), 161-167.

Wehmeyer, M. L. (2004). Beyond self-determination: Causal agency theory. *Journal of Developmental and Physical Disabilities, 16*(4), 337-359.

Wiedeman, A. M., Black, J. A., Dolle, A. L., Finney, E. J., & Coker, K. L. (2015). Factors influencing the impact of aggressive and violent media on children and adolescents. *Aggression and Violent Behavior, 25*, 191-198.

Williams, L. R., & Anthony, E. K. (2015). A Model of Positive Family and Peer Relationships on Adolescent Functioning. *Journal of Child and Family Studies, 24*, pp. 658–667.

Wright, C. L., & Silberman, K. (2018). Media influence on perception of driving risk and behaviors of adolescents and emerging adults. *Transportation research part F: traffic psychology and behaviour, 54*, 290-298.

Wright, S. L. (2017). Attachment and Self-Efficacy in Career Search Activities: A Structural Model. *The Career Development Quarterly, 65*(2), 98-112.

Wright, S. L., Perrone-McGovern, K. M., Boo, J. N., & White, A. V. (2014). Influential factors in academic and career self-efficacy: Attachment, supports, and career barriers. *Journal of Counseling & Development, 92*(1), 36-46.

Xia, X. (2016). Forming wage expectations through learning: Evidence from college major choices. *Journal of Economic Behavior & Organization, 132*, 176-196.

Xu, Y. J. (2013). Career outcomes of STEM and non-STEM college graduates: Persistence in majored- field and influential factors in career choices. *Research in Higher Education, 54* (3), 349-382.

Yardley, L., Spring, B. J., Riper, H., Morrison, L. G., Crane, D. H., Curtis, K., ... & Blandford, A. (2016). Understanding and promoting effective engagement with digital behavior change interventions. *American journal of preventive medicine, 51*(5), 833-842.

Yu, R., Branje, S., Keijsers, L., Koot, H. M., & Meeus, W. (2013). Pals, Problems, and Personality: The Moderating Role of Personality in the Longitudinal Association Between Adolescents' and Best Friends' Delinquency. *Journal of Personality, 81*(5), pp. 499–509.

Zikl, P., Bartošová, I. K., Víšková, K. J., Havlíčková, K., Kučírková, A., Navrátilová, J., & Zetková, B. (2015). The possibilities of ICT use for compensation of difficulties with reading in pupils with dyslexia. *Procedia-Social and Behavioral Sciences, 176*, 915- 922.

Zimmermann, G. (2010). Risk perception, emotion regulation and impulsivity as predictors of risk behaviours among adolescents in Switzerland. *Journal of Youth Studies, 13*(1), pp. 83-99

APPENDIX 1

Questionnaire for Research Study

This set of questions is to allow me to understand your future plans. Please be assured that thereare no right or wrong answers. I appreciate your honest responses in the following questions.

1. Please tick the box that describes you best:

☐ I **have decided** on my future career and I **know** which course I should take aftergraduating from my Secondary School.

My future course/ job is _____

☐ I **have not decided** about my future career and I **do not know** which course I should take after graduating from my Secondary School.

2. On a scale of 1-5, circle the number that describes you best:

QUESTION	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
A. It is important that my future job pays me well.	1	2	3	4	5
B. It is important that my future job makes me feel satisfied.	1	2	3	4	5
C. I don't mind if my future job is one that I don't enjoy.	1	2	3	4	5
D. I don't mind that my future job requires me to work for long hours.	1	2	3	4	5

3. Sometimes our decisions for the future can be affected by others. How important do you view these seven factors?

Order them in the list below by writing ONE number in each square **1** being the most important, while **7** being the least important factor.`

	FRIENDS	My friends can give good advice because they understand me.
	SOCIAL MEDIA	The information I get from social media such as Facebook and Instagram can be useful.
	FAMILY	I believe I can achieve with my family's strong support.
	PERSONAL INTEREST	I will only choose a career if I am interested in it.
	MONEY	The best job is the one which pays me well.
	MY RESULTS	The course and future career I choose depends on my resultsfrom my exams.
	MY TEACHER	I am sure my teacher gives the best advice for the course or career I should take.

The **most important** factor I have chosen is _____ because

_____

The **least important** factor I have chosen is _____ because

_____

Other than those in the list above, are there any other factors that will affect your decision when choosing a future career path? Write and explain. You may write more than one factor.

_____

_____

_____

Asia Pacific Journal of Developmental Differences
Vol. 9, No. 1, January 2022, pp. 119—142
DOI: 10.3850/S2345734122000142

See me, hear me: Successes and challenges of students with invisible disabilities at university in Singapore

Damaris Carlisle[1*]

1. *Lasalle College of the Arts, Singapore*

Abstract

Singapore has undergone a gradual shift towards a social model of inclusive education since the Compulsory Education Act came into force in 2003 (Republic of Singapore, 2000). With the aim of supporting disabled students, the Singapore government has increasingly provided resources and facilities in schools (Ministry of Education Singapore, 2018), resulting in larger numbers of these students continuing to tertiary education. Eleven individual interviews were conducted with students with invisible disabilities studying at different universities across Singapore. Their lived experiences provides insights into their realities and concerns as they reflected on their first-year at university and the successes and challenges they encountered as students with disabilities. Whilst support has improved since the announcement of support offices at institutes of higher learning (Siau, 2014), challenges remain ranging from attitudes to academic barriers, from systemic hurdles to concerns about career prospects. This has implications for policy, practice and research at tertiary level in Singapore.

Keywords: challenges, invisible disability, special educational needs, successes, university

* *Correspondence to:*
Dr Damaris Carlisle, Lecturer-in-Charge, English Language School of Creative Industries. Lasalle College of the Arts
Email: damaris.carlisle@lasalle.edu.sg

INTRODUCTION AND CONTEXT

As Singapore continues to strive towards an increasingly inclusive education system, more students with special educational needs and disabilities (SEND) are meeting entry requirements and gaining university places. The small city state currently has six publicly funded autonomous universities. Each varying in age, size and specialist focus, over 65,000 students were enrolled across the six institutions in 2017 (Ministry of Education Singapore, 2017). Since 2014, each institute of higher learning (IHL), which include the universities, three Institutes of Technical Education (ITE) and five Polytechnics, is required to have a Disability Support Office (DSO) as well as information on their websites about disability support services. In addition, the SEN Fund provides financial aid for learning such as the purchase of assistive technology (AT) or hiring of note-takers and interpreters. Until 2020 this was only available to students with physical and sensory disabilities (Republic of Singapore, 2014). The scope has since been widened to include students with learning, social and behavioural differences studying at ITE and polytechnic (Republic of Singapore, 2020).

This study considered lived experiences of 26 students with SEND as they reflected on their first-year of studying at university in Singapore, where they discussed their strategies and perceived issues of concern. Participants' perspectives were contextualised through the historical background to education policy and provisions for the education of learners with disabilities in Singapore, alongside developments in education reforms. Although there were commonalities across all the participants, this article focuses on the unique experiences of eleven of the participants with "invisible disabilities", who made up 35% of the interviewees of the study.

Invisible Disabilities

Invisible disabilities frequently relates to learning and psychiatric challenges not initially or overtly visible (N. Brown & Leigh, 2018; Burgstahler & Doe, 2006). This group included those with learning differences, such as dyslexia, attention deficit disorder (ADD), autism spectrum disorder (ASD), and mental health conditions. The rationale for choosing this descriptor is the difference may not be overtly visible to others or that students "often do not associate learning difficulty with disability in the traditional sense of a visible malady" (Boyko & Chaplin, 2011, p. 3).

The Impact of SEND on University Experiences

Much research relevant to the field of inclusive education and first-year experiences of learners at IHL has been conducted in Australia, the UK, and the USA, although some research is beginning to emerge from Asia. Whilst numbers of students with disabilities in higher education are increasing, they are disproportionately lower in numbers, are more likely to drop out or achieve poorer outcomes (Brock, 2010; Ebersold, 2011; Fuller,

Healey, Bradley, & Hall, 2004). Many of these learners continue to face obstacles to pursuing higher education leading to the danger that disability is seen as a secondary issue or personal responsibility to be managed individually. When considering learners with invisible disabilities in their first year at IHL, several possible barriers have been identified: attitudinal, informational and communication, and systemic barriers.

Attitudinal barriers

One of the most significant barriers is misinformation and negative attitudes that arise. A lack of understanding, experience and preconceived ideas about disabilities is often at the root. Within the context of IHL, attitudinal barriers can come from staff, the student with SEND, as well as their peers. Attitudes of staff pose one of the biggest hurdles (Burgstahler & Doe, 2006; Fuller et al., 2004; Hong, 2015; King, 2014; Rigler, 2013). Most educators do not undergo formal teacher training at tertiary level, employed instead for their industry expertise or research capabilities.

Learners who are seen as different often experience isolation at IHL as their peers feel uncomfortable and unsure of how to interact (King, 2014). Additionally, stereotyping of disabilities may discourage learners with SEND from disclosing for fear of standing out from their peers (King, 2014). Learners often identify themselves by their limitations instead of their strengths (Rutherford, 2017), which has implications for those with SEND. Rutherford argues that "by defining themselves in negative terms, this is potentially damaging educationally, as it creates artificial barriers", causing the learner to feel they are not improving (2017, p. 167). However, research suggests the importance of learners registering their disability at the application stage so that the disability can be assessed and provisions negotiated (Taylor, Baskett, & Wren, 2010).

Information and communication barriers

Without collaboration between stakeholders and within institutions, lack of knowledge and access to information can create challenges. This may refer to the knowledge of teaching staff and support service providers, as well as to learners and parents. Multiple studies have highlighted the issue of lack of knowledge of IHL staff (Burgstahler & Doe, 2006; Hong, 2015; King, 2014; Matthews, 2009; Office of Special Education Programs, 2005). Staff often feel they lack training, particularly when working with students with invisible disabilities (Burgstahler & Doe, 2006). Consequently, educators may be hesitant to adapt their teaching to the variety of educational needs or to implement appropriate accommodations. Furthermore, there may be communication barriers within IHL due to ambiguous information provided by legislation leading to differences in opinion about what might constitute, for example, a "reasonable adjustment" (Mann & Burkinshaw, 2017, p. 117).

Learners with SEND may lack knowledge of their condition or their legal rights. In late

onset of psychiatric disabilities, students may experience their first illness at IHL and therefore fail to understand what they are experiencing, what they need, or their rights as individuals with a disability (Zimmerman, 2004).

With advances in technology, AT can provide essential aids to learners with SEND. Increasingly, courses are using blended approaches, with many IHL using learning management systems to post materials online. However, materials and courses may remain inaccessible to learners with SEND. For example, the organisation of information by using headings that serve as a structural guide is particularly important for learners with ADD who may be overwhelmed by a cluttered webpage (Burgstahler, 2015b).

Systemic barriers

The education system itself creates systemic barriers to learning. Although inclusive policies are in place in many countries, the establishment of disability services in IHL is often inadequate (Taylor et al., 2010). The underpinning ethos of inclusive education stems from a social model of disability, implying that barriers such as attitudes, information and other forms of discrimination are the cause of disadvantage rather than individual characteristics or deficits (Oliver, 1990). Morgan and Houghton argue, "This places responsibility on individual members of staff within institutions and the subjects to change and adapt their policies and practices, not the student" (2011, p. 8). Systemic barriers, therefore, may relate to legislative, economic, administrative or pedagogical barriers.

Much research has centred at the institutional level. Direct service interventions have been trialled (Milsom, 2007; Peters, 2011), including inclusive practices and Universal Design for Learning (UDL) (Burgstahler, 2015b; Carballo, Cotán, & Spinola-Elias, 2019; Lemm & Lee, 2019; Sanger, 2020), social theory of learning difference (Oram, 2018), models of communities of practice to create a sense of belonging (Meehan & Howells, 2018; Rutherford, 2017; Tobbell et al., 2020; Wenger, 1998) and the development of transition pedagogy (Kift, Nelson, & Clarke, 2010; Nelson, Creagh, Kift, & Clarke, 2014; Penn-Edwards & Donnison, 2014; Raw, Tonkin, Peterson, & Jones, 2015). Other research has focused on the individual preparation of learners with disabilities and the importance of self-advocacy, self-determination and self-awareness skills (Connor, 2012; Milsom, 2007; Milsom & Hartley, 2005).

METHODOLOGY

This project was a qualitative investigation into the experiences of learners with SEND reflecting on their first year at university in Singapore. The phenomenological collective case study was developed through perspectival approaches to data collection. Informed by analytic induction and modified grounded theory approaches, the purpose was to generate theory from the interview data. The overview of the relevant literature

allowed the construction of theory frames built on past research (Rueschemeyer, 2009, p. 29) to ensure that context was considered as hypotheses were formed and revised. The central aim was to develop explanatory theory about the provisions for and access to education for students with SEND at university in Singapore based on reflections of their first year of study. Analysis of the historical background through parliamentary debates, policy documents and relevant university webpages provided a contextual framework within which to develop an explanatory theory. Participants were asked to reflect on their intentions, strategies, expected outcomes and significance (Blackledge & Hunt, 1985).

Data Collection

Criterion sampling was used to recruit participants where cases that met specific criteria were considered (Miles, Huberman, & Saldaña, 2014). Participants needed to have completed at least 6 months of studies and be a student at one of the six autonomous universities in Singapore, and have a formal assessment of SEND which included physical, sensory and/or invisible disabilities. Contact with specialist organisations serving specific disability groups, such as the Dyslexia Association Singapore and SPD Serving People with Disabilities, was made to enlist their help. Each specialist organisation was asked if they could advertise the research. Snowball sampling became an additional option to enhance the capture of a meaningful sample (Patton, 1990). Since the pool of possible participants was small, it was necessary to ask participants for recommendations or introductions to others who qualified to participate in the study (Morse, 2007).

To help with the dissemination of information that could be used and shared across different social media, the Participant Information Form was embedded in a Google Form so that potential participants could read all the relevant information in one place and respond using their device if they wished to take part. The response to the Google Form was accepted as consent to participate.

FINDINGS

The Participants

Interviews took place over six months from September 2019 to April 2020 and data were collected from participants studying at five of the six autonomous universities. The majority of participants were in their early to mid-20s, studying a range of subjects across the sciences, arts, and humanities (see Table 1). Most were studying full-time at undergraduate level. Participants divided almost evenly between face-to-face and video conference interviews.

Table 1: Descriptive information for each participant including gender, age, SEND and university studies

Participant	Gender	Age	SEND	Year of study	Subject of study	Interview
P1	F	Late 20's	ADHD	2nd	Communication & psychology (PT)	Face-to-face
P2	M	20	ASD	1st	Food science	Face-to-face
P3	F	21	Mental health condition	3rd	Earth science	Face-to-face
P4	F	21	Mental health condition	3rd	Physical sciences	Tele-conferencing
P5	F	29	Mental health condition	3rd	Marketing & advertising	Tele-conferencing
P7	F	21	ADD	3rd	Psychology	Tele-conferencing
P17	M	22	ASD	1st	Social work	Tele-conferencing
P22	F	Early 20's	ASD	3rd	Digital art & animation	Face-to-face
P23	M	24	Dyslexia	1st	Supply chain management	Tele-conferencing
P24	M	26	ASD	4th	Life sciences	Tele-conferencing
P25	M	22	ASD	3rd	Chemical engineering	Tele-conferencing

Figure 1 lists the questions created for the semi-structured interviews, based on Blackledge and Hunt's framework (1985). Each participant was interviewed once and was given the opportunity to read through the transcription to add, delete or amend information. They were also offered a follow up meeting if they wished, although no one chose this option.

Intentions

1. What were your plans when you chose your course?
    a. What helped you make your choice?
    b. Did you look at webpages for disability support?
    c. How important was your special educational need in making your choice?
2. Have your goals changed as a result of your experiences in your first year of study at university? Why? Why not?
3. How have your experiences in your university studies been different from those at school?
    a. Can you give me some examples?

Strategies

4. What strategies/ways of coping did you use to help you succeed in your first year of studies? Examples?
5. What kinds of support does the university offer? Examples?
6. Have you registered with the DSO? Why/why not?
7. What kind of support is offered by the DSO?
8. How well does this support fit with your own strategies/ways of coping?

Outcomes

9. How effective do you think your strategies have been so far?
    a. Academic results?
    b. How successful or satisfied do you feel?
10. What was your greatest success last year / in your first year?
11. Did you disclose your educational needs to the university?
12. Did/Do you get external help?
13. What were the outcomes of your dealings with DSO and/or counselling services?
14. Is there anything you would like to change or improve?
    a. How do you think you could do that?

Significance

15. How important was it to you to be accepted onto the course?
16. How important is it to you to succeed in the course?
17. How does your family feel about your studies?
    a. How do they support you?
18. Do you feel that you have:
    a. Become more independent?
    b. Been included?
    c. Been accepted by your lecturers and classmates?

Closing

Do you have anything else that you would like to add?
Do you have any further questions that you would like to ask me?

Figure 1. Questions used as the basis for the semi-structured interviews.

Explanatory Theory

Grounded in the analysis of the interview data, it is proposed that students with SEND entering university move along a continuum of "Preparing, Transitioning and Arriving" with varying degrees of fluidity. Figure 2 demonstrates how this process is ongoing, cyclical and, therefore, unlikely to be unidirectional, especially during the transitioning and arriving phases. This may be due to various internal or external factors (Boyko & Chaplin, 2011). Internal breakthroughs might concern accepting limitations due to their condition, which, in turn, influences the choice of course or, for example, developing awareness of what they can manage and advocating their needs. Internal barriers may present as unsuccessful strategies or a lack of awareness about available support. External successes could result from a smooth transition through appropriate and timely support, whereas obstacles could be due to faulty information or inappropriate provision.

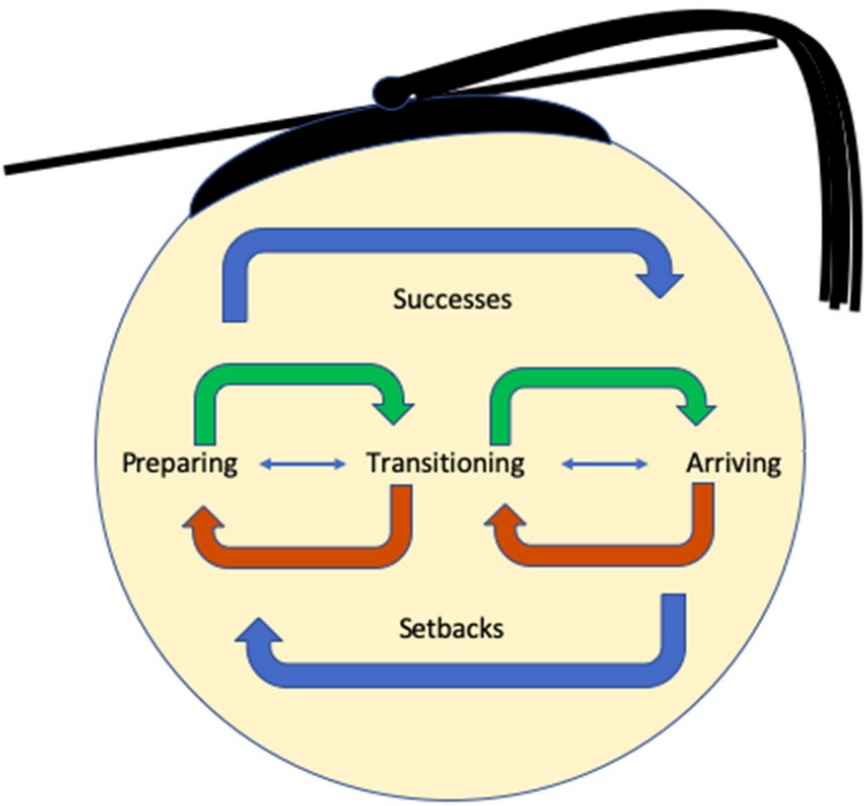

***Figure 2**. Model of explanatory theory for learners with SEND as they transition through their first year of university*

Transition is complex. As learners move along the continuum, they may modify their original intentions in response to their encounters of transitioning. Not all students experience a sense of arriving as they face further challenges, whether due to internalised self-perceptions or external barriers. This process may not be present simultaneously in all aspects of a student's life. Instead, they may achieve a sense of arriving in some areas but continue to be caught in a cycle of transition, unable to find a way to move on and out of the whirlpool (Anderson, Goodman, & Schlossberg, 2014).

Intentions and Strategies

Preparatory intentions

There were multiple intentions when preparing to apply for and start a course. Some wanted to start university for which they met the entry requirements. Others researched support that the university explicitly offered to students with their particular disability. However, the factor most commonly offered was finding a course that interested them, but more importantly, also provided employment prospects upon graduation:

> *First, I just research[ed] about it, like check[ed] the websites of the University, and I found out what the modules are and whether it can really help me in some way for jobs or career, whether it will capture my interest [and] whether I can actually cope with doing the modules. And that's how it helped me to make my decision.*
> (Student with ADD)

Starting with internet searches for courses (Diamond, Vorley, Roberts, & Jones, 2012), many identified which universities appeared to offer access for students with SEND and the kind of support provided for specific disabilities. Others sought information about the breadth of resources available, attending open days and speaking to staff or current students about the course and expectations (Winter & Chapleo, 2017):

> *I prefer smaller schools just because … there is more of a community. I think the most important factor is that they offer significant and very generous amounts of financial and mental health support as well.*
> (Student with mental health condition)

Success was most often described as acceptance on their choice of course, which validated the hard work needed to meet entry requirements and follow their dreams:

> *I guess it's always good to be accepted to a particular course because I know I have been preparing for it so much, and I know that someday I might be able to make it. And upon knowing that I have been accepted for my particular dream course, I see [it] as an opportunity to take the course that interests me the most.*
> (Student with ASD)

In preparing for their course, some students encountered setbacks. Gateway webpages of many universities gave the impression that support was only for those with physical or sensory disabilities, findings that resonate with the work by M. E. Wong (2014) conducted in Singapore. This resulted in some students not seeing themselves represented and possibly feeling they were not eligible for support:

> *When I was checking their website, they don't give a comprehensive list of who they will support. […] I don't see my condition there. […] They only say if you have physical disability or blindness, [you] can call for help, but there's nothing for people with word disorders, people with dyscalculia or people with ADHD. I don't know whether they would help me, so I just felt like maybe I don't bother.*
> (Student with ADD)

Academic intentions

Academic intentions were key drivers for many of the participants. For some, it was essential to retain consistently high grades, either due to intrinsic motivation or because it was a requirement for receiving a bursary. Some found that the university experience allowed them to transition to a different mindset, shifting from a focus on grades to the learning process, discovering new concepts, making time for exploration, and contemplating possible career paths (Rutherford, 2017). Finding a course they enjoyed, felt was of value and would lead to employment was crucial.

Apart from looking for courses that would allow them to achieve their desired academic outcomes, different strategies were employed to achieve these personal goals. Many relied on their self-advocacy skills to explain to lecturers and administrative staff what they needed to succeed (Milsom & Hartley, 2005; Peters, 2011). This sometimes included special considerations for the completion of assessment tasks. Two-way peer support (Boyko & Chaplin, 2011) was also highlighted as a valuable strategy for realising academic success.

Success could be measured through self-management (Connor, 2012) and the discovery or use of study skills strategies that helped with academic achievement (Rutherford, 2017), such as chunking tasks to help manage anxiety or pre-reading materials to prepare for lectures. For students with SEND who had mastered these skills, they did not always choose to seek disability support:

> *For me, I tried to train this thinking since young. Even in poly, even though I had extra time, I tried to finish the paper before that. I knew I [could] do it, so coming to Uni, I also wanted to give myself that challenge to complete all the papers on time, and so far, I have managed to do so.*
> (Student with dyslexia)

Some students continued to struggle with their academic intentions. For example, some seemed to have self-awareness of their condition rather than self-acceptance as they tried to act "normal" and avoided seeking assistance. This left them prone to stereotype threat (Good, Aronson, & Inzlicht, 2003), which may have led to difficulties managing workloads. For others, systemic barriers prevented learners from accessing appropriate support. For example, the lack of expertise (Yap, 2019), the narrow modes of delivery and assessment created further barriers (Fuller et al., 2004; Sanger, 2020), such as not having access to notes before a lecture or using participation grades with students who found it challenging to take part in group activities:

> *One more challenge was socialising and getting help from my classmates. I always feel that people think I'm very weird; maybe doing group work is so challenging. … I want to be a better team member, and not to disappoint others, be less distracted. I still struggle with distraction. I still struggle with procrastination.*
> (Student with ADD)

Social intentions

Having transitioned from academically rigorous institutions, many modified their objectives towards social intentions to help achieve rounded outcomes and holistic development. Several expressed the desire to seek inclusion in campus life and supportive peers. Due to previous negative experiences, several saw the start of university as an opportunity to have a fresh start (Hong, 2015; Zimmerman, 2004):

> *I know that I have these conditions, but on the other hand, I also don't want it to be an excuse for me not doing well. So, in this sense, I decided just to go to Uni clean, without any advantages or things like this.*
> (Student with dyslexia)

These students described their successes in different ways, but most often, being able to take part in campus life was essential to feel they belonged to and were part of a social group or community of practice (Meehan & Howells, 2018; Rutherford, 2017; Tobbell et al., 2020; Wenger, 1998). They might have found this from their cohort, living in university accommodation, or being part of co-curricular activities (CCA). Others felt it was beneficial to open up about their challenges as a way to raise awareness and reduce stigma:

> *I feel that this particular student group, the people there, are apparently closest to me as compared to most of my course mates. I think we tend to spend more time together mainly through certain meetings or through preparing certain events.*
> (Student with ASD)

Course design was cited as a barrier to developing friendships, especially modular course structures where the cohort changes every three months. Social setbacks were more prevalent for those with ASD, where communication barriers could lead to misunderstandings and, in some cases, bullying:

> *All these nasty comments that were mentioned behind my back is a kind of a social bullying because it's like a social conformity of wanting me to be like the rest of them.* (Student with ASD)

Expected Outcomes and Significance

Professional development

The majority explained their expected outcome was to graduate and find a job by gaining meaningful experiences relevant to the job market. This is significant since most expressed the desire to be employed and achieve financial independence after graduation, linking to the long-standing notion that Singaporeans need to be self-supporting and contribute to society (Ministry of Social and Family Development Singapore, 2012):

> *I need to gain the skills required to work in the industry because if I don't have the skills, there's no way I can survive in the industry, which is very competitive.* (Student with ASD)

Achievements in the area of professional development were seen through managing their financial situation with part-time jobs or securing bursaries. The importance of finding internships to develop their professional profile was stressed (Burgstahler, Lopez, & Jirikowic, 2007; Ebersold, 2011), as well as staying on track to graduate. At times, moving to a different academic environment meant having to adjust academic expectations, whilst others described difficulties in securing or maintaining internships due to preconceived ideas about their disability.

Personal development

Participants tended to centre on holistic gains with the aim of acquiring new experiences to develop resilience, self-worth and self-advocacy (Milsom & Hartley, 2005; Peters, 2011). Many expressed a drive to overcome challenges and desire to be accepted by their peers and lecturers. The significance of such expectations was developing independence and autonomy (Doren, Gau, & Lindstrom, 2012) and having no limits set by others:

> *It's more of sympathy, which I also sometimes feel a bit annoyed. I understand where they're coming from. I feel they mean well, but I do not want to be sympathised with*

but accepted as a person. (Student with dyslexia)

Achievements were expressed as overcoming internal barriers, persevering through challenging times and gaining independence. Developing a network of support through joining interest groups or participating in peer support groups (Batchelor, Pitman, Sharpington, Stock, & Cage, 2020) helped many feel a sense of inclusion. Other students had a contrasting experience where they felt excluded, fearing the stigma of opening up about their challenges with peers, stemming from negative past encounters. Some felt that support mechanisms were not in place (Fuller et al., 2004) or were not aware that support was available to facilitate learning and personal development:

> *I came in hoping that my mental health journey was going to be really good, and I would be safe, and it was all going to be okay. I think the reality is that it's actually been not quite so great just because of the environment, not necessarily because of the support infrastructure or anything. My goal coming into college was to really enjoy it, and my goal right now is to survive.*
> (Student with mental health condition)

Some students experienced the effect of Singapore's stress on meritocracy and academic competition as an adverse impact, compared to the support they experienced in CCA:

> *So why would they want to share so openly with you, as compared to the co-curricular activities where they are willing to veer into the area of feedback, where they know that you know if you're significantly challenged, they try to give you feedback to see how can we improve better. I think [the] CCA, in that sense, helped me a fair bit.*
> (Student with ASD)

Resource support

Resource support came from the DSO, university counsellors, external specialist organisations such as SGEnable, and the family. Not all students with SEND sought support from the DSO. However, where provisions were made, the significance was seen in accommodations provided for assessment. Universities that set up the DSO as a one-stop-shop to organise support reduced the burden on students of having to contact numerous departments. Other students found flexible study options valuable (Department of Education and Training Australia, 2017), notably, if their condition deteriorated or adjustments were needed.

Families were acknowledged as important for financial support and non-judgemental emotional and practical backing such as providing meals. However, one participant explained their parents did not understand their needs.

> *Another thing is the language barrier because [my parents] aren't great in English.*

> *They can speak English, but they aren't amazing at it. Talking about mental health requires a lot of niche terms. So, I think it's just very hard. They'll be like, "It's school that's stressful. Why are you so stressed?". I don't know how to explain it to them. It's not school, per se.*
> (Student with mental health condition)

In terms of starting the academic year, orientation programmes were helpful to meet new people and navigate the campus (Coccarelli, 2010; Kift et al., 2010). Some universities offered meet and greet sessions specifically for students registered with the DSO, often in the form of peer support groups, which provided reassurance.

Barriers to resource support were often due to a lack of cross-department communication, leaving students with the extra burden of explaining and constantly reminding staff and classmates of their needs (Milsom & Hartley, 2005; Taylor et al., 2010; Tobbell et al., 2020). When appropriate support was not available, students with SEND often found they had to work harder than their peers, resulting in not having the time to take part in social activities and exacerbating the sense of exclusion.

Financial support

Financial support was available for students with disabilities in the form of the SEN Fund, from specialist organisations in the form of grants and bursaries, and free counselling services provided by each university. Until the start of 2020, the SEN fund was available only to students with physical and sensory disabilities to pay for software, specialist equipment or services such as notetakers and interpreters (Republic of Singapore, 2020). Free counselling offered by each university provided a regular opportunity to receive help with ongoing mental health conditions for the first time:

> *Because I couldn't get help before I went to Uni, and during that time, I struggled a lot with my mental health. … I couldn't really access mental health services because they're pretty expensive.*
> (Student with mental health condition)

Blackall and colleagues suggest financial support for a broader range of AT and support services could be instrumental to the academic achievement of a student with SEND (2013). Similarly, lack of financial support to access AT could increase the financial, as well as time burden on learners with SEND (Thomas, 2015). Students remarked that the funding criteria were too restrictive because at the time of the interviews, the fund was not available to students with invisible disabilities.

The contextual reality, revealed through the voices of students with SEND as they entered university, explored the numerous successes and setbacks that the participants articulated as they reflected on the strategies used in their first year of studies and their

expected outcomes. The successes and setbacks may have derived from internal drivers or barriers. Equally, external factors contributed to the achievements or the continued challenges that students faced.

IMPLICATIONS

Some of the challenges faced by students with SEND transitioning to IHL are internal (Folkman & Moskowitz, 2004). For example, some chose not to disclose their needs based on past experiences, affirming findings from research conducted in the UK, USA and South Africa (Beckett & Glazzard, 2019; Burgstahler & Doe, 2006; Vergunst & Swartz, 2020). This likely made it difficult for IHL to anticipate support mechanisms needed. Although the quality and level of support provided differed widely across the autonomous universities in Singapore, there are a number of implications based on the feedback from students and emergent evidence of successful and beneficial practice that could be replicated across IHL more consistently.

Institutional infrastructure

Students derive a sense of belonging from the college climate. Creating a welcoming atmosphere can be fostered through a physical environment that is clean, well-maintained and accessible. It is clear that varied and multiple spaces are needed to meet differing needs. Examples include "natural restorative" spaces to allow students to escape (Winter & Chapleo, 2017, p. 195), quiet, safe places for students to manage sensory overload, and areas where students can rest between classes when physical exhaustion is a factor.

As we all rely more heavily on ICT, institutions need to consider keeping their systems up to date and compatible in an attempt to achieve accessible (Burgstahler, 2015b) and seamless navigation. This entails regular training for staff so that faculty can use learning management systems and teaching tools to their full potential.

Institutional policies and practices

First impressions are essential (Winter & Chapleo, 2017). Although students are unlikely to base their choice of university solely on information found on university websites (Diamond et al., 2012), the internet is often the starting point and repeatedly returned to during the decision-making process. Visibility of services for students with SEND need refinement and enhanced targeting to improve communication with greater clarity and reach (C. Brown, Varley, & Pal, 2009). Relevant webpages need to be easily navigable (Harvey & Maruca, 2020) and provide more concise and broader ranging information about the disabilities and challenges supported; not only to identify services provided but also to address specific concerns (Beckett & Glazzard, 2019; Wong, 2014), sending the message that it is safe to raise anxieties or ask for help.

At a policy level, if the Government aims to increase educational pathways and hence diversity, institutions need to conduct research to understand the effectiveness of policies, resources and support so that measures can be tested and refined (Moody & Thomas, 2020). For example, systematic collection of statistical data about the number of students with SEND enrolling and graduating from university may help institutions make comparisons with the non-disabled population in order to investigate and address discrepancies (Ebersold, 2011). Such data would also be valuable at a global level as the UN aims to attain its commitment to the Sustainable Development Goals (United Nations, n.d.).

On a practical level, greater efforts could be made to streamline systems for registration with the DSO. This was evidenced through participants' experiences of bureaucratic gatekeeping, requiring students to have, for example, medical certificates to authenticate their claims (Mann & Burkinshaw, 2017), even though they had received assessments and support through school. Institutional policies should be developed to avoid inconsistencies between schools on accommodations and to improve cross-faculty communication (Taylor et al., 2010). It is vital that each department understands its role in supporting a student. If the DSO operates as the one-stop-shop and point of contact, this may avoid unresolved student requests for support passing back and forth between academic and administrative departments.

Institutions have a responsibility for the experience and success of students with SEND in higher education. Course design and flexible practices can help students to feel included (Gale & Parker, 2014; Grace & Gravestock, 2008; Tobbell et al., 2020). Courses could be reconceptualised to address the time needed for completion if a student with SEND cannot carry a standard full-time load. Alternative options could be offered, such as nested courses so that students have options to exit a course with meaningful qualifications (Department of Education and Training Australia, 2017, p. 9). Rigid practices, such as attendance requirements and modes of assessment, reduce the sense of autonomy (Tobbell et al., 2020) and may increase levels of anxiety. Offering a range of assessment modes to choose from to demonstrate learning may reduce the need for separate accommodations for students with SEND (Sanger, 2020; Thomas, 2015).

Assumptions that students move directly from school to university need to be dispelled (Baker & Irwin, 2021). Given that educational pathways to university have increased in Singapore, not all learners arrive with the necessary study skills (Rutherford, 2017). With successes of pre-commencement interviews to evaluate preparedness for study (Wood, Gray-Ganter, & Bailey, 2016) and extended orientation programmes (Raw et al., 2015), similar study skills programmes could be offered, which research suggests are most effective when provided before the start of the course or when embedded into the course structure (Jairam, 2020).

Since employment was a significant consideration for participants, many felt there should be more resources provided for both course and career advice (Blackall et al., 2013; Burgstahler et al., 2007; Ebersold, 2011). Specific disabilities may restrict students' course or module choices, and as a consequence, individuals might need more careful counselling over selection and workloads. Frustration was expressed at the lack of options for internships, implying limited employment opportunities in the future. IHL need to develop their relationships with industry, as well as Social Service Agencies to increase accessibility to relevant work experiences; a goal that the Singapore Government and organisations have voiced (Ministry of Social and Family Development Singapore, 2016).

Professional development

Professional development in two specific areas was highlighted in the interview data: training DSO staff and raising awareness amongst faculty and students. Although described as kind and approachable, participants often felt that DSO staff did not have the skills and knowledge or the time to effectively support students with varying needs. These findings are echoed in a similar study exploring perspectives of staff working as DSO at IHL in Singapore. Interviews with staff identified a number of issues, including; lack of manpower; staff having multiple responsibilities and functions; expressed needs for professional development; improved coordination between internal departments (Yap, 2019). Developing the role of the DSO with clear parameters, training and careers paths may help in these areas.

Regular and continued awareness-raising was also deemed essential to improve teaching and learning approaches and increase the confidence of academic and support staff in working with students with SEND. As attitudes towards disability in Singapore remain largely ill-informed, with the majority not knowing how to interact (Lien Foundation, 2016), staff need to learn to ask and to listen to students with SEND about their needs (Fuller et al., 2004) in a confidential and respectful manner. For example, lecturers should be mindful to give students access to teaching materials before a session to help with familiarisation of a topic or specialist language. As awareness of diverse needs increases, using the proactive approach of UDL may help to mitigate many of the negative experiences expressed by students (Burgstahler, 2015a; Carballo et al., 2019; Lemm & Lee, 2019; Sanger, 2020) and being treated as a "separate species" (Reeve, 2014, p. 107) or as someone with "separate educational needs" (TEDx, 2015).

Inclusion for students meant academic and non-academic support (Boyko & Chaplin, 2011) to develop a sense of belonging (Meehan & Howells, 2018; Thomas, 2015) and the desire to have the time, energy and finances to be able to participate in socially inclusive activities and develop relationships with their peers and staff. Caldwell describes belonging as "a place of safety, a place or community we recognise and in

which we feel recognised, valued – and to which we can contribute" (2017, p. 242). This is possible through positive and continued communication (Tobbell et al., 2020). Participants' criticisms of multiple or tight deadlines and modular course structures imply that time is insufficient to develop rapport in short courses. With a focus on retention of learners, teaching and support staff need to create "conditions, opportunities, and expectations for ... engagement to occur" (Thomas, 2015, p. 147). This may include the adoption of transition pedagogy (Nelson et al., 2014), pre-commencement interviews (Wood et al., 2016) and the use of ice-breakers and "getting to know you" activities to develop rapport and encourage inclusive learning environments, as well as the need to continue to reach out and check in with students rather than assuming they are coping with student life.

Funding

Funding to support students with SEND should encompass resources, personnel, and grants (Department of Education and Training Australia, 2017; Kift et al., 2010; King, 2014; Raw et al., 2015; Wood et al., 2016). Being forced to source their own resources places a significant time burden on students with SEND, contributing to a consensus among participants that there is a need for more substantial numbers of personnel. DSO not only need time to work with students but also to keep up to date with technologies and inclusive practices to offer relevant support and ensure IHL have the appropriate infrastructure to support AT as part of Singapore's dream of becoming a "Smart Nation" (Republic of Singapore, 2015, p. 12).

The narrow criteria for accessing the SEN Fund should be reconceptualised to address whatever AT is necessary to participate academically. Although the fund's scope has been recently broadened, examples of students unable to make full use of the fund because they did not have assistive devices challenges the inclusivity of the SEN Fund as it currently operates. It should include all aids to assist life as a student, not just learning, so that addressing needs can be considered under one fund rather than having to access multiple sources.

Discrepancies in the criteria and allocation of the SEN Fund, such as excluding part-time students, are likely a result of universities internally allocating the funds in their budget and assuming that these students are working and can fund their own needs. These incongruities support the argument that the fund should come under the MOE's auspices to reduce inconsistencies in allocation (Republic of Singapore, 2016). Finally, thresholds for funding should be reconsidered to be more realistic for specific groups to allow full participation in academic and social university life.

LIMITATIONS AND FUTURE RESEARCH

Although recruitment of participants was purposive, it relied on specialist organisations'

full consent to advertise the study to relevant recruits through specialist support sites and snowball recruitment. Participation was self-selected, preventing researcher bias in the recruitment process. However, recruitment relied on prospective participants becoming aware of the study and choosing to opt-in. Experiences at only five of the six autonomous universities are reflected in this study and neither was it possible to interview students who had started but quit their course. However, it was possible to interview participants with SEND who had chosen not to register or use the services of the DSO, adding a perspective as to why they had made this decision.

Given the limitations of the study, some areas could be considered for future research. As Singapore begins to collect more data about the numbers of people living with disability through the ten-yearly census, it may encourage the collection of quantitative data about students with disabilities continuing their studies at IHL, such as numbers, type of impairment, and retention and graduation rates. Since levels of attrition tend to be higher for students with SEND, locating participants who dropped out of their university studies may allow researchers to gain an understanding of the factors that contribute to such learners withdrawing from their studies. The recency of peer support groups set up in IHL to support mental wellbeing would be a further research area to explore the effectiveness in reducing stereotypes and creating more open and safe environments to discuss emotional needs (Batchelor et al., 2020).

CONCLUSION

It is interesting to note that the students' experiences in this study are not dissimilar to students with disabilities at university in other countries. Aspirations, such as wanting to study a subject that interests them, graduate, and find employment, as well as challenges encountered, seem to mimic many experienced by students with disabilities in the UK, for example (Blackall et al., 2013; Fuller et al., 2004).

It is hoped that government authorities, administrators and educators will enhance their knowledge base about the support needs of these students to address challenges of institutional infrastructure, institutional policies and practice, professional development needs and funding, as well as spark interest, to continue research in this field.

Professor Chan Heng Chee's analysis of the 2020 Singapore general election described the voting population as wanting "a kinder, gentler politics with support for diverse voices" (Yuen, 2020). As more learners with disabilities reach university, their future expectations are burgeoning, which warrants more consistent and coherent development in support and provision for these students. Maybe now is the time for the Singapore Government to update Article 12 of the Constitution so that people with disabilities are expressly included and protected under the forbidden classifications for discrimination.

REFERENCES

Anderson, M., Goodman, J., & Schlossberg, N. K. (2014). *Counseling adults in transition: Linking Schlossberg's theory with practice in a diverse world* (4th ed.). Springer Publishing Company.

Baker, S., & Irwin, E. (2021). Disrupting the dominance of 'linear pathways': How institutional assumptions create 'stuck places' for refugee students' transitions into higher education. *Research Papers in Education, 36*(1), 75–95. https://doi.org/10.1080/02671522.2019.1633561

Batchelor, R., Pitman, E., Sharpington, A., Stock, M., & Cage, E. (2020). Student perspectives on mental health support and services in the UK. *Journal of Further and Higher Education, 44* (4), 483–497. https://doi.org/10.1080/0309877X.2019.1579896

Beckett, J. P., & Glazzard, J. (2019). Negotiating the challenges of social work training and being diagnosed with dyslexia. *Asia Pacific Journal of Developmental Differences, 6*(2), 262–280. https://doi.org/10.5330/PSC.n.2012-16.49

Blackall, H.-L., Peterson, P., Hollowell, J., Shah, N., Selvakumaran, M., Baily, L., ... West, L. (2013). University challenge 2013: *The Trailblazers' higher education report.* Trailblazers Young Campaigners' Network. Retrieved from http://www.musculardystrophyuk.org/wp-content/uploads/2015/01/University-challenge-2013-updated.pdf

Blackledge, D., & Hunt, B. (1985). *Sociological interpretations of education*. Routledge.

Boyko, L., & Chaplin, E. K. (2011). *Students with learning disabilities: Access to higher education in Canada.* Higher Education Group, Ontario Institute for Studies in Education, University of Toronto. Retrieved from https://www.researchgate.net/publication/270823822

Brock, T. (2010). Young adults and higher education: Barriers and breakthroughs to success. *The Future of Children, 20*(1), 109–132. https://doi.org/10.1353/foc.0.0040

Brown, C., Varley, P., & Pal, J. (2009). University course selection and services marketing. *Marketing Intelligence and Planning, 27*(3), 310–325. https://doi.org/10.1108/02634500910955227

Brown, N., & Leigh, J. (2018). Ableism in academia: Where are the disabled and ill academics? *Disability & Society, 33*(6), 985–989. https://doi.org/10.1080/09687599.2018.1455627

Burgstahler, S. (2015a). Equal access: Universal design of instruction. Retrieved August 4, 2018, from https://www.washington.edu/doit/equal-access-universal-design-instruction

Burgstahler, S. (2015b). Opening doors or slamming them shut? Online learning practices and students with disabilities. *Social Inclusion, 3*(6), 69–79. https://doi.org/10.17645/si.v3i6.420

Burgstahler, S., & Doe, T. (2006). Improving postsecondary outcomes for students with disabilities: Designing professional development for faculty. *Journal of Postsecondary Education & Disability, 18*(2), 135–147. Retrieved from http://www.rrtc.hawaii.edu

Burgstahler, S., Lopez, S. T., & Jirikowic, T. (2007). *Creating a transition program for teens: How DO -IT does it, and how you can do it, too.* University of Washington. Retrieved from https://www.washington.edu/doit/book/export/html/1443

Caldwell, P. (2017). Belonging. In K. Soldatic & K. Johnson (Eds.), *Disability and rurality: Identity, gender and belonging* (pp. 233–243). Routledge.

Carballo, R., Cotán, A., & Spinola-Elias, Y. (2019). An inclusive pedagogy in Arts and Humanities university classrooms: What faculty members do. *Arts and Humanities in Higher Education, 0*(0), 1–21. https://doi.org/10.1177/1474022219884281

Coccarelli, J. L. (2010). Applying Schlossberg's transition theory to students with learning disabilities in the transition from high school to college.

Connor, D. J. (2012). Helping students with disabilities transition to college. *TEACHING Exceptional Children, 44*(5), 16–25. https://doi.org/10.1177/004005991204400502

Department of Education and Training Australia. (2017). *Final report: Improving retention, completion and success in higher education. Higher Education Standards Panel.* Australian Government. Retrieved from http://apo.org.au/system/files/175811/apo-nid175811-796616.pdf

Diamond, A., Vorley, T., Roberts, J., & Jones, S. (2012). *Behavioural Approaches to Understanding Student Choice.* The Higher Education Academy. Retrieved from https://www.heacademy.ac.uk/system/files/resources/student_choice.pdf%0Ahttp://www.heacademy.ac.uk/assets/Documents/research/Student_Choice.pdf

Doren, B., Gau, J. M., & Lindstrom, L. E. (2012). The relationship between parent expectations and postschool outcomes of adolescents with disabilities. *Exceptional Children, 79*(1), 7–23. https://doi.org/10.1177/001440291207900101

Ebersold, S. (2011). *Inclusion of students with disabilities in tertiary education and employment.* Organisation for Economic Co-operation and Development. https://doi.org/10.1787/9789264097650-en

Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology, 55*, 745–774. https://doi.org/10.1146/annurev.psych.55.090902.141456

Fuller, M., Healey, M., Bradley, A., & Hall, T. (2004). Barriers to learning: A systematic study of the experience of disabled students in one university. *Studies in Higher Education, 29*(3), 303–318. https://doi.org/10.1080/03075070410001682592

Gale, T., & Parker, S. (2014). Navigating change: A typology of student transition in higher education. *Studies in Higher Education, 39*(5), 734–753. https://doi.org/10.1080/03075079.2012.721351

Good, C., Aronson, J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Journal of Applied Developmental Psychology, 24*(6), 645–662. https://doi.org/10.1016/j.appdev.2003.09.002

Grace, S., & Gravestock, P. (2008). *Inclusion and diversity: Meeting the needs of all students*. Routledge.

Harvey, B., & Maruca, R. (2020). Creating a supportive mental health environment. *Ivey Business Journal, 97*(27), 2–4. https://doi.org/10.1021/cen-09727-feature4

Hong, B. S. S. (2015). Qualitative analysis of the barriers college students with disabilities experience in higher education. *Journal of College Student Development, 56*(3), 209–226. https://doi.org/10.1353/csd.2015.0032

Jairam, D. (2020). First-year seminar focused on study skills: An ill-suited attempt to improve student retention. *Journal of Further and Higher Education, 44*(4), 513–527. https://doi.org/10.1080/0309877X.2019.1582757

Kift, S., Nelson, K., & Clarke, J. (2010). Transition pedagogy: A third generation approach to FYE - A case study of policy and practice for the higher education sector. *The International Journal of the First Year in Higher Education, 1*(1), 1–20. https://doi.org/10.5204/intjfyhe.v1i1.13

King, J. (2014). *Retention of undergraduate students with disabilities at the University of Washington*.

Lemm, K., & Lee, J. (2019). Early experiences of diversity in the Yale-NUS classroom. In C. S. Sanger, N. W. Gleason, & L. Seah (Eds.), *Diversity & inclusion in curriculum and classroom: A community resource for Yale-NUS faculty and international liberal arts educators* (pp. 74–

94). Yale NUS College: Centre for Teaching & Learning.
Lien Foundation. (2016). *Inclusive attitudes survey part 1: Views of the general public.* Retrieved from http://www.lienfoundation.org/sites/default/files/FINAL - Inclusive Attitudes Survey Part 1_30May16.pdf
Mann, V. E., & Burkinshaw, H. N. T. (2017). The SpLD tutorial as a third space. In S. M. Rutherford (Ed.), *Informal learning: Perspectives, challenges and opportunities* (pp. 115–134). Nova Science Publishers. https://doi.org/10.1016/j.arthro.2012.05.044
Matthews, N. (2009). Teaching the "invisible" disabled students in the classroom: Disclosure, inclusion and the social model of disability. *Teaching in Higher Education, 14*(3), 229–239. https://doi.org/10.1080/13562510902898809
Meehan, C., & Howells, K. (2018). 'What really matters to freshers?': Evaluation of first year student experience of transition into university. *Journal of Further and Higher Education, 42*(7), 893–907. https://doi.org/10.1080/0309877X.2017.1323194
Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE. https://doi.org/10.1080/0140528790010406
Milsom, A. (2007). Interventions to assist students with disabilities through school transitions. *Professional School Counseling, 10*(3), 273–278. https://doi.org/10.1177/2156759X0701000309
Milsom, A., & Hartley, M. T. (2005). Assisting students with learning disabilities transitioning to college: What school counselors should know. *Professional School Counseling, 8*(5), 436–441. Retrieved from JSTOR
Ministry of Education Singapore. (2017). *Post-secondary education: Pursuing pathways that fit your interests, abilities and passions* (pp. 1–17). pp. 1–17. [Brochure]. Retrieved from https://beta.moe.gov.sg/uploads/post-secondary-brochure.pdf
Ministry of Education Singapore. (2018). *Education statistics digest 2018.* Singapore Government. Retrieved from https://www.moe.gov.sg/docs/default-source/document/publications/education-statistics-digest/esd_2018.pdf
Ministry of Social and Family Development Singapore. (2012). *Enabling Masterplan 2012-2016*. Singapore Government. Retrieved from https://www.msf.gov.sg/policies/Disabilities-and-Special-Needs/Pages/default.aspx
Ministry of Social and Family Development Singapore. (2016). *3rd Enabling masterplan 2017-2021*. Singapore Government. https://doi.org/10.15713/ins.mmj.3
Moody, J., & Thomas, L. (2020). *Increasing diversity: Tackling underrespresentation of protected student groups in higher education*. Advance HE. https://doi.org/10.1021/cen-v081n005.p030
Morgan, H., & Houghton, A.-M. (2011). *Inclusive curriculum design in higher education: Considerations for effective practice across and within subject areas.* Higher Education Academy. Retrieved from https://www.heacademy.ac.uk/sites/default/files/resources/introduction_and_overview.pdf
Morse, J. M. (2007). Sampling in grounded theory. In A. Bryant & K. Charmaz (Eds.), The *SAGE handbook of grounded theory* (pp. 229–244). London, UK: SAGE. https://doi.org/10.4135/9781848607941
Nelson, K., Creagh, T., Kift, S., & Clarke, J. (2014). *Transition pedagogy handbook: A good practice guide for policy and practice in the first year experience at QUT* (2nd ed.). Retrieved from https://eprints.qut.edu.au/76333/1/Transition_Pedagogy_Handbook_2014.pdf
Office of Special Education Programs. (2005). *Family involvement in the educational development of youth with disabilities: A special topic report of findings from the National Longitudinal*

Transition Study-2 (NLTS2). U.S. Department of Education. Retrieved from http://www.nlts2.org/reports/2005_03/nlts2_report_2005_03_complete.pdf

Oliver, M. (1990, July 23). The individual and social models of disability. *[Paper Presention] Joint Workshop of the Living Options Group and the Research Unit of the Royal College of Physicians.* Retrieved from http://disability-studies.leeds.ac.uk/files/library/Oliver-in-soc-dis.pdf

Oram, D. (2018). Losing sight of land: tales of dyslexia and dyspraxia in psychophysical actor training. *Theatre, Dance and Performance Training, 9*(1), 53–67. https://doi.org/10.1080/19443927.2017.1415955

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). SAGE.

Penn-Edwards, S., & Donnison, S. (2014). A fourth generation approach to transition in the first year in higher education: First year in higher education community of practice (FYHECoP). *The International Journal of the First Year in Higher Education, 5*(51), 1838–2959. https://doi.org/10.5204/intjfyhe.v5i1.190

Peters, J. (2011). *Transition skills of first-year college students with learning disabilities*.

Punch, K., & Oancea, A. (2014). *Introduction to research methods in education* (2nd ed.). SAGE.

Raw, L., Tonkin, A., Peterson, R., & Jones, A. (2015). Transition pedagogy for an undergraduate, case-based learning medical program. *The International Journal of the First Year in Higher Education, 6*(1), 23–34. https://doi.org/10.5204/intjfyhe.v6i1.228

Reeve, D. (2014). Part of the problem or part of the solution? How far do 'reasonable adjustments' guarantee 'inclusive access for disabled customers'? In K. Soldatic, H. Morgan, & A. Roulstone (Eds.), *Disability, Spaces and Places of Policy Exclusion* (pp. 99–114). London: Routledge.

Republic of Singapore. *Compulsory Education Act. ,* (2000). https://sso.agc.gov.sg/Act/CEA2000.

Republic of Singapore. (2014). *In Parliamentary Debates*. Twelfth Parliament, 10 March 2014, 11, (Sim Ann, Minister of State for Education and Communications and Information). Retrieved from https://sprs.parl.gov.sg/search/fullreport?sittingdate=10-03-2014

Republic of Singapore. (2015). *In Parliamentary Debates*. Twelfth Parliament, 14 July 2015, 21, (Tan Chuan-Jin, Minister for Social and Family Development). Retrieved from https://sprs.parl.gov.sg/search/fullreport?sittingdate=14-07-2015

Republic of Singapore. (2016). *In Parliamentary Debates*. Thirteenth Parliament, 08 April 2016, 15, (Ng Chee Meng, Acting Minister for Education). Retrieved from https://sprs.parl.gov.sg/search/fullreport?sittingdate=08-04-2016

Republic of Singapore. (2020). *In Parliamentary Debates*. Thirteenth Parliament, 03 March 2020, 123, (Denise Phua Lay Peng, Member for Jalan Besar). Retrieved from https://sprs.parl.gov.sg/search/fullreport?sittingdate=03-03-2020

Rigler, M. (2013). *The retention of college students with disabilities: What encourages them to stay in college?*

Rueschemeyer, D. (2009). Usable theory: Analytic tools for social and political research. Princeton University Press.

Rutherford, S. M. (2017). Rules of the game: Informal learning and the development of identity during the transition to higher education. In S. M. Rutherford (Ed.), *Informal learning: Perspectives, challenges and opportunities* (pp. 135–174). Nova Science Publishers.

Sanger, C. S. (2020). Inclusive pedagogy and Universal Design approaches for diverse learning environments. In C. S. Sanger & N. W. Gleason (Eds.), *Diversity and inclusion in global higher education: Lessons from across Asia* (pp. 31–71). Palgrave Macmillan. https://doi.org/10.4324/9781315797885

Siau, M. E. (2014, March 8). Support offices on campus for special needs students. *TODAYonline*. Retrieved from https://www.todayonline.com

Taylor, M., Baskett, M., & Wren, C. (2010). Managing the transition to university for disabled students. *Education + Training, 52*(2), 165–175. https://doi.org/10.1108/00400911011027743

TEDx. (2015, January 12). *Isn't it a pity? The real problem with special needs* | Torrie Dunlop [Video]. Retrieved from https://www.youtube.com/watch?v=UJ7QaCFbizo

Thomas, L. (2015). Developing inclusive learning to improve the engagement, belonging, retention, and success of students from diverse groups. In M. Shah, A. Bennett, & E. Southgate (Eds.), *Widening higher education participation: A global perspective* (pp. 135–159). Chandos Publishing. https://doi.org/10.1016/B978-0-08-100213-1.00009-3

Tobbell, J., Burton, R., Gaynor, A., Golding, B., Greenhough, K., Rhodes, C., & White, S. (2020). Inclusion in higher education: An exploration of the subjective experiences of students. *Journal of Further and Higher Education, 0*(0), 1–12. https://doi.org/10.1080/0309877X.2020.1753180

United Nations. (n.d.). Education - United Nations Sustainable Development. Retrieved February 4, 2019, from Sustainable Development Goals website: https://www.un.org/sustainabledevelopment/education/

Vergunst, R., & Swartz, L. (2020). Experiences with supervisors when students have a psychosocial disability in a university context in South Africa. *Teaching in Higher Education, 0*(0), 1–14. https://doi.org/10.1080/13562517.2020.1730784

Wenger, E. (1998). Communities of practice: Learning, meaning and identity. Cambridge University Press.

Winter, E., & Chapleo, C. (2017). An exploration of the effect of servicescape on student institution choice in UK universities. *Journal of Further and Higher Education, 41*(2), 187–200. https://doi.org/10.1080/0309877X.2015.1070400

Wong, M. E. (2014). Support for students with visual impairment in higher education in Singapore: Considering university publicity materials. *CAISE Review, 2,* 62–76. https://doi.org/http://dx.doi.org/10.12796/caise-review.2014V2.008

Wood, D., Gray-Ganter, G., & Bailey, R. (2016). Pre-commencement interviews to support transition and retention of first year undergraduate students. *Student Success, 7*(2), 21–31. https://doi.org/10.5204/ssj.v7i2.338

Yap, A. (Ed). (2019). *Perspectives on disability support at institutes of higher learning in Singapore*. Singapore Management University.

Yuen, S. (2020, July 16). Voters want a kinder, gentler politics, says Chan Heng Chee. *The Straits Times*. Retrieved from https://www.straitstimes.com

Zimmerman, G. M. (2004). *A study of the organizational factors influencing the access of students with psychiatric disabilities to disability support services*.

Asia Pacific Journal of Developmental Differences
Vol. 9, No. 1, January 2022 pp. 143—153
DOI: 10.3850/S2345734122000157

The effectiveness of phonemic awareness intervention in student with dyslexia

Rexsy Taruna[1*]

1 *STIKes Mercubaktijaya, Padang, Indonesia*

Abstract

The purpose of this research project was to determine the impact direct instruction in phonemic blending would have on improving phonemic blending, phonic and word reading fluency. Five dyslexic students, four boys and one girl, between 7 years and 9 years received an individually adjusted phonemic blending intervention. Phonemic awareness or blending intervention was given by a speech therapist twice a week during the intervention phase (60 minutes per session; 16 sessions; 960 minutes). All five dyslexic students in this study developed phonemic blending, phonic and word reading fluency as a result of an individually adjusted phonemic awareness intervention.

Keywords: dyslexia; phonological awareness; phonemic awareness; phonemic blending; phonic

* *Correspondence to:*
Rexsy Taruna, Speech Therapy Program STIKes Mercubaktijaya, Padang, Indonesia Email: rexsytaruna@mercubaktijaya.ac.id

INTRODUCTION

Written language skills are very important for a student in the context of education. Unfortunately, some students have low academic achievement because their reading ability levels are not on a par with their peers. This condition is known as a specific learning disorder with impairment in reading or dyslexia (APA, 2013). Dyslexia is a language-based learning disability that has a negative impact on academic achievement, characterized by specific difficulties in accurate and/or fluent word recognition and by poor spelling and decoding abilities (APA, 2013). These difficulties are not be attributable to low intelligence, lack of educational opportunities, socio-cultural environment, or obvious neurological deficits (Navas, Ferraz,, & Borges, 2014).

Phonological awareness deficits are a major cause of reading disorders in dyslexia (Melby-Lervåg, Lyster, & Hulme, 2012; Knoop-van Campen, Segers, & Verhoeven, 2018). Phonological awareness deficits that affect reading and spelling accuracy do not only occur in children who speak English, but also occur in children who use Bahasa Indonesia (Jap, Borleffs, & Maassen, 2017). This happens because Bahasa Indonesia has a high level of orthographic transparency with an almost one-to-one grapheme-to-phoneme correspondence, except for the letter "e," which has two sound forms "ə" (səpeda/bicycle) and "e" (meja/table) (Winskel & Widjaja, 2007).

Phonological awareness is the umbrella term that refers to the ability to identify, discriminate, and manipulate oral language units at the word, syllable, and phoneme level (Mather & Wendling, 2012). Phonological awareness is crucial in learning to read, especially phonemic awareness (Melby-Lervåg, Lyster, & Hulme, 2012). Phonemic awareness is a subset of phonological awareness that refers specifically to the ability to blending, segmenting, and manipulate the phoneme within words (Hulme et al, 2012). For instance, the word pulau has four sounds or phonemes; /p/ /u/ /l/ /aw/. Phonemic awareness is of awareness of sounds, not letters. The word pulau has five letters, but we hear only four phonemes when the word is spoken.

Phonemic awareness contributes to the accurate acquisition of word reading, nonword reading and spelling skills. It helps student understand grapheme–phoneme correspondence (Mather & Wendling, 2012; Torgesen & Mathes, 2000). Therefore, it is very important for dyslexic students to receive systematic phonemic interventions because this type of interventions make a significant difference in reading ability (Melby-Lervåg, Lyster, & Hulme, 2012; Layes, Lalonde, & Rebai, 2015; Bishop & Snowling, 2004).

METHOD

Participants

The participants were recruited from the Speech Therapy Practice at Pekanbaru, Riau.

The inclusion criteria were:

- Age 7 – 9 years
- Using Bahasa Indonesia
- Dyslexia with or without developmental language disorders
- The diagnostic criteria for dyslexia in this study consisted of specific difficulties in accurate and/or fluent word recognition and poor spelling and decoding abilities
- The diagnostic criteria for developmental language disorders in this study consists of specific difficulties in receptive and/or expressive language and by average performance in nonverbal intelligence based on psychologist diagnostic report
- Phonological blending ability at the syllable level

All five student, four boys and one girls, age 7 years 0 month to 9 years 11 month fulfilled the inclusionary criteria.

Instrument(s)

Phonemic blending, phonic and word reading fluency were measured using the Asesmen Membaca Awal (Early Reading Assessment). Asesmen Membaca Awal (Early Reading Assessment) is a criterion-referenced test, using Indonesian language.

- **Phonological blending**—Phonemic blending is a test that aims to identify a child's ability to combine sounds into a word. This test consists of 10 items with various Indonesian syllable patterns. A score of 1 is given to items that are answered correctly and a score of 0 is given to an incorrect response.

- **Phonic**—Phonic is a test that aims to identify a child's ability to name letters based on their sounds. This test has 30 items consisting of vowels, consonants, and diphthongs in Indonesian. A score of 1 is given to items that are answered correctly and a score of 0 is given to an incorrect response.

- **Word reading fluency**—Word reading fluency is a test that aims to assess a child's ability to read words accurately and quickly. This test has 20 items consisting of various Indonesian syllable patterns. A score of 1 is given to items that are answered correctly and a score of 0 is given to an incorrect response.

- **Data collection procedures**—This study. This study has a single-subject multiple-baseline design across behaviours replicated across five participants. The baselines were established by measuring the dependent variables on two occasions (twice a week) prior to the intervention. Phonemic awareness or blending intervention was given by a speech therapist twice a week during the intervention phase (60 minute per session; 16 session; 960 minute). The dependent variables were measured every

therapy session. All dependent variables were measured on two occasions (twice a week) post-intervention and at a follow-up 1 month later.

Table 1: Sample Instructional Sequence of Phonemic Blending

Instructional feature	**What to do**	**Explicit instruction**
Introduce the activity	Show students the puppet and explain the task.	"This is our puppet, Buster. He's still learning how to blend the sounds in words, so you're going to show him how to do it. He'll say the sounds in a word and you say the whole word."
Model explicit examples	Use the puppet to present the phonemes.	Have the puppet say /p/ /u/ /l/ /aʷ/, then you say, *"pulau (island)"* Continue with in.
Provide students opportunities	Provide group turns on the remaining items in the instructional set	"Now Buster will say the sounds and you tell him the whole word. "Have the puppet say /p/ /i/ /s/ /aʷ/, then ask, "What word did you hear? *pisau (knife).* Repeat with remaining items in set.
Assess understanding	Provide individual turns. Present items in a different order than previously introduced.	Follow procedures for providing students opportunities
Ongoing assessment and feedback	Provide feedback during group and individual practice: Model the correct response, have students repeat the correct response, and review the item at least twice more or until students are sure of the correct response.	Provide feedback on blending. If a student says a phoneme or the whole word incorrectly, tell them the word, repeat the phonemes and whole word, say the phonemes again, and have them repeat the whole word. "The word is *pulau*. /p/ /u/ /l/ /aʷ/, *pulau*. Now you try. /p/ /u/ /l/ /aʷ/." *Pulau.* "Yes, *pulau*."
Review	Provide individual turns on today's target sound.	Follow procedures for providing students opportunities

In this study, the researcher uses the phonemic blending intervention (blending phoneme by phoneme) protocol from The University of Texas Center for Reading & Language Arts/ UTCRLA (2004). The selection of this intervention protocol is based on the criteria as follows; (1) explicit, direct instruction that is systematic, sequential, and cumulative; (2) individualized instruction that meets the specific learning needs of each student (3) intensive, highly concentrated instruction that maximizes student engagement; and (4) multisensory instruction (UTCRLA, 2004).

Data analysis

Analysis descriptive and paired samples t-test was conducted to evaluate the difference between the pretest and posttest scores.

RESULTS

Five student with dyslexia were included in the study (Table 2). Based on descriptive analysis, the difference in pretest and posttest scores is known on each dependent variable (Table 3). These differences can also be seen in Figure 1 – Figure 3 (Descriptives Plots). Furthermore, the paired samples t-test analysis showed that there was a significant difference between the pretest phonemic blending and the posttest phonemic blending ($t = -8.573$; $p < 0.01$), pretest phonic and posttest phonic ($t = -17.493$; $p < 0.01$), pretest word reading fluency and post test reading fluency ($t = -12.944$; $p < 0.01$).

Table 2. Participants

	Subject I	**Subject II**	**Subject III**	**Subject IV**	**Subject V**
Age	7 years	7 years	7 years	7 years	9 years
Gender	Male	Male	Male	Male	Female
Dyslexia	Without DLD	Without DLD	Without DLD	With DLD	With DLD

Table 3. Descriptive Analysis

	Pretest PB	**Posttest PB**	**Pretest Phonic**	**Posttest Phonic**	**Pretest WRF**	**Posttest WRF**
N	5	5	5	5	5	5
Mean	0.800	5.000	3.000	23.400	3.600	10.200
SD	0.447	1.225	1.000	3.362	1.140	1.304

Note. PB (phonemic blending); NWF (word reading fluency)

Table 4. Results of the paired samples t-test

Pretest	Posttest	*t*	*p*
Phonemic blending	Phonemic blending	-8.573	<.0.001
Phonic	Phonic	-17.493	<.0.001
Word reading fluency	Word reading fluency	-12.944	<.0.001

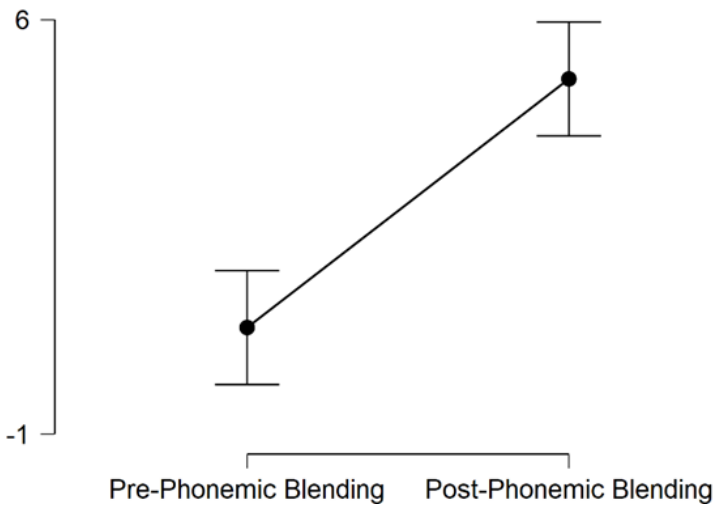

Figure 1. Descriptives Plots of Phonemic Blending

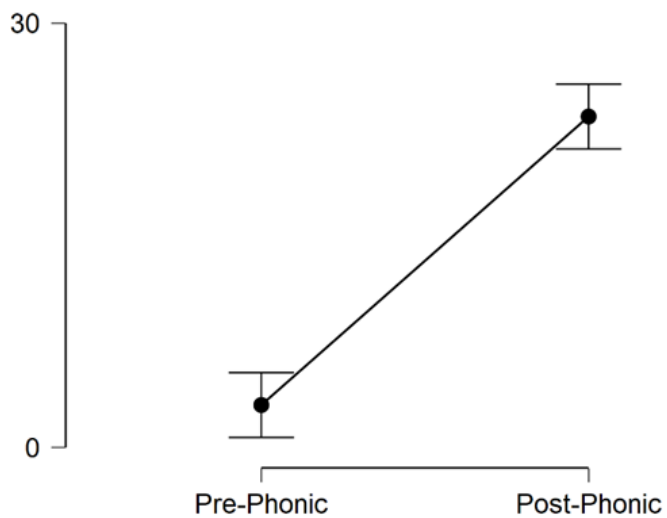

Figure 2. Descriptive Plots of Phonic

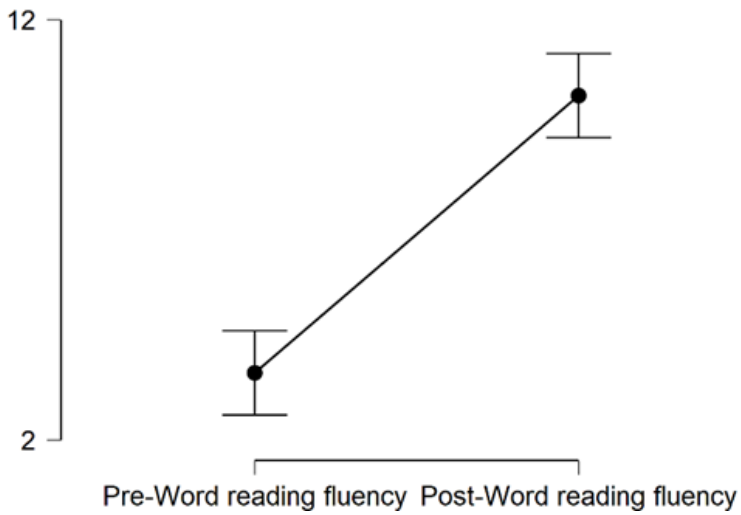

Figure 3. Descriptives Plots of Word Reading Fluency

Subject I-III: Dyslexia only

The first to third participants in this study were students with dyslexia without comorbid developmental language disorders. In Figures 4 to 6, it can be seen that there is an increase in phonemic blending, phonic, and word reading fluency in the intervention phase (3-18) when compared to the baseline phase (1-2). After receiving 16 intervention sessions (19-20), improvements occurred in all dependent variables. Post-intervention (19-20) and follow-up (21-22) generalization probe data showed that the treatment effect was maintained.

Subject IV-V: Dyslexia with developmental language disorders

The fourth and fifth participants in this study were students with dyslexia with comorbid developmental language disorders. In Figures 4 to 6, it can be seen that there is an increase in phonemic blending, phonic, and word reading fluency in the intervention phase (3-18) when compared to the baseline phase (1-2). After receiving 16 intervention sessions (19-20), improvements occurred in all dependent variables. Post-intervention (19-20) and follow-up (21-22) generalization probe data showed that the treatment effect was maintained.

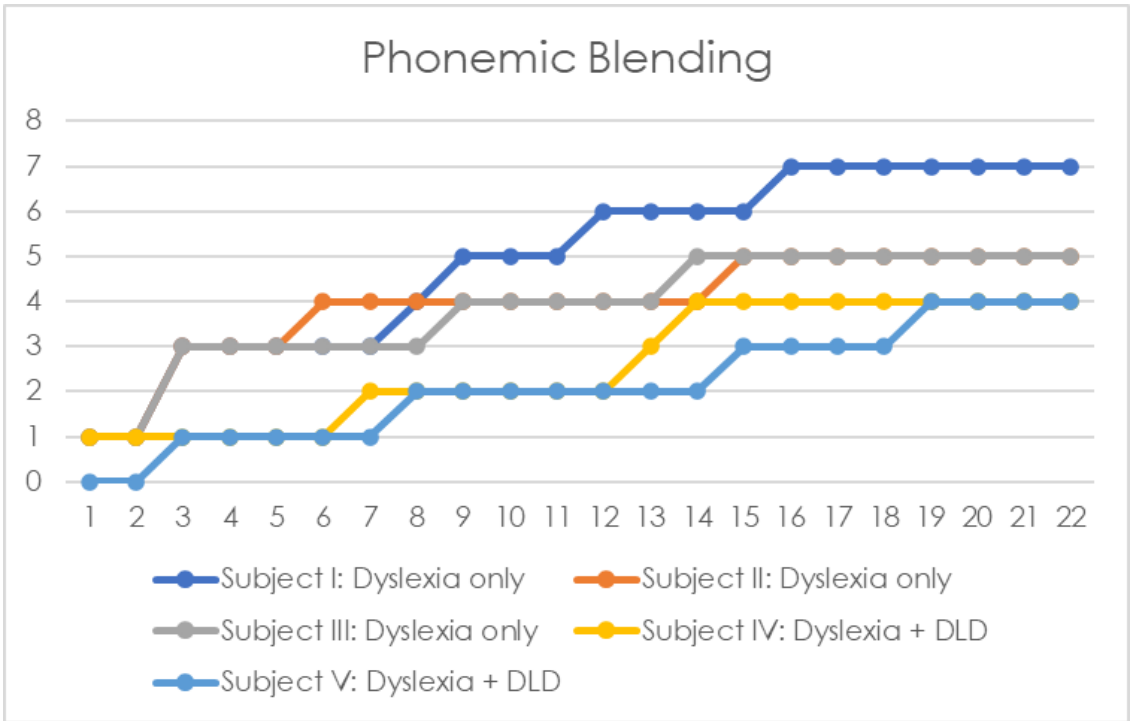

Figure 4. Phonemic Blending

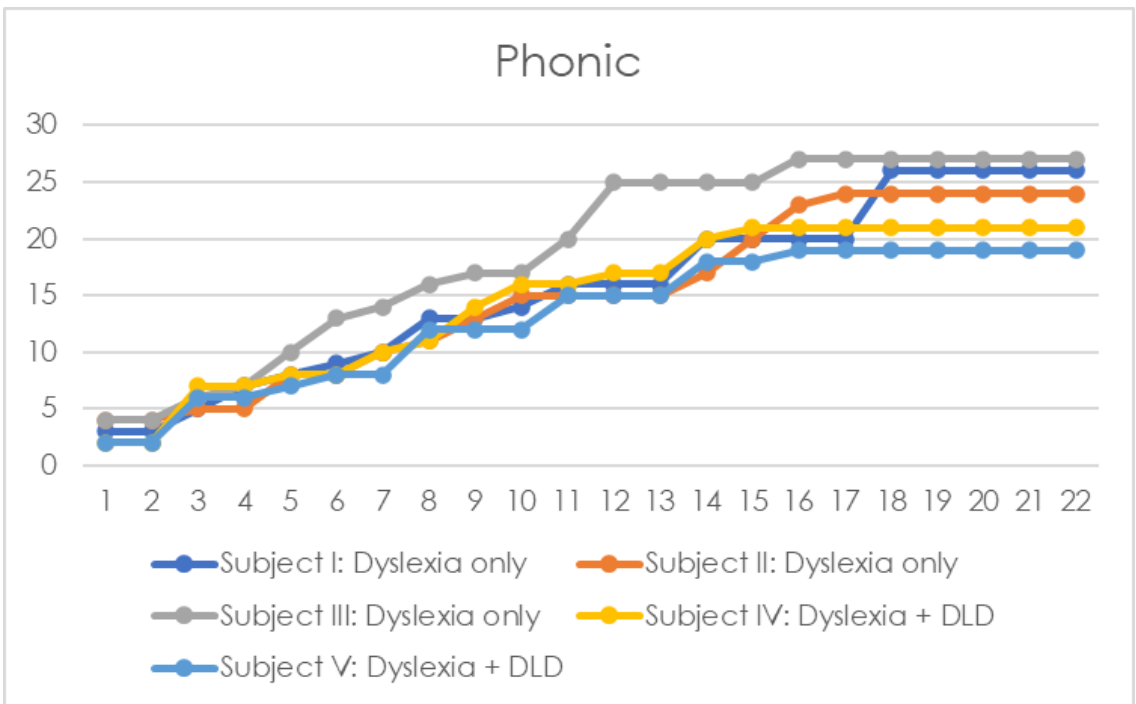

Figure 5. Phonic

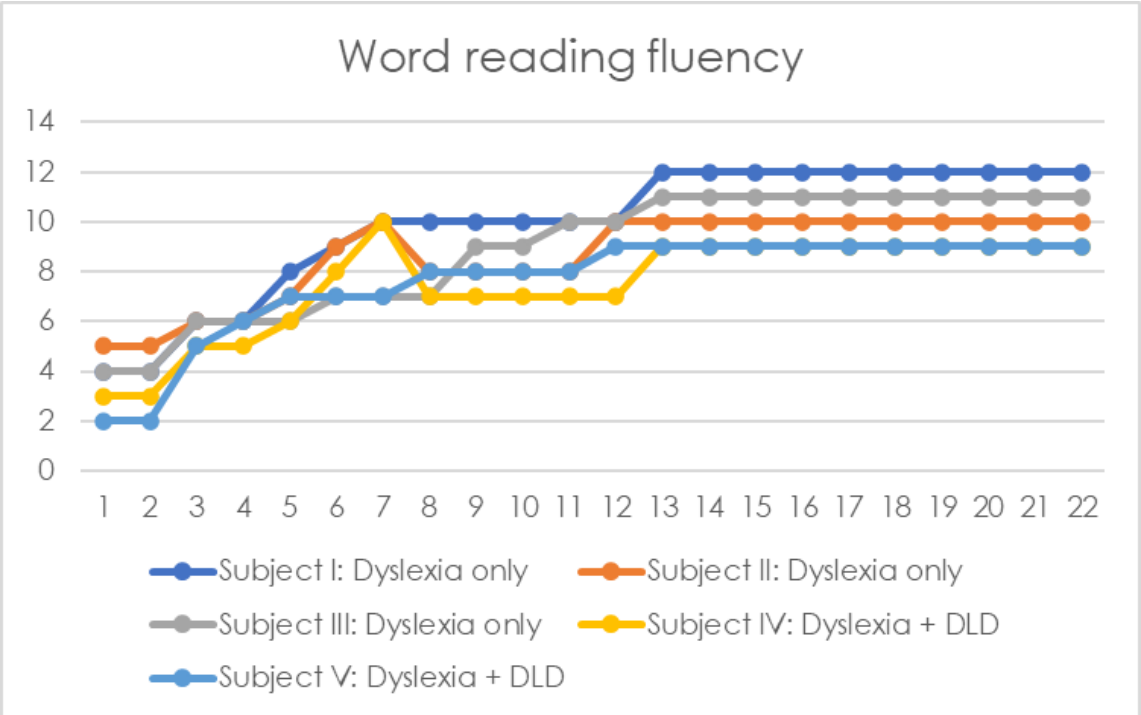

Figure 6. Word reading fluency

DISCUSSION

This study identified that dyslexics without comorbidities and dyslexics with comorbid developmental language disorders obtained significant benefits after receiving 960 minutes of phonemic blending intervention. Phonemic awareness and reading ability have a positive relationship. The higher the phonemic awareness, the higher the reading ability (Miller, Sanchez, & Hynd, 2003). In a meta-analysis research, it was found that there was a significant effect of the phonemic intervention on early reading ability (NICHD, 2000). Furthermore, the effectiveness of the phonemic awareness intervention on early reading ability was significantly better in Pre-K and grade 1 students. In particular, this study showed that Subject V who was 9 years old showed the lowest phonic performance and word reading fluency.

This study also found that phonic ability in dyslexics with comorbid developmental language disorders was 6 points lower than dyslexics without comorbidities. The same thing was found in ability on word reading fluency in dyslexics with comorbid language development disorders 2 points lower when compared to dyslexics without comorbidities. Differences in phonic and word reading fluency between dyslexics without comorbidities and dyslexics with comorbidities occur because of differences in phonological memory abilities..

Phonological memory is one of the most important phonological processing abilities for reading skills (Torgesen & Burgess, 1998; Wagner & Torgesen, 1987). Phonological memory skills consist of verbal short-term memory and verbal working memory. Taruna & Syaf (2018) in their study found that dyslexics without comorbidities only had a deficit in verbal working memory (VWM), while verbal short-term memory (VSTM) abilities were within normal limits. In contrast to dyslexics with comorbid developmental language disorders, who have deficits in two phonological memory abilities, namely VSTM and VWM.

CONCLUSIONS

The purpose of this research project was to determine the impact direct instruction in phonemic blending would have on improving phonemic blending, phonic and word reading fluency. The children in general have benefited from the 16 sessions of intervention through the exposure to phonemic blending intervention. All five children in this study developed their phonemic blending, phonic and word reading fluency as a result of an individually adjusted phonemic awareness intervention.

REFERENCES

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition: DSM-5* (5th ed.). American Psychiatric Publishing

Bishop, D. V. M., & Snowling, M. J. (2004). Developmental Dyslexia and Specific Language Impairment: Same or Different? *Psychological Bulletin, 130*(6), 858–886. https://doi.org/10.1037/0033-2909.130.6.858

Hulme, C., Bowyer-Crane, C., Carroll, J. M., Duff, F. J., & Snowling, M. J. (2012b). The Causal Role of Phoneme Awareness and Letter-Sound Knowledge in Learning to Read. *Psychological Science, 23*(6), 572–577. https://doi.org/10.1177/0956797611435921

Jap, B. A. J., Borleffs, E., & Maassen, B. A. M. (2017). Towards identifying dyslexia in Standard Indonesian: the development of a reading assessment battery. *Reading and Writing, 30*(8), 1729–1751. https://doi.org/10.1007/s11145-017-9748-y

Knoop-van Campen, C. A. N., Segers, E., & Verhoeven, L. (2018). How phonological awareness mediates the relation between working memory and word reading efficiency in children with dyslexia. *Dyslexia, 24*(2), 156–169. https://doi.org/10.1002/dys.1583

Layes, S., Lalonde, R., & Rebai, M. (2015). Effectiveness of a Phonological Awareness Training for Arabic Disabled Reading Children: Insights on Metalinguistic Benefits. Bellaterra *Journal of Teaching & Learning Language & Literature, 8*(4), 24. https://doi.org/10.5565/rev/jtl3.621

Manther, N., & Wendling, B. J. (2012). *Essentials of Dyslexia Assessment and Intervention* (1st ed.). Wiley

Melby-Lervåg, M., Lyster, S. A. H., & Hulme, C. (2012). Phonological skills and their role in learning to read: A meta-analytic review. *Psychological Bulletin, 138*(2), 322–352. https://doi.org/10.1037/a0026744

Miller, C. J., Sanchez, J., & Hynd, G. W. (2003). Neurological correlates of reading disabilities. In H. L. Swanson, K. R. Harris, & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 242–255). New York, NY: Guilford Press

National Institute of Child Health and Human Development (NICHD). (2000). Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups (NIH Publication No. 00-4754). Washington, DC: U.S. Government Printing Office. Retrieved November 11, 2005, from http://www.nichd.nih.gov/ publications/nrp/ report.htm

Navas, A. L. G. P., Ferraz, R. D. C., & Borges, J. P. A. (2014). Phonological processing deficits as a universal model for dyslexia: evidence from different orthographies. *CoDAS, 26*(6), 509–519. https://doi.org/10.1590/2317-1782/20142014135

Taruna, R., & Syaf, A. (2018). Working and Phonological Memory in Dyslexiaand SLI Children in Indonesia: Preliminary Studies. *Asia Pacific Journal of Developmental Differences, 5*(2), 177-188

Torgesen, J. K., & Burgess, S. R. (1998). Consistency of reading-related phonological processes throughout early childhood: Evidence from longitudinal–correlational and instructional studies. In J. L. Metsala & L. C. Ehri (Eds.), *Word recognition in beginning literacy* (pp. 161–188). Mahwah, NJ: Erlbaum

Torgesen, J. K., & Mathes, P. M. (2000). *A basic guide to understanding, assessing, and teaching phonological awareness.* Austin, TX: PRO-ED.

UTCRLA. (2004). *Reading Strategies & Activities Resource Book. For Students at Risk for Reading Difficulties, Including Dyslexia.* University of Texas System

Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin, 101*(2), 192–212. https://doi.org/10.1037/0033-2909.101.2.192

Winskel, H., & Widjaja, V. (2007). Phonological awareness, letter knowledge, and literacy development in Indonesian beginner readers and spellers. *Applied Psycholinguistics, 28* (1), 23–45.

Asia Pacific Journal of Developmental Differences

Guidelines for Contributors

Overview

The Asia Pacific Journal of Developmental Differences (APJDD) will be unique in addressing a range of special educational needs including dyslexia, autism, dyspraxia, dyscalculia, ADHD in the Asian context. The journal will cover theory into practice and will provide a showcase for research in the Asian context as well as highlighting research areas which have implications for further research within Asia and beyond.

Frequency of Journal

The Journal will be published twice a year in January and July.

Contributions Considered for the Journal

Primary consideration for publications will be given to manuscripts that are focused on developmental differences within the Asia Pacific region. Manuscripts will be peer reviewed and included in the journal on the following criteria:

- They contribute to the further understanding of developmental differences as well as the applications and implications in the educational, social and cultural environments.
- They include sound research methods, interpretation and validity of results
- They contain organised and clarity of writing
- They contribute to the local Asian context
- They should be original papers that have not been submitted to other journals or publications.

Editorial Policy—Retractions

The APJDD takes the issue of retractions very seriously. In line with requirements of major academic journals the APJDD will continue to monitor publications for retractions. No future citation will be permitted for articles that have been retracted and a correction will be issued if any such article is published in error. In the case of citations prior to retraction no such correction will be issued, in line with the policy for other journals of this type. Please contact the editor in the first instance if there are any concerns. COPE guidelines have been accessed in preparing this guidance.

Articles published in the APJDD should be original work that has not been published in this form elsewhere. In rare instances where previous publication has been made, this will be fully acknowledged.

Submission of Manuscripts

All manuscripts are to be sent in electronic copy (MS WORD) as well as a PDF copy of the final edited document. PDF copy is required to verify the word copy and for publishing purposes. There is no need to submit hard copies of manuscripts.

Images, charts and diagrams should be sent separately where possible to ensure high quality reproductions.

Submissions are to be emailed to the editor at both email addresses below:

Angela Fawcett
DAS Research Consultant
Dyslexia Association of Singapore,
Emeritus Professor, Swansea University,
angela@das.org.sg

Deborah Hewes
Managing Editor
Dyslexia Association of Singapore
www.das.org.sg/publications/49-research-journal.html
deborah.hewes@das.org.sg

DAS Research Committee
Dyslexia Association of Singapore
www.das.org.sg/about-dyslexia/research/current-research.html
research@das.org.sg

Preparation of Manuscripts

It is expected that all manuscripts be submitted using the American Psychological Association (APA) standard of referencing and publication. APA style is detailed in the Publication Manual of the American Psychological Association (7th ed), which offers sound guidance for writing with clarity, conciseness and simplicity. Authors should follow the APA style in preparation of their manuscripts.

DYSLEXIA ASSOCIATION OF SINGAPORE

Our Mission: Helping People with Dyslexia and Specific Learning Differences Achieve

Our Goal: To build a world class organisation dedicated to helping people with dyslexia and those with specific learning differences in Singapore.

Our Aims:

- To put quality first in delivering a comprehensive and effective professional service for dyslexic people and those with specific learning differences on a not-for profit basis.
- To provide an assessment service for individuals at risk of having dyslexia and/or specific learning differences.
- To provide educational programmes and other support services for individuals with dyslexia and/or specific learning differences.
- To raise public and professional awareness of the nature and incidence of dyslexia and specific learning differences.
- To enable others (teachers, parents and professionals) to help dyslexic individuals and those with specific learning differences.
- To assist and elicit financial and other support for people with dyslexia, those with specific learning differences and their families.
- To promote and carry out local research into dyslexia, specific learning differences and to disseminate results.
- To network with other organisations in Singapore and internationally to bring best practices to the DAS and Singapore.

DAS as a Social Enterprise

- We provide high-quality, professional, innovative and client-focused solutions to create and sustain services for the dyslexic community in Singapore and the region.

- We operate as a financially viable and cost-effective business which at the same time ensures that no dyslexic person is unable to access our services because they cannot afford it.

- We generate social returns on our investments through the development of a dynamic, motivated team of highly qualified and experienced professionals.

- We have a heightened sense of accountability to stakeholders through our professional management team.

Registered in 1991, the Dyslexia Association of Singapore (DAS) is today a vibrant voluntary welfare organisation with over 250 full-time staff who provide a wide array of services for dyslexics not only in Singapore but in the region. DAS Specialist Psychologists conduct assessment and diagnosis for preschool students to adults. DAS Educational Therapists, Speech and Language Therapists and Specialist Teachers provide support for over 3,500 preschool, primary and secondary school students in 14 venues all over Singapore. Increasingly, DAS provides support for dyslexics who also suffer from other Specific Learning Differences such as ADHD, Dyspraxia, Dyscalculia and Non-verbal Learning Differences.

The DAS Academy is a Private Education Institution (PEI) registered with the Council for Private Education (CPE). It is a wholly-owned subsidiary of the Dyslexia Association of Singapore (DAS).

Like DAS, the Academy is also a registered charity with the Commissioner of Charities. DAS Academy delivers a wide range of workshops and courses including a Master of Arts in Special Educational Needs. DAS Academy provides the bridge that links professionals, caregivers and people with special needs.

Asia Pacific Journal of Developmental Differences

Volume 9 ♦ Number 1 ♦ January 2022

Contents

DYSLEXIA ASSOCIATION OF SINGAPORE

www.das.org.sg