Asia Pacific Journal of Developmental Differences

Contents

Editorial Comment

Angela J. Fawcett, Editor-in-Chief

Welcome to the latest edition of the Asia Pacific Journal of Developmental Differences, published to coincide with the international Unite SpLD conference in June 2018. Following the previous edition which was edited by my colleague Professor John Everatt, in this edition we return to our standard format. I would like to thank John for his splendid contribution in enriching our journal. In this edition, we again present seven original articles drawn largely from the Asian Pacific region. Once again, as appropriate for an international journal, we have contributions from Singapore, Japan, Indonesia, India, and the UK. A number of the articles have been submitted by authors who have previously contributed to our journal and it is a pleasure to welcome them back.

In the first article in this issue, from Tuty Elfira Abdul Razak, Edmen Leong and colleagues at DAS from the English Exam Skills Programme (EESP) present a follow up to their earlier published article, which established significant improvement in dyslexic children following this support regime, by contrast with a control group who received ordinary classroom teaching. In this article, the Orton Gillingham approach is evaluated in light of the principles of the Universal Design (UD) for learning framework, and applied to a small group of non-dyslexic learners, who followed the intervention for 20 weeks. As in the previous study, the pre-test established the starting level of this group, and the post-test established the significant benefit 5 of the learners obtained from the EESP. Effect size analyses established that this was particularly effective for the students in the Standard stream. Interestingly, this research showed qualitative effects gathered from student interviews and teachers logs, to enrich our understanding of the usefulness of this approach with a non-dyslexic cohort.

In the second article in this issue, from Jieping Ou, Akiro Uno and colleagues from Japan, the authors evaluate a checklist, the Pupil Rating scale revised, which is commonly used to identify children with dyslexia in China, in comparison with standardised measures of literacy and intelligence. This important article established that although 18% of this cohort of 140 children showed problems in literacy indicative of dyslexia, not one of these was identified by the checklist, which focuses on auditory comprehension and spoken language, as well as orientation, motor co-ordination and behaviour. The results suggest that this screening test may be dated and an assessment including measures of literacy as well as IQ is more effective in identifying risk, than teachers' perceptions.

An article from Indonesia, by Rexsy Taruna and Auliya Syaf, speech therapist and psychologist respectively, adopts a rare experimental approach in examining the overlaps between the different disorders, here dyslexia and language impairment. Using an experimental approach to compare data in two experiments to evaluate the difficulties experienced by children with differing diagnoses and profiles in working memory and phonological memory. The results from the digit span test, a standardised test of intelligence, drawn from the WISC, suggested that both groups were impaired by comparison with age norms, but that children with SLI showed the greatest impairment in planning, reflecting issues with executive function. It is exciting to see new research coming through from this area, which suggests that Indonesian children show a similar pattern of difficulties to children identified by English language testing.

A further article from Suvarna Renta Chinta from India, examined the impact of phonological awareness and rapid naming speed as predictors for progress in dyslexic children learning in Teluga, a native Indian language. This is an important article, because there are few standardised tests available in native Indian languages, but the researchers were able to design their own versions in order to investigate these skills which have been identified as highly predictive for children learning in English. Interestingly, in this multi-lingual study, rapid naming proved the most useful in identifying children who were likely to struggle within the education system. Here, there are suggestions of a different pattern of processing from children with English as a first language, possibly reflecting the differing approaches in teaching in Teluga, which is primarily based on segmentation for early readers.

Family literacy is now emerging as an important topic in understanding the response that some children make to intervention. Clearly the support of parents is particularly important in order to benefit fully from academic support either within school or from an educational provider such as DAS. Previous research on this topic in Singapore has shown that sometimes parental involvement can compromise satisfactory progress, particularly if parents are unaware of the difficulties a dyslexic child might experience and try to push the child to achieve at the level of their peers. In an interesting article in on this topic, Yiyao Weng investigated the impact of the family literacy approach for a small group of young children with dyslexia and their parents in Singapore. On this occasion parents were presented a series of workshops to ensure that they give appropriate support while working with their children at home. Interestingly it seems that the period of support was not long enough to impact significantly on the children's performance, although the effect sizes were extremely promising in terms of future impact. Nevertheless, it is clear that the parents were very receptive to the workshops they had received and their involvement led to an improvement in their children's literacy. Consequently, there seems to be considerable potential to move forward with this approach in Singapore, in order to develop understanding further.

In a lively and novel approach, Patricia Mui Hoon Ng presents here a review of the robot applications available and in use with children in Singapore. The article aims to sensitise the reader to the potential for the use of robots with the new generation of children that will grow up in a highly technological world. The approach has potential for working in areas such as behaviour modification, social and motor skills, numeracy, language and literacy, as well as enhancing executive function through the need for planning, and the possibilities for use with children with special needs are discussed.

Finally, Neil Alexander-Passe needs no introduction to readers of this journal. In this article, Alexander-Passe addressed the issues of disability or difference in terms of adults with dyslexia, and covers a range of potentially contentious issues such as whether or not to disclose your dyslexia to a potential employer. Introducing a major new framework, the bi-ability model from Valeras, 2010, Alexander-Passe argues that this approach is a more realistic evaluation of the combination of strengths and weaknesses that comprise dyslexia. He goes on to investigate the growth that dyslexics can experience through developing resilience in handling academic stresses, although he emphasises here that it is not necessary to suffer in order to become successful.

As you may see, this is another varied and interesting issue, combining experimental work, reviews and new models to explain the phenomena of dyslexia. We look forward to receiving many more contributions for review, and thank you as readers for your interest in this journal.

ENGLISH EXAM SKILLS PROGRAMME

OUR AIM

The aim of the English Exam Skills Programme is to provide students with direct support to equip them with the knowledge, skills, strategies and attitudes to cope with the demands of the English language syllabus in school, leading to their PSLE paper.

RECOMMENDED FOR

Students with difficulties in various English exam components such as Synthesis and Transformation and Comprehension.

COMPONENTS COVERED IN A TYPICAL LESSON:

• Grammar
• Editing
• Synthesis & Transformation
• Comprehension
• Annotation Skills

OUR APPROACH

The programme provides an extension to what students have been taught in the Main Literacy Programme (MLP) and helps to put the skills learned into practical use in their examinations.

In class, students will be exposed to various language components and related strategies in order to cope with their language needs in their English examinations.

The curriculum has been carefully designed and frequently evaluated by our team to ensure its suitability for our students. Lessons are in line with the MOE English Language Syllabus, and reference the Orton-Gillingham principles.

For more info, visit www.das.org.sg

Exploring the effectiveness of the English Examination Skills Programme on struggling non-dyslexic learners

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1. Dyslexia Association of Singapore

ABSTRACT

The effectiveness of sequential, cumulative and multisensory intervention programmes on learners with dyslexia has been proven in multiple academic literature. This study serves as a follow-up on previous research which explored the classroom practices of the English Exam Skills Programme (EESP). In comparison between students with dyslexia and a control group, the previous study found significant progress in their grammar, vocabulary and comprehension components of their English examination paper after intervention. Aligning with the Universal Design for Learning (UDL) framework, the EESP is postulated to benefit all learners, including struggling learners with or without a diagnosis of SpLD or any learning difficulties, who are scoring below 65% in their school English Language examination papers. This study seeks to investigate the possible effectiveness of the EESP on a group of struggling non-dyslexic learners after a 20-week intervention. Results indicate a significant effect of intervention for this small group of non-dyslexic students.
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Keywords: English Exam Skills, structured intervention, dyslexia, struggling learners,
            Universal Design for Learning UDL

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INTRODUCTION

The Primary School Leaving Examination (PSLE) is a major milestone for all primary school learners in Singapore's mainstream education. It is a national exam administered by the Ministry of Education (MOE) and taken by all students at the end of their sixth year in primary school before they move on to secondary school. The PSLE tests students' proficiency in the English language, their respective mother tongue languages (typically Chinese, Malay, Tamil or other Indian languages), Mathematics and Science. The format of the examinations within the PSLE has been revised consistently throughout its history to suit the MOE's revised curricula, however, the standard examination procedure has retained many of the same elements throughout the years despite changes being made to the requirements of each question and the score allocated to each question. All graduating primary school students are required to attain at least a pass grade in both their English and Mathematics exams in order to progress to secondary school. Given the importance of passing the English Language paper as a prerequisite to secondary education, many students and parents alike are highly concerned about their children's ability to cope with the subject.

At the Dyslexia Association of Singapore (DAS), above and beyond the scope to provide children diagnosed with dyslexia with literacy intervention, the English Exam Skills Programme (EESP) was developed to help students prepare and cope with the demands of the English Language paper of the PSLE. Since the start of the programme in 2013, it has seen five batches of graduating Primary 6 students through the PSLE and based on the annual programme evaluation of students' termly pretests and posttests, students who attended the EESP showed improvements in their overall school English grades. Feedback received from students and parents demonstrated that students were more confident in answering exam-formatted questions as they had been trained to answer questions in a structured and step by step sequence. The additional help provided on top of the literacy intervention through the DAS Main Literacy Programme (MLP), is beneficial to dyslexic students who are already struggling in acquiring the broad ranging aspects of language and literacy.

The EESP, which aligns closely to the Orton-Gillingham approach, has been found to benefit Primary 5 and Primary 6 learners in components of their English Language examination. In a recent research study, when a comparison of the performance between the experimental group of Primary 5 and 6 dyslexic students who attended the EESP and a control group was conducted, there was significant progress recorded in the grammar, sentence transformation and comprehension components of the experimental group (Leong, Asjamiah & Wang, 2017). The evaluation of the programme and its practices through its previous study, therefore, informed us that the structured, cumulative and progressive nature of the EESP curriculum and teaching approach would benefit learners who struggle in aspects of language and literacy. The results of this study would provide a basis for conducting this research, which aimed to explore the possibility and potential

of extending our curriculum to undiagnosed and struggling learners. MOE schools offer additional help to struggling learners through the recruitment of Allied Educators (AED) to provide students with in-class support and pull-out sessions targeting on basic literacy and behavioural aspects. However, there seems to be a lack of support with regard to examinable components. Thus, this study aims to explore how the EESP programme can help learners who are struggling despite receiving additional support in school.

This paper will look at how the research-based Universal Design for Learning (UDL) framework (Hall, Strangman & Meyer, 2003), a curriculum design that caters to learners of different abilities, fits into the EESP to cover a wider group of students. It will then compare and draw parallels of the UDL to the Orton-Gillingham principles and direct instruction methodology.

2. LITERATURE REVIEW

Some studies have found similar difficulties between learners with Specific Language Impairment (SLI) and those with dyslexia. These were found to have potential comorbidities with overlaps in the diagnostic criteria of individual disorders (Snowling, 2001; Catts, et al., 2005; Nithart, et al., 2009; Newbury, et al., 2011; Mccarthy, Hogan & Catts, 2012; Nash, et al., 2013; Adlof, et al., 2017). Despite distinct differences of SLI and dyslexia in the areas of phonological processing, word reading and spelling accuracy revealed in previous studies, a study showed that SLI and dyslexia share similar genetic influences, providing neurobiological evidence to support the role and thus emphasising the importance of oral language ability (Catts, et al., 2005; Newbury, et al., 2011; Mccarthy, Hogan & Catts, 2012). Building on this, Snowling (2001) explained that children at risk of dyslexia stemmed from a more general delay in oral language development and that improvement in language skills could serve as a protective factor for children with dyslexia. In essence, intervention programmes aimed at supporting learners with dyslexia, a language disorder, were postulated to also benefit learners with language difficulties, with or without comorbid dyslexia.

Orton-Gillingham Approach in the EESP

The EESP programme and its curriculum has been developed in reference to the Orton-Gillingham (OG) approach; a structured, sequential, multi-sensory and phonics based approach channelled to teach the basic concepts of reading, spelling and writing (Ritchey & Goeke, 2006; Rose & Zirkel, 2007) which was developed in the 1960s for students with severe dyslexia. Skills taught through this approach are hierarchical in nature and focus on the automaticity of specific sub skills that follows a 'bottom-up approach'. Teaching using the OG approach involves intensive repetition, which is necessary in order for students with dyslexia to retain the components of phonological awareness as well as the various rules that need to be understood in order to achieve reading fluency (Shaywitz, 2003).

The main feature of the OG approach is its simultaneously multisensory instruction, which enables students to tap on multiple learning pathways in order to enhance working memory and learning. EESP lessons integrate multi-sensory learning through the use of manipulatives, Grammar games, the use of coloured and shape symbols in the teaching of 'Synthesis & Transformation' and annotating 'Reading Comprehension' texts, as well as the use of interactive SMART board to teach students how to approach questions in 'Reading Comprehension' (Leong, Asjamiah & Wang, 2017). Another characteristic of the OG approach is the teaching of new concepts in a systematic and structured manner, beginning with the easiest and then progressing gradually to acquire increasingly complex skills. Students are also given opportunities to transfer and apply their knowledge of phonogram concepts and spelling rules when attempting the 'Editing' component of the English paper. Apart from that, they are also taught various learning strategies in a sequential, incremental and cumulative way such that increasing confidence is attained at every step of the way.

Role and effectiveness of direct instruction

Researchers have proven that direct instruction methodology has been shown to be effective in helping students who struggle with language processing, vocabulary, and memory (Lewis & Doorlag, 2005). These diverse learners have benefited from explicit instruction in skills, concepts, rules, procedures, and strategies (Mercer & Mercer, 2005; Rosenberg, O'Shea, & O'Shea, 2006). The process of direct instruction provides intensive, systematic teacher input through modelling or examples, and offers many opportunities for students to practice specific targeted skills (Gagnon & Maccini, 2005). Students work in groups to receive new content and then participate in supported practice sessions. The pace of the lesson is fast with a high degree of student engagement and response. Teacher prompts and cues are given and then faded as students are guided to mastery. Throughout the process, the teacher catches student errors and provides appropriate corrective feedback.

The importance of the role direct or explicit teaching in a student's learning; including areas of phonemic awareness, phonics, fluency, vocabulary and comprehension, has been proven in a number of studies (Van Keer, 2004; Taylor, Peterson, Pearson and Rodriguez, 2002; National Institute of Child Health and Human Development, 2000). Rupley, Blair and Nichols' (2009) discussion on effective reading instruction for struggling readers contended the significance of explicit instruction in developing each of these above mentioned processes, which are involved in a collective interplay that allows effective reading acquisition.

When the characteristic features of the OG approach and direct instruction methodology are studied closely, it appears that there are parallels between both teaching approaches. The systematic and structured teaching of new concepts in the OG aligns to the explicit instruction of skills, concepts, rules, procedures and strategies of the direct

instruction approach. Both approaches also emphasise the importance of teaching strategies to students in a sequential, incremental & cumulative manner with increasing difficulty through the provision of modelling and examples given by teachers. Lastly, both approaches outline the importance of intensive repetition and opportunities to practice the skills that students have learnt while being supported with feedback from teachers. The parallel features of the OG and direct instruction have been summarised in the table below.

Table 1: Summary of OG approach and direct instruction

ORTON-GILLINGHAM (OG)	DIRECT INSTRUCTION
Systematic and structured	Explicit instruction in skills, concepts, rules and strategies
Sequential, incremental & cumulative	Intensive, systematic teacher input
Intensive repetition	Opportunities to practice targeted skills with supported practice and corrective feedback

Universal Design for Learning

Universal Design for Learning (UDL) is a theoretical framework developed to expand learning opportunities for all individuals (Hall, Strangman & Meyer, 2003), to guide the development of curricula that are flexible and supportive of all students by decreasing the barriers that frequently limit student access to materials and learning in classrooms (Dolan & Hall, 2001; Meyer & Rose, 1998; Pisha & Coyne, 2001; Rose, 2001; Rose & Dolan, 2000; Rose & Meyer, 2002). As a curriculum approach, the UDL is developed based on research from the neurosciences and effective teaching practices. It prescribes that the design of curriculum should take into consideration the needs of all students in mind, so that teaching methods, materials, and modes of assessment are usable by all. Based on traditional curriculum, a student who has difficulty decoding or comprehending printed text is compelled to accustom and adapt to reading in print as best as he or she can. A UDL curriculum, however, is designed to be flexible by incorporating different mediums of presenting information so that alternatives are available. A UDL curriculum creates opportunities for adaptation so that it minimizes barriers and maximizes students' access to new information and learning. The UDL framework guides the development of curriculum by means of 3 principles (Table 2) that promotes flexibility in relation to 3 fundamental learning components in the brain: recognition, strategy, and affect (Rose & Meyer, 2002).

Table 2: The three UDL principles (Rose, 2001)

PRINCIPLES OF THE UNIVERSAL DESIGN FOR LEARNING (UDL) FRAMEWORK
Principle 1: To support recognition learning, provide multiple, flexible methods of presentation Principle 2: To support strategic learning, provide multiple, flexible methods of expression and apprenticeship. Principle 3: To support affective learning, provide multiple, flexible options for engagement.

Recognition learning

The first UDL principle focuses on recognition learning and the importance of providing multiple and flexible methods of presentation when teaching patterns. The UDL approach believes that no single teaching methodology for pattern recognition will be sufficient for every learner so it encourages the use of several elements and materials to support instructional content by providing multiple examples for the learner. The second recommended practice in recognition learning is to provide multiple media and formats. A wide range of tools for presenting instructional content are available digitally, thus teachers may manipulate size, colour contrasts, and other features to develop examples in multiple media and formats. These can be saved for future use and flexibly accessed by different students, depending on their needs and preferences. The third UDL teaching method for recognition emphasizes highlighting critical features and essential components to better support recognition. The fourth teaching method for recognition is to support background knowledge, and in this aspect, by evaluating students' knowledge about a concept before designing instruction, teachers can better support their students' knowledge base and scaffold instructions accordingly. (Rose & Meyer, 2002)

Strategic learning

Teachers need to vary and be flexible with their teaching methodologies so that students can find the most desirable and suitable learning strategy for themselves. This flexibility will help meet the needs of diverse students as they enter the instructional stage with different approaches and knowledge for learning. The strategic learning aspect of the UDL promotes that students should be given supported practice when they are engaged in initial learning of a new concept or skill to ensure success and eventual independence. Supported practice enables them to split up a complex concept into more manageable components before they fully master how to apply them. Students are also encouraged to

be active and responsible learners and getting teachers to respect individual differences and scaffold students as they move from initial learning to practiced level and less supported skills mastery. Lastly, in order to successfully demonstrate the skills that they have learned, teachers should provide flexible opportunities for demonstrating the skills by varying their expectations, requirements, degree of question difficulty and their means of assessment and scoring. (Rose & Meyer, 2002)

Affective learning

The third principle of UDL is affective learning, which is the recognition of the importance of engaging learners in instructional tasks. In line with the theory of differentiated instruction (Tomlinson, 2001) which reinforces the need for effective classroom management, this UDL principle highlights that engagement is a vital component of good classroom management, organization and instruction. Therefore, teachers are encouraged to adjust the levels of difficulty of the materials used in the classroom, provide varying levels of scaffolding to gain and maintain learner attention during the instructional episode, give rewards and offer choices of learning tools. By providing varying levels of scaffolding when giving instructions, students have access to varied learning contexts as well as choices about their learning environment. (Rose & Meyer, 2002)

Table 3: Comparison between UDL & combination of OG and direct instruction

UDL	OG & DIRECT INSTRUCTION
Offers multiple and flexible methods of presentation and examples	-
Provide multiple media and formats to present content of lesson	-
Highlights critical features and essential components to support recognition	Systematic and structured, explicit instruction of new skills taught
Flexible teaching methodologies to provide diverse learning needs	Simultaneously multisensory
Supported practice in initial learning of a new concept or skill to ensure success and eventual independence	Opportunities to practice targeted skills with supported practice and corrective feedback
Flexible opportunities to demonstrate the skills by varying their expectations, requirements, degree of question difficulty and means of assessment and scoring	Sequential, incremental & cumulative - from easy to complex skills

Effectiveness of smaller class size

Research studies in the area of supporting struggling learners have found positive effects of smaller class size on their learning processes and achievements (Pedder, 2006; Bosworth & Caliendo, 2007; Krassel & Heinesen, 2014; Bosworth, 2014; Harfitt & Tsui, 2015). Despite that, the average class size of a mainstream primary school in Singapore with varied learners was reported as 32.9 (Education Statistics Digest, 2015). This differed substantially from an average EESP class size of 4. As revealed in recent research, a smaller class size would create more opportunities for individual teaching time for each learner (Leong, 2015). These quality sessions could maximise learning and bring about higher achievements.

Despite large class sizes in mainstream schools, the Ministry of Education (MOE) have recognised the needs of students with mild Special Educational Needs (SEN) studying in these schools and has implemented a system to provide support in various ways. This includes the deployment of an AED LBS (Allied Educator in Learning and Behavioural Support) and SST (Special Education Schools' Teachers) in every mainstream primary school to provide support in order to meet the individual learning and behavioural needs of students with SEN (Moe.gov.sg, 2018). Having undergone compulsory courses for both building of theoretical knowledge and training of practical skills in which some of the modules includes Effective Teaching & Learning in Special Education, Behavioural and Communication Difficulties and Practice and Intervention Technique, these AEDs and SSTs have the required knowledge and skills to support these students (Nie.edu.sg, 2018).

In line with the benefits of small group teaching, the MOE has introduced school-based dyslexia remediation in primary schools in 2012. With the belief in the foundational importance of reading, these remediation sessions support Primary 3 and 4 students outside school hours by focusing on letter-sound associations. Through systematic screening processes, Primary 3 students were identified and offered this programme (Moe.gov.sg, 2012). It was reported that this programme was effective in improving spelling and writing (TODAY online, 2015).

However, besides being conducted with a smaller class size, it is important to note that this remediation programme provided by mainstream schools does not support students at Primary 5 and 6 levels and that it focuses on basic literacy skills. Other than reading and writing, struggling learners would require specific strategies and skills targeted at examinable components in order to meet the demands of examinations. To fill this gap, these skills were delivered in a small class size with structured and sequential teaching at DAS through the English Exams Skills programme (Leong, 2015).

Research Aims

This research aims to determine the effectiveness of the English Examination Skills Programme (EESP) on struggling, non-dyslexic learners. The programme and its carefully designed curriculum and teaching methodology has proven to benefit children with dyslexia and literacy acquisition difficulties (Leong, 2015; Leong, Asjamiah & Wang, 2017) . Therefore, the aim of this study is to explore how the EESP can be beneficial to students who are struggling in their school English examinations despite receiving additional support from school.

METHODS

Participants

A total of 10 students participated in our study. These are students who have come to the Dyslexia Association of Singapore for academic support because of their struggles with school despite not having a diagnosis of dyslexia. The detailed profiles of these students are collected and screened prior to enrolment via a learning profile questionnaire. Some examples of difficulties mentioned in the questionnaire include struggles to pass English Language examinations, difficulties with understanding and carrying out instructions, concentration and motivational issues, forgetfulness, and dependence on guidance from teacher and parents. The learning profile questionnaire also reflected that four of the student participants were suspected to have dyslexia but were not assessed, one was diagnosed with sensory integration issues, one was suspected to have speech and language impairment (SLI) and the rest were not identified to have any learning difficulties. These students are from Primary 3 to Primary 6 in their schools, and were placed in separate classes together with learners with dyslexia according to their school level and abilities for the purpose of this study.

Research Design

Students enrolled in the programme would start off by completing a pretest during their very first lesson. They would then undergo a 20-week intervention over a period of about 6 months before ending completing a posttest on the 20th week. The teachers who conducted these lessons were tasked to complete a student progress log (Appendix A) on weeks 10 and 20 to record the progress they have observed. At the end of the 20-week intervention, teacher and student interviews were also conducted. Tabulation of the pretest and posttest scores, an analysis of the students' pretest and posttest answers, the teacher log, as well as the teacher and student interviews were all data collection procedures implemented to triangulate and evaluate the effectiveness of the designed programme for struggling learners who might not have a diagnosis of dyslexia. Figure 1 provides a representation of the research design of this study.
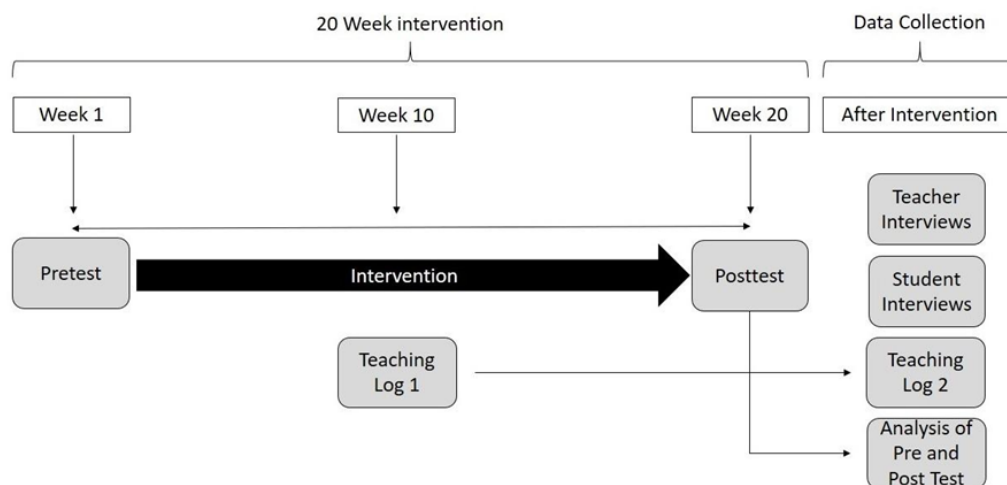
Figure 1: Data collection procedures

Instruction

Students enrolled in the intervention would have 20 hours of remediation of exam related topics over 20 weeks. Topics for Primary 3 and 4 students include grammar, editing and comprehension. Topics for Primary 5 and 6 students in both the Standard and Foundation stream include synthesis and transformation, editing and comprehension. Lessons were designed in accord with the OG principles as well as structured and conducted using the RIMAIR approach as described in Leong, Asjamiah and Wang (2017).

Data Collection Procedures

Pretest & Posttest Results
Of the 10 students who participated in the study, only 5 were present for both the pretest as well as the posttest at the start and end of the intervention programme. Four of these students were in the Primary 5 and 6 Standard stream, and one of them in the Primary 3 and 4 stream. The tabulation and analysis of the pretest and posttest data only took into account the 5 students with pretest and posttest data. All 10 students however were involved in other data collection procedures.

The completed pretest and posttest of the 5 students were individually marked and their scores were tabulated. These test papers were specific to the streams these students were placed in. Quantitative data in the form of a t-test and tests for effect sizes were recorded. Qualitative data from the pretests and posttests were also collected analysing

the errors of each student's script, and comparing the differences between each student's pretest and posttest scripts.

Student progress log

The teachers conducting the programme were tasked to complete a teaching log during the 10th and 20th session of the programme. Items in the log provided the teachers with opportunities to comment on their students' process of acquisition of skills taught in each component. Items also provided opportunities for teachers to indicate possible differences in learning observed between these students and their peers. There were also items that allowed teachers to indicate if students had benefited from the programme and how. A sample of the teaching log can be found in Appendix A.

Teacher interviews

Teacher interviews were also conducted after the programme. A total of 6 questions were asked with the objective of finding out the perceptions of teachers on the effectiveness of the lessons, as well as the transferability of the skills they taught to the students' school work. A question was also asked on the difficulties they faced in teaching these students. A sample of the teacher interview questions can be found in Appendix B.

Student interviews

Student interviews were conducted over the phone. A total of 11 questions relating to the familiarity, memory and understanding of the various topics taught were asked during the phone interview session. Answers to these interview questions were recorded for analysis. A sample of the student interview questions can be found in Appendix C.

RESULTS

Pretests & Posttests

Quantitative data

A paired samples t-test was conducted to evaluate the difference between the pretest and posttest scores of these 5 students. Results of the t-test ($p<.05$) suggest that there is a significant improvement between the pretest and posttest scores of these students.

An effect size analysis (Cohen, 1988) was also conducted as an alternative method in measuring the strengths of the improvements for the group of students. A Cohen's effect size value ($d=0.5$), a medium effect size, suggests average improvements of the 5 students. A separate analysis was also conducted looking at only the 4 students in the Primary 5 and 6 Standard stream. The Cohen's effect size value ($d=1.02$), a large effect size suggests large improvements of the 4 students in the Standard stream. Figure 2 presents a graphical illustration of the progress these 5 students made. It may be seen that only 1 student showed a small decline in raw scores from pre to post-test.
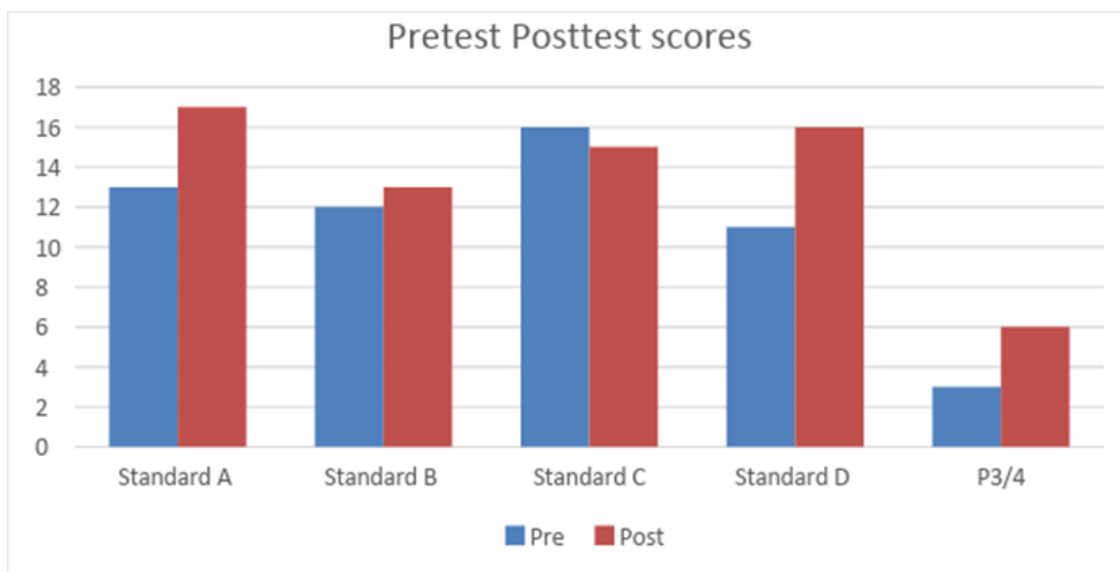
Figure 2: Comparison of pretest and posttest scores

Qualitative data

A qualitative analysis of the students' written responses in their pretest and posttests was conducted to supplement the quantitative scores. This process was necessary to look at the micro details of their ability to understand and apply the concepts, strategies and skills that they have acquired over the 20 weeks. When the written responses of the pretests were compared to those on the posttests, there was a marked difference in the quality of the students' responses. In the posttests, the majority of students attempted all the questions without leaving any blanks in the boxes or spaces provided. Students were also observed to have the awareness and ability to apply sub-skills they have learnt and acquired in specific components of the English exam paper.

Student progress log & teacher interviews

The information recorded in the student progress logs supported the teachers' responses during the interviews. The six teachers reported that students were able to comprehend the new concepts that were introduced to them during the EESP lessons but at least half of them required continued guidance and support to apply them in practice questions. These students also needed repetition and benefited from the compulsory review component at the start of every lesson as they often could not recall what was taught or introduced in the previous lesson. The students who had no diagnosis of dyslexia and were not attending the literacy remediation classes at DAS also needed more guidance in familiarising with spelling rules and strategies as they had no prior knowledge of these. Another observation made by teachers in the study was the weak reading comprehension ability of the students. The majority of them were struggling with text processing skills and understanding the content of the comprehension passages used

during the lessons, therefore time and effort had to be allocated to teach these students annotation techniques in order to help them interpret and make sense of their reading.

Student Interviews

After the twenty-week intervention period, five students were selected for phone interviews to find out their perceptions on the effectiveness of the EESP lessons, transferability of skills and concepts learnt to school work and how different EESP lessons were from school. The interview responses were analysed through coding processes.

Majority of the students interviewed generally felt that the programme helped them understand the components of the English examination paper better as they had more clarity on the required sub-skills of each component and were more confident in identifying concepts that were applicable to different question types. Two students highlighted that the difficulty level of questions at school and EESP were different as the questions formatted in school examination papers were more challenging and some concepts tested were beyond the scope that they had learnt during English lessons. According to them, at DAS, questions were formatted closely to the skills and concepts that were introduced, practiced and reviewed so these were much more manageable. On the overall, the students' responses revealed themes that will be summarised in the following sections of the Discussion.

DISCUSSION

Indicators of progress

Based on the analysis of pretests, posttests, progress logs and interviews, two types of observations were found to indicate progress in the students' abilities. These are reflected in Figure 3 (Summary of research findings) and will be explained in detail below.

i) Understanding of concepts

Our analysis of students' pretest and posttest answers showed that students showed an awareness of concepts they have been taught. In the Synthesis and Transformation component of both tests, students were able to apply changes in the aspect of time reference when they transformed a sentence from direct to indirect speech. Although their final answers were inaccurate because not all aspects that needed changes were done, the students showed awareness of the need to change specific parts of the sentences. Students were also observed to adhere to explicit instructions given by teachers during Comprehension lessons as seen in their practice of numbering paragraphs to help them in their search for answers when they attempt questions that require reference to specific paragraphs. There was also evidence of them highlighting key words and target words in Comprehension questions that would help them understand and process the requirements of the question.

ii) Application of concepts

The students' ability to apply concepts was observed in the accuracy of their pretest and posttest answers. These were evident across two components of the test which includes Synthesis and Transformation and Comprehension.

For Synthesis and Transformation questions that test on the topic of 'Direct and Indirect Speech', students were observed to be able to make appropriate and accurate changes in word classes from verbs to nouns or adjectives and changes in the aspect of pronouns. As for the Comprehension section, most of the students showed improvement in the accuracy of their answers for vocabulary-context questions as seen in the comparison of their pretest and posttest answers. For instance in the pre-test, a student quoted a whole sentence although the question required him to quote only a three-word phrase from the passage. In the post-test, he was able to quote the phrase accurately and this is evidence that he had understood the requirements of the question more clearly and had an awareness of 'phrase' in contrast to 'sentence'. There was also a general improvement across all students in answering 'True or False' question types. Some students left the True or False questions blank in the pretest but in the posttest, all the students attempted all questions although not all their responses were accurate.

Another aspect of comprehension skills that was observed across all students was the effort to annotate the passage and questions. Annotation skills and reference tracking skills are explicitly taught during EESP lessons as it builds coherence during the reading and text analysis process and helps students understand their reading content. Evidence of students applying these skills are observed in their numbering of paragraphs, application of the 'Circle, Underline, Box, Bracket' (CUBB) method for question analysis and highlighting key words from the passage and questions.

Factors that hinder progress

Based on analysis of pretests, posttests, progress logs and student-learning profiles, three types of observations were found to hinder the students' progress. These are reflected in Figure 3 (Summary of research findings) and will be explained in detail below.

i) Behaviour

An analysis of the teaching logs and learning profiles of students reported that all students in the study have some extent of difficulty with attention that made them easily distracted from tasks. These parents had indicated in the learning profiles that their children have difficulty channelling their focus and attention for a longer period of time when completing school assignments and revising their school work at home. These observations support the information recorded by EESP teachers in the learning logs. Teachers noted that some of the student participants required reminders to stay on task as they were easily distracted by their classmates.

ii) Memory retention

An analysis of teaching logs showed that students faced difficulty with retaining information that has been delivered during the lessons. The students needed a lot of repetition of concepts taught and needed guidance and constant reminders when attempting independent work. The lack of retention of concepts resulted in students having difficulty transferring the skills they have learnt into actual questions on their worksheets. Thus, a number of explicit explanations from the teachers were necessary in order to help them understand the concepts and skills again before they could attempt questions independently.

iii) Transferability

As earlier recorded in the results section, the student interviews revealed that while half of the students expressed that the EESP was beneficial to them as it helped them gain familiarity with topics and question types tested in their school English syllabus, there were students who felt that questions that they were given in their schools were more challenging and beyond the scope of what was taught in the EESP classes. This explains a difficulty in transferability of skills learned in the EESP classes to school based exam type questions. This could be due to the short period of 20 weeks these students were enrolled in the EESP. Given the wide range of topics tested for in school exams and in the PSLE, students would not have covered all heavy weighted topics within 20 weeks.

A closer look at observations made across the whole range of data sources (as illustrated and summarised in Figure 3) also revealed a relationship between the students' ability to retain concepts and strategies, transferability of these skills and their independent application into actual exam-formatted questions (as indicated by arrows). Taken together, the progress indicators and factors that hinder progress provides a clear indication of how the EESP is able to benefit a struggling learner, and how there are possible challenges that could and should be addressed.

LIMITATIONS

Although the research has reached its aims, there were some unavoidable limitations. Firstly, the sample size of struggling learners in the study was small. The results of the statistical data analysis might therefore not be able to represent a more general population of struggling learners. Secondly, the duration of the study lasted for 20 weeks and this may, to some extent, affect the students' ability to retain and transfer the skills they have acquired into actual exam-formatted questions. An hours lesson per week may lack the intensity to address the transferability issue that students have demonstrated. Therefore, a longer period of study of about 4 terms (40 weeks) might be more effective and significant in helping the students achieve more progress.
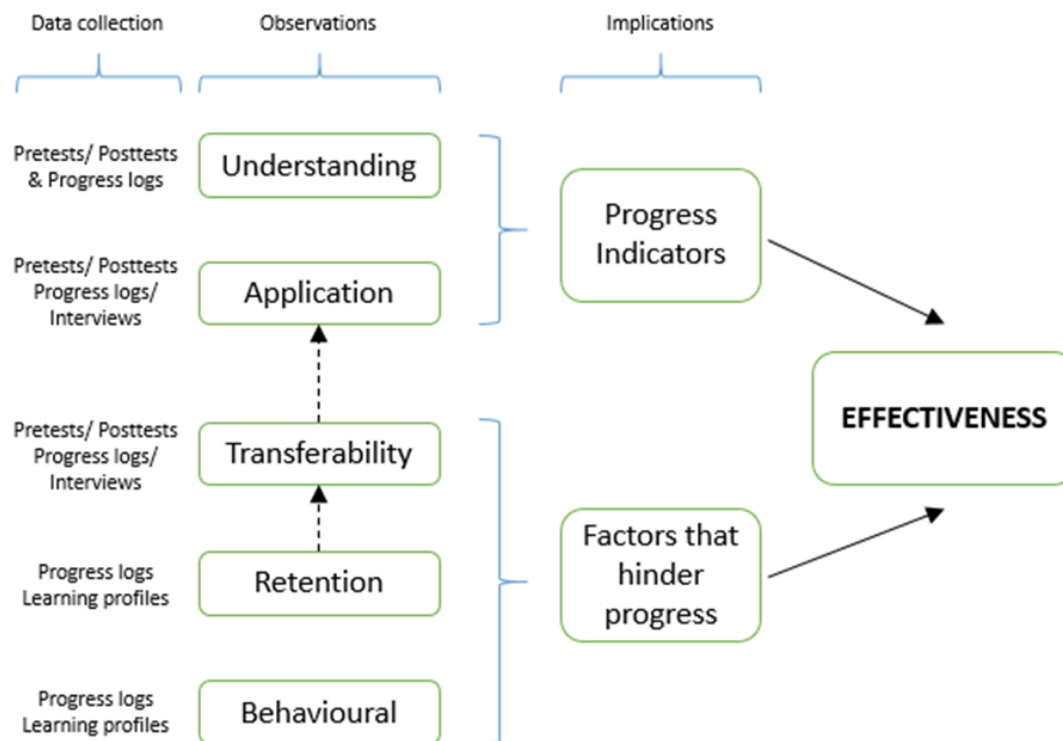
Figure 3: Summary of research findings

CONCLUSION & FUTURE CONSIDERATIONS

This study has shown that the EESP's structured teaching approach encompassing OG principles, direct instruction methodology and principles of UDL are effective for struggling learners. As discussed in the literature, the parallels between OG, direct instruction and UDL principles such as placing emphasis on essential components, flexible teaching methodologies, guided practice and opportunities to demonstrate skills, are already reflected in the programme's existing teaching methodology and classroom practices.

Our results and findings have also demonstrated that struggling learners display difficulties similar to dyslexics in some aspects of acquiring literacy and language skills such as behavioural issues, memory retention and transferability difficulties. These factors largely affect and hinder the students' ability to make progress in the EESP. The students in general have benefited from the 20 weeks of intervention through the exposure to new skills and strategies and how these are applicable to exam-formatted questions but all of them could possibly fully benefit to a greater extent if the intervention period was longer.

If the programme were to accept students beyond dyslexia in the future, it needs to take into consideration the entry criteria in terms of the range of scores attained by students in their school English examinations. Those who are severely struggling in school might not benefit from the programme intervention because of the wide gap in aspects of language and literacy skills these areas which would require another form of intervention. These severely struggling learners could either have low IQ levels or other learning difficulties that the scope of the programme cannot address. Another future consideration to study the effectiveness of the EESP would be to embark on another study that looks at offering intervention for struggling learners with increased frequency, intensity and a longer duration of the study, perhaps incorporating some of the flexible modes of presentation recommended by UDL.

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APPENDIX A

EESP NON-DYSLEXIC RESEARCH: STUDENT PROGRESS LOG
Student: **Level/Stream:**
EdT: **Centre:**
Term/Year:
EDITING
Describe the process of the student's acquisition of the skills taught? (Comment on the student's understanding, application and automaticity)
How different is the student from his/her peers in understanding Editing concepts?
GRAMMAR (LEAVE BLANK IF NOT APPLICABLE)
Describe the process of the student's acquisition of the skills taught? (Comment on the student's understanding, application and automaticity)
How different is the student from his/her peers in understanding Grammar concepts?
SYNTHESIS & TRANSFORMATION (LEAVE BLANK IF NOT APPLICABLE)
Describe the process of the student's acquisition of the skills taught? (Comment on the student's understanding, application and automaticity)
How different is the student from his/her peers in understanding Synthesis and Transformation concepts?
COMPREHENSION
Describe the process of the student's acquisition of the skills taught? (Comment on the student's understanding, application and automaticity)
How different is the student from his/her peers in understanding Comprehension concepts?
GENERAL
Has the student benefitted from the programme? How?

APPENDIX B: INTERVIEW QUESTIONS FOR TEACHERS

OBJECTIVES	QUESTIONS	PROMPTS
1. To find out the perceptions of *EdTs on the effectiveness of the **EESP lessons.	**1. Has EESP lessons helped the child in his/her answering of Editing questions in class?**	(If yes) How does it help? (If no) Why does it not help?
	2. Has EESP lessons helped the child in his/her answering of Synthesis and Transformation questions in class?	
	3. Has EESP lessons helped the child in his/her answering of Comprehension questions in class?	
	4. Has EESP lessons helped the child in his/her answering of Grammar questions in class?	
2. To find out the perceptions of *EdTs on the effectiveness of the **EESP lessons and the transferability of skills and concepts taught to school work.	**5. Has EESP helped the child's learning in school?**	Do you think he/she applies the skills and concepts learnt in school and at home?
3. To find out if there are any difficulties faced when teaching that could possibly hinder the acquisition of skills and concepts	**6. What are some difficulties faced when teaching him/her?**	What about in terms of: 1. Delivery of the lesson? 2. Students' learning? 3. Application of skills and concepts learnt?

APPENDIX C: INTERVIEW QUESTIONS FOR STUDENTS

OBJECTIVES	QUESTIONS	PROMPTS
1. To find out the perceptions of students on the effectiveness of the **EESP lessons.	1. **Has EESP lessons helped you in your answering of Editing questions in class?**	(If yes) How does it help? (If no) Why does it not help?
	2. **Has EESP lessons helped you in your answering of Synthesis and Transformation questions in class?**	
	3. **Has EESP lessons helped you in your answering of Comprehension questions in class?**	
	4. **Has EESP lessons helped you in your answering of Grammar questions in class?**	
2. To find out the perceptions of students on the effectiveness of the **EESP lessons and the transferability of skills and concepts taught to school work.	5. **Has EESP helped your learning in school?**	(If yes) How does it help? (If no) Why does it not help?
3. To find out if students are aware of what is taught in **EESP lessons and how they differ from school	6. **Are EESP lessons different from school? (If yes) How are they different?**	

The Applicability and Limitations of the Pupil Rating Scale Revised-Screening for Learning Disabilities in Chinese Children

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Abstract

As more school learners face difficulties in learning Chinese and request for specific instructions increases, efficient assessment tools for these children are necessary. This study explores the applicability and limitations of the Pupil Rating Scale Revised-Screening for Learning Disabilities (PRS) for identifying children with learning problems. A total of 140 third-grade Chinese children from a primary school in Ningbo were tested for their reading and writing attainment, and teachers rated these children using a modified PRS. Of the participants, 18% were evaluated as having a low performance in reading and/or writing achievement tasks. However, according to the PRS's diagnostic criteria, not one of these children was identified as having a learning disability based on teachers' ratings. It is therefore hard to conclude that the PRS can be recommended for identifying children who are thought to have reading or writing deficits, or in other words, developmental dyslexia.

Keywords: Learning Disabilities, the Pupil Rating Scale Revised (PRS), Applicability, Limitation

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INTRODUCTION

On the basis of the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10, 2016), learning disabilities are characterized by a significant discrepancy between an individual's general intellectual function and their ability to acquire new language and other cognitive skills. Evaluation and testing by a trained professional can help identify specific learning disorders. Developmental dyslexia is considered a relatively common subtype of specific learning disorder. According to the International Dyslexia Association (Lyon, Shaywitz, & Shaywitz, 2003), developmental dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties recognizing words accurately and/or fluently, and poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities.

Developmental dyslexia is also a common subtype of learning disability in China (Shu & Meng, 2000). Following the definition of developmental dyslexia, we assume that some reading and writing tests as well as cognitive ability tests need to be conducted when diagnosing a child as having developmental dyslexia. However, checklists are widely used as screening instruments for learning disabilities in China. One of these checklists is the Pupil Rating Scale-Revised (PRS) (Myklebust, 1981), which is characterized by its ease of use and interpretation. It consists of five subscales: Auditory Comprehension, Spoken Language, Orientation, Motor Coordination, and Personal-Social Behavior. Scores on the first two subscales are combined to produce a Verbal Score; scores on the remaining three subscales are combined to produce a Nonverbal Score. The Verbal and Nonverbal Scores are added together to produce a Total Score.

In previous studies, children's scores of Combined Raven's Test (CRT) were used to examine the criterion-related validity of PRS by conducting correlation analyses between the scores of CRT with the nonverbal scores, verbal scores and total scores of PRS (Jing, et al., 1998; Wei, 2004). Both these studies found that there were moderate positive correlation between the scores of CRT with the nonverbal scores, verbal scores and total scores of PRS.

The predictive validity of PRS was measured by comparing the correlation coefficient between PRS's verbal scores, nonverbal scores as well as total scores with children's scores on final exams (Jing, et al., 1998; Wei, 2004). These studies found that the verbal scores, nonverbal scores and total scores of PRS were significantly correlated with the scores of final exams. Exploratory Factor Analysis with Varimax Rotation was employed and this revealed the main factors of PRS were verbal, social adaptation, and operation, which was also divided into time and orientation as well as operation in the study by Wang, et al., (2010). In conclusion, these studies concluded PRS had good validity and was suitable for group screening of learning disabilities (Jing, et al., 1998; Wang, et al., 2010; Wei, 2004).

So far, the validity and reliability of a modified PRS as a screening checklist for learning disabilities has been tested by investigating the relationship between a modified PRS and the scores on final exams in many regions of China, as outlined above (Jing, et al., 1998; Wei, 2004). However, it is thought that the results of one final exam cannot reflect children's academic achievements objectively, because the difficulties associated with the final exam may differ between schools.

In addition, it is not clear whether PRS can detect each specific subtype of learning disability in Chinese children, because no previous study has investigated the relationship between PRS and data on basic academic skills (e.g. reading skills, writing skills, and calculation skills). Since developmental dyslexia is a nucleus subtype of specific learning disability, the effectiveness of a modified PRS should be tested in terms of the detection of developmental dyslexia to demonstrate the ongoing validity of PRS as a screening checklist. Moreover, the PRS could now be seen as dated, having been designed in 1981 and based on a specific interpretation of dyslexic difficulties extant at that time, when it is usually recommended that tests are revised every 10 years or so. The question arises, is the definition of dyslexia underlying the PRS still valid, is the PRS still valid in 2018 for Chinese children and how well does it compare with the scores derived from a range of tests of academic ability.

The aim of this study was to assess the validity of PRS as a screening checklist for developmental dyslexia. In this study, we investigated how effectively the PRS can detect children who show low performance on objective reading and writing tests, that is, children thought to have developmental dyslexia.

METHODS

Participants

The participants in this study were 140 third grade pupils (75 boys and 65 girls) from a primary school in Ningbo Zhejiang, China. The following tests were administered to them when they enrolled in the third and fourth grades. Teachers in charge of these pupils were asked to rate their students when the participants enrolled in the fourth grade.

Material

Word-reading task
To evaluate the reading accuracy of Chinese words, we conducted a word-reading task. The stimuli consisted of 20 one-character words and 20 two-character compound words (see APPENDIX A). All words were selected from textbooks that had already been studied by the participants. Equal numbers of stimuli in each character-length condition were classified into typical words or atypical words, in terms of the consistency of orthography-to-phonology mappings as follows.

Fang, Horng and Tzeng (1986) defined the consistency of correspondences between orthography and phonology in Chinese words. Following their definition, a character was classified as *consistent* if all characters with the same phonetic radical shared the same pronunciation; otherwise, it was classified as *inconsistent*. In addition, Fang, et al., introduced the concept of graded consistency. An *inconsistent* character was classified as *inconsistent-typical* if the pronunciation of the character was the most common pronunciation used in characters containing the same phonetic radical. An *inconsistent* character was classified as *inconsistent-atypical*, if the pronunciation of the character was not the most common in characters containing the same phonetic radical.

The degree of consistency in orthography-to-phonology correspondence (consistency value) is given by dividing the number of characters with the same phonetic radical and the same pronunciation of that character (i.e. number of friends) by the number of words with the same phonetic radical (i.e. number of neighbours). For example, seven characters were learned by the participants that shared the same phonetic radical, '令' (冷leng, 领 ling, 铃ling, 岭ling, 拎lin, 玲ling, and 龄ling). Of these characters, five characters—领, 铃, 岭, 玲, and 龄—are pronounced as *ling* (ignoring tonal differences).

The consistency value of these five characters is 0.71 (i.e. 5/7). In this study, we classified readings of inconsistent-atypical characters as *atypical* reading when their consistency values were below 0.4, and readings of inconsistent-typical characters as *typical* reading when their consistency values were higher than 0.6. As for single-character words, they were referred to as typical words, if the pronunciation was a *consistent* or *typical* reading; a word was referred to as an *atypical* word if the pronunciation was an atypical reading. As for two-character compound words, a word was referred to as a typical word if both constituent characters were read *as consistent* or *typical* reading; a word was referred to as an atypical word if at least one constituent character was read as an *atypical* reading.

Rapid word-reading task
To evaluate word-reading fluency, a rapid word-reading task was conducted. The stimuli consisted of 10 one-character words and 8 two-characters words that participants had already learned (see APPENDIX B). They were asked to read words as quickly and accurately as they could. Time was measured using stopwatches beginning when the children began to read, until they finished reading all the stimuli.

Rapid passage-reading task
To evaluate reading fluency, a rapid passage-reading task was conducted. This task consisted of one paragraph with 336 words (see APPENDIX C). The original first author for this study created the story. Participants were asked to read the passage as quickly and accurately as they could. Time was measured with stopwatches, beginning when children began to read, until they finished reading the passage.

Word-writing task
To evaluate word-writing accuracy, a word-writing task was conducted. The stimuli used were 12 two-character compound words that do not have homophones (see APPENDIX D). These words were printed out in Pinyin (a phonemic coding system used in mainland China), and the participants were asked to write down corresponding words.

Raven's Coloured Progressive Matrices (RCPM)
RCPM was administered as an easy way to assess participants' intellectual maturity, and to exclude the effects of intellectual factors on reading/writing performance.

The Pupil Rating Scale Revised
We used a Chinese version of the revised PRS modified by Jing, et al., (1998). It consisted of five subscales, namely Auditory Comprehension, Spoken Language, Orientation, Motor Coordination, and Personal-Social Behaviour. The teachers in charge of the participants rated each child in terms of the five subscales.

PROCEDURES

At the time of the first data collection, a word-reading task, a rapid word-reading task, and a rapid passage-reading task were administered to participants. For the word-reading task, rapid word-reading task, and rapid passage-reading task, each child was tested individually, and the examiners recorded errors. Each child's responses were also audiotaped for later verification. The word-writing task and the RCPM were administered in the classrooms. In the second data collection, the word-writing task and the RCPM were administered to all the participants in this study who were also evaluated by their classroom teachers using the PRS Revised. Teachers in charge of the classes were asked to review the PRS evaluation methods before they rated their respective pupils. All of the checklists were collected on the same day.

RESULTS

The children whose RCPM scores were below -1.5 SD were excluded (n = 7) from further study, to ensure the group were in the normal range for non-verbal IQ. The children whose reading or writing test scores (tests 1 to 4) were below -1.5 SD (in more than one test) were classified as part of a RWD group (having a reading/writing disability), that is, they were thought to have 'Reading deficits' or 'Writing deficits'. The main findings can be summarized as follows: 12% of the children (n = 16) were assessed as having a problem reading Chinese Words accurately, 9% of the children (n = 12) were assessed as having a problem in reading fluency, and 8% of the children (n = 11) were assessed as having a problem writing Chinese Words accurately. Among the RWD group, 54% of the children (n = 13) showed a single deficit in reading accuracy, reading fluency or writing accuracy. 29% of the RWD group children (n=7) showed double deficits in these reading/writing abilities, and about 17% of the children (n=4) showed triple deficits. Table 1 presents the deficit patterns of the RWD group.

Table 1. The deficit's patterns of the RWD group

		Reading accuracy	Reading fluency	Writing accuracy
Single deficit (Total 54%, n=13)	25% (n=6)	✗	○	○
	16.6% (n=4)	○	✗	○
	12.5% (n=3)	○	○	✗
Double deficits (Total 29%, n=7)	12.5% (n=3)	✗	✗	○
	12.5% (n=3)	✗	○	✗
	4% (n=1)	○	✗	✗
Triple deficits	17% (n=4)	✗	✗	✗

○ = Normal   ✗ = Deficit

According to the diagnostic criteria of the PRS, when total scores are below 65, and verbal scores are below 20, the child will be considered as having Verbal Learning Disabilities. On the other hand, when total scores are below 65, and nonverbal scores are below 40, the child will be considered as having Nonverbal Learning Disabilities. There was no participant who met these criteria. Thus, using PRS, no participants in this study were assessed as having Learning Disabilities. Table 2 presents the grade's mean score and standard deviation of the PRS.

Table 2. The Grade's PRS scores (n=133)

PRS Score	Max	Min	Mdn	M	SD
Verbal	45	23	41	39.06	6.34
Nonverbal	75	42	66	65.23	9.95
Total	120	68	105	104.29	16.04

Pearson product-moment correlation coefficients between the total PRS scores and performance on literacy tests were calculated. There was a significant correlation between the total PRS scores of whole grade and the performance on all literacy tests, with the exception of the rapid word-reading task.

Table 3. Correlation Coefficients between Total PRS Scores and the Grade's Scores on Reading and Writing Tests (n = 133)

	Total PRS Score
Word-reading task	.284 **
Rapid-word-reading task	-.156
Rapid-passage-reading task	-.334 **
Word-writing task	.476 **

*: p < .05 **: p < .01

Correlation coefficients between PRS subscales' scores and the scores of Reading and Writing Tests were also calculated per group. In the Normal group, the scores of Auditory Comprehension and Spoken Language are significantly correlated to the scores of rapid passage-reading and word-writing tasks. Moreover, there was a significant correlation between the scores of Orientation and performance on all literacy tests.

Table 4. Correlation Coefficients between PRS Scores and the Scores on Reading and Writing Tests for Normal group (n = 99)

	Auditory Compre-hension	Spoken Language	Orientation	Motor Coordination	Personal-Social Behavior
Word-reading task	.199*	.167	.215*	.095	.162
Rapid-word-reading task	-.103	-.118	-.218*	-.110	-.024
Rapid-passage-reading task	-.319**	-.274**	-.305**	-.303**	-.212*
Word-writing task	.392**	.355**	.300**	.285**	.317**

*: p < .05 **: p < .01

Table 5. Correlation Coefficients between PRS Scores and the Scores on Reading and Writing Tests for RWD group (n=24)

	Auditory Comprehension	Spoken Language	Orientation	Motor Coordination	Personal-Social Behavior
Word-reading task	-.019	-.044	.059	.068	.060
Rapid-word-reading task	.155	.274	.214	.133	.190
Rapid-passage-reading task	-.084	-.020	-.116	.035	-.148
Word-writing task	.425*	.363	.470*	.339	.412*

*: p < .05 **: p < .01

Table 6. PRS Scores for the RWD and Normal Groups

	RWD (n=24)	Normal (n=99)		
PRS Score	M (SD)	M (SD)	U	p
Auditory Comprehension	15.58(2.73)	17.88(2.67)	652	.000
Spoken Language	19.58(3.73)	22.16(3.52)	737	.002
Orientation	15.63(2.60)	17.90(2.67)	650	.000
Motor Coordination	12.33(2.10)	13.37(2.05)	825	.014
Personal-Social Behavior	31.79(5.51)	35.23(5.47)	753.5	.004
Verbal	34.96 (6.24)	40.04 (6.03)	660.5	.000
Nonverbal	59.54 (9.47)	66.49 (9.65)	735	.003
Total	94.5 (15.42)	106.54 (15.39)	712.5	.002

In the RWD group, on the other hand, only the score of word-writing task show the significant correlation with the scores of Auditory Comprehension and Orientation.

A Mann-Whitney U test was conducted to compare the PRS Scores for the RWD group and the Normal group. All PRS subscales' scores and the total score for the RWD group were significantly lower than those for the Normal group (p < .01).

DISCUSSION

No participants were identified as having learning disabilities by teachers' ratings in this study, even though 18% (n = 24) of the students showed low performance on objective reading and/or writing tests. Although the RWD group's PRS scores were significantly lower than those of the Normal group, none of the children in the RWD group met the PRS diagnostic criteria. The question is whether the differences in PRS scores between the RWD group and the Normal group are meaningful for identifying the children who have learning problems. Therefore, it is hard to say that the PRS is useful for identifying children with learning disabilities.

Although the PRS's subscales do not include any questions related to reading or writing abilities, some reading and writing tests in this study were significantly correlated with the total PRS scores. This suggests that the PRS might be showing the relationship between reading and writing abilities in Chinese. Previous research found some relationships between subscales and reading ability. For example, Colligan (1979) found that Auditory Comprehension correlates highly with reading capability in English. Why might we expect there to be a relationship between Auditory comprehension and reading? The answer seems to be that this subscale includes measures such as following instructions and retaining information, both associated with working memory which has been implicated as a contributory factor in dyslexia. The subscale of Spoken language is also directly linked to reading, and has also been found to be associated with success in reading in English-speaking children (Colligan, 1979).

The present study also showed that some reading and/or writing tests' scores were significantly correlated with the scores of Auditory Comprehension but these correlations were found in the Normal group only, if we separate the children by level of achievement. However, no such relationship pertained for the RWD group, who showed only a correlation between word writing and Auditory Comprehension. In addition, the Normal group's score of reading and writing were significantly correlated with the scores of Spoken Language, while the RWD's scores of reading and writing were not. Furthermore, the Orientation scores for the Normal group significantly correlated with performance on reading and writing tests. Being oriented means that one has an accurate awareness of time, place, direction, and relationships. The PRS includes these four aspects of orientation, some of which have been associated with dyslexia (Myklebust, 1981), aspects which tend to be overlooked in more recent tests. Thus, these

results suggest that performance on reading and/or writing in Chinese were correlated with the abilities of Auditory Comprehension, Spoken language, and Orientation overall, which is consistent with the results of previous research in English. However, the comparison between the Normal and RWD groups, in which the RWD group's scores on all of the subscales were significantly lower than that of the Normal group, suggests a different pattern for Chinese dyslexics than the English-speaking dyslexic.

In contrast, Jing, et al., (1998), who translated and revised the PRS into Chinese, examined pupils from primary schools in Guangzhou, and found that the prevalence of pupils with learning disabilities in Guangzhou was 8.3%. In addition, Wang, et al., (2010) conducted investigations in four primary urban schools in Zhanjiang, and found that 10.3% of the participants were identified as having learning disabilities. These previous studies succeeded in screening children with learning disabilities in Chinese. The difference between these studies and the current study would be that in this study objective measures of literacy were administered, so that we were able to compare the ratings on the PRS with actual achievement. By contrast, the previous studies relied on the findings of the PRS to identify children with difficulties, and this study suggests that those findings might well be inaccurate.

Sun and colleagues (2013) conducted investigations on over 6000 students from primary schools to investigate the prevalence of dyslexia and its potential risk factors. In the study by Sun, et al., (2013), children with dyslexia were identified not only based on the scores of PRS, but also with reference to the scores of the Dyslexia Checklist for Chinese Children (DCCC), a Chinese language test and the Combined Raven's Test. This suggested that when using the PRS as a screening test for developmental dyslexia, some other supplementary tests are necessary. According to the study by Sun, et al., (2013), gender, mother's education level, and learning habits (p<.01) were associated with dyslexia. Since PRS was used to evaluate children's behavioral characteristics at school by their teacher, a further study might be needed to investigate the family environment and children's behaviour at home when screening for learning difficulties. Moreover, the study by Sun, et al., investigated students only from grade 3 to grade 6. Children from grade 1 to grade 2 as well as kindergarten should also be included in the investigation so that we can clarify the prevalence rate of dyslexia in young children and start to intervene as early as possible.

In addition, the PRS has also been used for screening bilingual or multilingual students with study problems, as well as in learning English. For example, Johnson (1997) conducted investigations in an international school in Belgium to compare the learning achievements of pupils with the teachers' evaluations of these children using the PRS. The results of Johnson's study suggest that the PRS may indeed aid in the early identification of youngsters in the process of acquiring English who may also have learning problems.

Previous studies have considered the PRS as an effective tool for identifying learning disabilities. However, we are concerned that pupils who use a different language in school and in daily life might have problems listening or speaking. Many children with learning disabilities have difficulty processing auditory information (Johnson, 1997). It is thought that teachers have tended to give lower scores for bilingual pupils with some learning problems, since the PRS subscales emphasize the pupils' abilities on auditory comprehension and spoken language.

On the other hand, there are many kinds of dialects in most regions of China, whereas usually Mandarin is used in schools. Children who speak dialects at home use Mandarin at school. The PRS has been conducted in many regions of China, including Zhejiang, Jiangsu, and Guangzhou. In previous studies, teachers were asked to follow the manual of the PRS and rate the children objectively. As a result, the verbal and total scores of pupils in Guangzhou where children may speak Cantonese at home, were relatively lower than those in other regions (Wei, 2004). The influence of Cantonese, which retains many characteristics of ancient Chinese, has been found to lead to lower evaluations of pupils in Guangzhou. Children who speak a dialect seem to show low auditory comprehension and low spoken-language skills relative to children who speak Mandarin. Consequently, teachers are more likely to identify them as having learning disabilities.

According to the international definition of learning disabilities (ICD-10, 2016; DSM-5, 2013), not only Speaking and Listening difficulties, but also Reading, Spelling, and Calculating are included. A learning disability is represented as a category of disabilities in several domains (Fletcher, Lyon, & Shaywitz, 2002). In contrast, the subscales of PRS are focused on Auditory Comprehension and Spoken Language. It can be considered that children who have problems reading or writing may be overlooked when we base our assessments solely on PRS scores. Indeed, our results indicate that none of the children at risk on reading or writing would be correctly identified using the PRS. Moreover, it is not clear that the PRS was designed to consider differences in IQ level between those children who might be diagnosed as dyslexic, and those who have a more generalized learning difficulty based on low IQ.

Furthermore, many studies simply define groups of children as 'learning disabled' despite evidence that the meaning of learning disabled varies in different academic domains and even in different countries (Fletcher, et al., 2002). Although the PRS is divided into verbal and nonverbal subscales, it is difficult to specify what problems the children have, by relying simply on the results of the PRS. When a child has (or is at risk for) a form of developmental dyslexia, which is considered a common subtype of learning disability, objective reading and writing tests are necessary to identify what kind of academic difficulties she/he has. More importantly, specific identification can then directly link to intervention.

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APPENDIX A: THE STIMULI OF WORD-READING TASK

CHARACTER TYPE (CONSISTENCY VALUE)		
	TYPICAL	**ATYPICAL**
ONE-CHARACTER	跑 (0.66) 棋 (0.8) 飘 (0.75) 颗 (0.75) 极 (0.75) 望 (0.66) 递 (0.66) 诚 (0.66) 抵 (1) 练 (0.66)	贫 (0.13) 姐 (0.14) 枯 (0.4) 浇 (0.25) 灭 (0.2) 挂 (0.12) 盼 (0.13) 柴 (0.33) 输 (0.33) 攻 (0.25)
TWO-CHARACTER	傍晚 (1,0.66) 欺骗 (0.8,0.66) 骄傲 (0.66,1) 叮嘱 (0.71,1) 结构 (1,1) 议论 (1,1) 富裕 (0.75,0.75) 呼唤 (1,1) 旗帜 (0.8,0.75) 肌肤 (1,1)	眼睛 (0.11,0.25) 姑娘 (0.66,0.2) 感恩 (0.33,0.33) 价钱 (0.33,0.4) 推理 (0.14,0.66) 佳话 (0.12,0.25) 附近 (1,0.33) 等待 (0.16,0.16) 欣赏 (0.33,0.28) 路途 (0.2,0.33)

APPENDIX B:
THE STIMULI OF
RAPID WORD-READING
TASK

CHARACTER TYPE	
ONE-CHARACTER	**TWO-CHARACTER**
架　　笑 笔　　睡 捧　　桌 话　　盏 短　　蝉	辽阔　海洋 勇敢　粮草 检阅　呵护 菠萝　视线

APPENDIX C: THE STIMULI OF RAPID PASSAGE-READING TASK

爷爷坐在院子里扎(zā)灯笼的时候，我就坐在旁边的椅子上画画。我喜欢把爷爷认真工作的样子画下来。夏天的时候，院子里虽然很凉快，爷爷还是不停地用一条水蓝色的毛巾擦(cā)汗。

有一天我放学回到家，看见爷爷扎的灯笼已经堆成了小山。我就坐在旁边把小山一样的灯笼和爷爷画了下来。涂颜色的时候，我发现水蓝色的铅笔用完了，只好用绿色来画爷爷的毛巾。画完之后我拿给爷爷看，爷爷停下手上的活儿，用毛巾擦了把汗。他看着绿色的毛巾问我："为什么把爷爷的毛巾画成绿色呢？"我说："水蓝色的铅笔用完了。"爷爷听了，把画还给我，又继续埋头工作。

第二天我放学回到家，发现屋檐(yán)下的灯笼全部不见了。我吃了一惊，赶紧跑进屋里找爷爷。我才踏进屋里，就看到桌子上放着一盒崭(zhǎn)新的画笔。哦，一定是爷爷把灯笼卖了，给我买了画笔当礼物。

APPENDIX D:
THE STIMULI OF WORD-WRITING TASK

PINYIN	ANSWER
zhù fú	祝福
xiōng pú	胸脯
yuán fèn	缘分
huāng liáng	荒凉
xùn sù	迅速
qiān xū	谦虚
ān wèi	安慰
wēi xiǎn	危险
tǐ tiē	体贴
huó pō	活泼
fēn fāng	芬芳
yī kào	依靠

Working and Phonological memory in dyslexia and SLI children in Indonesia: preliminary studies.

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Abstract

This research aimed to identify the working and phonological memory profile and whether these differ in severity in dyslexic and SLI children who were identified with dyslexia in Indonesia. In experiment 1, the WISC subtest digit span had been administered to obtain information about phonological memory ability in every child. Both groups (SLI and DD+SLI) showed the same degree of severity in under average phonological memory, with a non-significant trend to greater deficit in SLI+ based on poorly developed specification. In experiment 2, the performance of children with SLI and dyslexia without co-morbidity was compared on tests of working memory and executive function. Both groups showed significant impairment in both numbers forwards and reversed, but children with SLI were significantly worse on numbers reversed than the children with dyslexia, indicating a greater difficulty in planning and executive function in children with SLI.

Keywords: Dyslexia, specific language impairment, phonological memory,
                  executive function, WISC

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INTRODUCTION

The outcome of several studies (Badian, 1998; Mann &Liberman, 1984; Gathercole & Baddeley, 1993; Gathercole, Willis, Emslie, & Baddeley, 1992) show that phonological memory contributes to the reading development of dyslexia children and language development of specific language impaired (SLI) children. Verbal memory span is often known as phonological memory or the phonological loop. This ability is one of the components of working memory (Baddeley, 2000). Verbal memory span involves the ability to listen to auditory information and then repeat this verbally. Baddeley, Gathercole, & Papagno (1998) proposed that verbal memory span (phonological memory) deficit has an effect on language learning (listening, speaking, reading, and writing), and phonological deficit has been the consensus as a marker (or proximal cause) of dyslexia (Catts, Adlof, Hogan, & Weismer, 2005; Fletcher, Lyon, Fuchs, & Barnes, 2007; Shaywitz, 2003; Snowling, 2000; Uhry, 2005).

Dyslexia (diagnosed on the basis of reading and spelling problems) can occur with or without specific language impairment (listening and/or speaking problems). If dyslexia occurs without specific language impairment (SLI), then language abilities such as semantic, syntax, morphology, and discourse ability are within the normal limits. It is different when dyslexia is comorbid with specific language impairment, then overall language abilities such as phonology, semantic, syntax, morphology, and discourse (pragmatic) would be disturbed. Some researchers also showed the risk of dyslexia is increased significantly in children by a diagnosis of speech sound disorder (phonological representation problem) and specific language impairment comorbidity (Lewis, Freebairm, Taylor, 2000, Lewis, Freebairm, Taylor, 2000). Verbal memory span (phonological memory) deficit in dyslexia and specific language impairment was recognized to be the profile for both populations, therefore the hypothesis which was submitted was (1) verbal memory span deficit is also the profile of Indonesian children dyslexia and specific language impairment, (2) there will be no difference in the degree of severity of the verbal memory span deficit on the dyslexia as compared with specific language impairment with dyslexia comorbidity.

METHOD

Participants

Participants in the research were ten children (N=10) recruited from the therapy center in Pekanbaru, Indonesia, including nine boys (9) and a girl (1). They were divided into two groups; (1) dyslexia group, and (2) specific language impairment group with dyslexia comorbidity. Children in both the dyslexia and specific language impairment group with dyslexia comorbidity had the diagnostic report of educational psychologists and speech therapists.

Instrument

Data used in the research was secondary data which extracted from the participants' diagnosis report. Information about verbal memory span ability was found from the WISC subtest digit span results (forward and backward). It assesses children's ability to memorize new information, hold it in short-term memory, concentrate, and manipulate that information to produce some result or reasoning processes. WISC (Wechsler, 1974) is the standard intelligence test instrument in Indonesia to measure intellectual ability in verbal and performance subtests.

RESULT

Descriptive analysis

Ten participants in the research have been divided into 2 groups, a) dyslexia and b) specific language impairment group with dyslexia comorbidity (Table 1).

Table 1. Participant description

	Dyslexia (n = 5)			SLI + Dyslexia (n = 5)		
	Mean	SD	Range	Mean	SD	Range
Age	9.40	1.95	5	9.00	1.58	4

Statistical Analysis

In terms of analysis, an independent samples t-test was conducted to test if there were differences in the score between the two groups. Before the statistic samples test analysis was conducted, the data were checked in a data normality and homogeneity test. Conclusions of the score results and hypothesis test results are presented on the table 2, 3 and 4.

Table 2. Mean (Scaled score) and SD

	Dyslexia (n = 5)			SLI + Dyslexia (n = 5)		
	Mean	SD	Range	Mean	SD	Range
Digit span	7.2	.84	2	5.6	2.30	6

Table 3. Mean (raw score) and SD

	Dyslexia (n = 5)			SLI + Dyslexia (n = 5)		
	Mean	SD	Range	Mean	SD	Range
Forward	4.40	.55	1	3.40	1.95	5
Backward	2.80	.45	1	2.00	1.23	3

Table 4. Hypothesis test statistical analysis result

Statistical analysis	Sig. (2-tailed)
Normality test	Dyslexia (.314); SLI + Dyslexia (.685)
Homogeneity test	.802
Independent samples test	.182

DISCUSSION

Analysis of the digit span scores of both groups children showed there was no significant difference between the groups, although the mean score of the dyslexic group was higher, and the performance of the SLI+ children more variable. It seems likely that the lower memory span in children with SLI+ is related to their deficits in language acquisition, which are typically more severe than the milder deficits identified in spoken language in dyslexia. This study concludes that verbal memory span deficit is the profile of the Indonesian dyslexia population including those with specific language impairment. Various researchers internationally also have stated the same with a similar pattern of results (Pennington, 2009; Flanagan & Kaufman, 2009).

This study has identified that there is a non-significant difference between forward digit span and backward digit span in dyslexia group compared to SLI + dyslexia group (table 3). However, it seems that the raw score in forward digit span is always higher than the raw score in backward digit span at both groups. This may happen because backward digit span needs a more complex manipulation rather than forward digit span. Although the raw score of forward digit span is always higher than the raw score

of backward digit span, interpretation is normally based on the combined raw score of forward digit span and backward digit span to derive the scaled score. This practice, however, can omit important information in the process of data analysis important for clinical practice (Reynolds, 1997; Banken, 1985). This is related to the working memory theory proposed by Baddeley (2000). Some experts state that forward digit span is related more to measuring the ability of phonological memory (phonological loop), meanwhile backward digit span is related more to measuring the ability of central executive (Alloway, Gathercole, Kirkwood, & Elliot, 2009). If dyslexia is a learning disorder based on phonological processing, it might be assumed that the raw score on forward digit span should have been lower than the raw score on backward digit span. Moreover, Swanson (1994) also stated that dyslexia is related more to the deficiency in forward digit span rather than the deficiency in backward digit span.

In their study, Jap, Borleffs, &Maassen (2017) have also identified that there are differences in ability in digit span in children without dyslexia (typical) when compared with children at risk of dyslexia in Indonesia (Table 5). These differences did not reach significance in this group, at either Grade 1 or grade 2, but a small effect size was identified for digits forward at both grade levels.

Table 5. t test results of typical readers and at-risk readers (Standard Indonesia) from Jap et al., 2017.

Component	Typical (n = 55)		At-risk (n = 9)		t test
	Mean	SD	Mean	SD	t
Forward	5.09	0.89	4.78	1.09	0.82
Backward	3.06	0.89	3.00	0.71	0.21

EXPERIMENT 2.

In order to establish whether the difficulties identified relate more to dyslexia than SLI, a 2nd experiment was undertaken with further groups of children, this time without co-morbidity.

INTRODUCTION

Verbal Memory Span (VMS) is often known as phonological memory or the phonological loop. VMS is a part of the working memory system (Baddeley, 2000) and is defined as the ability to hear sequential sounds through the auditory system and repeat them verbally. It differs from working memory (WM), which is the more complex capability to manipulate the received information (Baddeley, 2000). Based on clinical evaluation, those memories can be distinguished in two ways; (1) memory for numbers forward is evaluated to measure the capability of VMS; (2) memory for numbers reversed is evaluated to measure the capability of working memory or central executive (Vance, 2008; Alloway, Gathercole, Kirkwood, & Elliot, 2009).

Both these capabilities are important for learning oral and written language (Gathercole & Baddeley, 1990) with important implications for our understanding of the role of memory in children with language-based learning disability. Archibald and Gathercole (2006), for instance, reported that children with developmental language disorder or SLI (SLI) have problems with both VMS and WM, and children with specific learning disability (for example, developmental dyslexia or DD) are also found to have trouble with their VMS and WM (Giofre et al., 2016).

The objectives of this study are:
  (1) to identify VMS and WM profiles in the SLI Group and DD Group;
  (2) to compare the capability of VMS and WM in the SLI Group and DD Group;
  (3) to compare the capability of VMS and WM between the SLI Group and DD Group.

The hypotheses of this study as follows;
  (1) A VMS problem is the profile for children with SLI and DD;
  (2) the problem of WM is the profile of SLI, not for DD;
  (3) there is no significant mean difference between VMS and WM in the SLI Group, whereas it occurs in DD Group;
  (4) there is no significant difference of VMS between the SLI Group and DD Group;
  (5) there is a significant difference of WM between SLI Group and DD Group.

The specific questions asked in this study are:
  1. Is the problem of VMS and WM the profile for the following groups of Indonesian children:
    a) SLI
    b) DD

  2. Is there any significant mean difference between the VMS and WM in Indonesian children with the following profiles?

c) SLI
d) DD

3. Is there any significant mean difference between VMS and WM in Indonesian children with SLI and DD?

METHODS

Participants

In this study, the participants are divided into two groups: (1) SLI Group (n= 5 male children); and (2) DD Group (n=5 male children). The ten children were recruited from the Psychology Center University of Abdurrab Pekanbaru (Riau, Indonesia). The children (n=10; male) in this study were recruited based on the following criteria:

1. Developmental dyslexia without comorbid conditions (reading score 2 SDs below the mean, the IQ verbal and IQ performance greater than 85).
2. Developmental language disorder (SLI) without comorbid conditions (language score 2 SDs below the mean, IQ performance greater than 85).
3. Both criteria above can be seen from the diagnostic report on each child.

Materials and Procedure

The ten boys who were recruited (different subjects from Experiment 1), based on the above criteria, were scheduled for assessment of the capability of number memory forward and number memory reversed using TAPS-3 or Test of Auditory Processing Skill (Martin & Brownell, 2005). Unlike the WISC, TAPS has been designed to be administered by non-psychologists. Each child was assessed using TAPS-3 individually, and the assessment as well as the interpretation was conducted by the speech therapist. After each child is assessed, the speech therapist will change the raw score on each subtest (number memory forward and number memory reversed) to become a scaled score.

RESULTS

The ten boys were assessed using the Test of Auditory Processing Skills (TAPS-3) on the capability of number memory forward and number memory reversed subtest. Based on the analysis, the following results were obtained from a series of t tests comparing the 2 groups: (1) there is no mean difference between NMF and NMR in the SLI Group; (2) there is a significant mean difference between NMF and NMR in the DD Group; (3) there is no NMF mean difference between SLI Group and DD Group; (4) there is a significant difference of NMR mean in SLI Group and DD Group (table 2.1 and 2.2).

Table 2.1. Comparison of performance in the test of number memory forward and reversed (in-group)

Group	NMF	NMR	Levene's Test for Equality of Variances	Sig. (2-tailed)
	Mean (SD)	Mean (SD)		
SLI	4.4 (.547)	4.4 (1.51)	.237	1.00
DD	4.4 (.894)	7.6 (.547)	.532	.000

Table 2.2 Comparison of performance in the test of number memory forward and reversed (out-group)

Variables	SLI (n = 5)	DD (n= 5)	Levene's Test for Equality of Variances	Sig. (2-tailed)
	Mean (SD)	Mean (SD)		
Age	8.4 (.547)	8.2 (.447)		
Number memory forward (NMF)	4.4 (.547)	4.4 (.894)	.532	1.00
Number memory reversed (NMR)	4.4 (1.51)	7.6 (.547)	.237	.002

RESEARCH QUESTION 1A

Is the problem of VMS and WM the profile of Indonesian children with SLI?

Answer:
The problem in VMS and WM is the profile of Indonesian children with SLI. The mean (scaled score) in the SLI Group is 4.4 (2 SDs below the mean) on the NMF subtest and 4.4 on the NMR subtest (2 SDs below the mean).

RESEARCH QUESTION 1B

Is the problem of VMS and WM the profile of Indonesian children with DD?

Answer:
VMS and WM problems are the profile of Indonesian children with DD. The mean (scaled score) in DD Group is 4.4 (2 SDs below the mean) on NMF subtest and the mean on NMR subtest is 7.6 (1 SDs below the mean). Although VMS and WM are the profile of Indonesian children with DD, there are differences in terms of severity from children with SLI. On the NMF subtest, the scaled score is 2 SDs below the mean, while the scaled score on NMR subtest is 1 SDs below the mean.

RESEARCH QUESTION 2C

Is there any significant mean difference between VMS and WM in Indonesian children with SLI?

Answer:
There is no significant mean difference between VMS and WM in Indonesian children with SLI; where p > 0.05.

RESEARCH QUESTION 2D

Is there any significant mean difference between VMS and WM in Indonesian children with DD?

Answer:
There is a significant mean difference between VMS and WM on Indonesian children with DD; where p ≤ 0.05.

RESEARCH QUESTION 3

Is there any significant mean difference between VMS and WM in Indonesian children with SLI and DD?

Answer:
There is no significant difference in NMF mean between the SLI Group and DD Group; where p > 0.05. However, there is a significant difference in NMR mean between the SLI Group and DD Group; where p≤ 0.05.

DISCUSSION

In this preliminary study, the researcher found that the problem in VMS and WM is the characteristic profile for Indonesian children with a diagnosis of SLI. These findings correspond to various studies in developing countries, for example the study of Archibald and Gathercole (2006). Moreover, it seems that the compatibility with these study results is also found in the DD Group, where the problems of VMS and WM are characteristic of Indonesian children with DD, but the capability of WM (1 SD below the mean) is better than the VMS capability (2 SDs below the mean). The results of this study correspond to the research by Giofre et al., (2016) and Swanson (1999), which identify that problems in VMS and WM are characteristic of children with DD, and more specifically that WM capability in children with DD is better than their VMS capability.

Various researchers have argued that WM is more relevant for listening comprehension and reading comprehension than decoding (for instance, Pennington, 2009; Oakhill, Cain, & Bryant, 2003), and we know that the main symptom of DD is a problem with decoding (IDA, 2002). Based on this, it makes sense for researchers to hypothesize that the capability of WM on DD should be better compared to VMS capability. If children with DD have trouble with WM (2 SDs below the mean), not only reading, but also all academic fields will be affected (Swanson & Sache-Lee, 2001), and it seems to be related to other conditions, for example DD is comorbid with ADHD (Savage, Lavers, et al., 2007).

OVERALL DISCUSSION.

In experiment 1, we established that both children with Dyslexia and those with Dyslexia plus SLI showed impairments in both digit span forward and backward, with the greatest deficits in those children with co-morbid SLI and dyslexia. The question arises, whether this relates more to the SLI or the Dyslexia component? In order to unravel the relative contributions of the 2 developmental disorders, a 2nd experiment was conducted, in this case using children with no evidence of comorbidity, and comparing dyslexic and SLI groups. The results of the 2nd study indicated that both groups showed problems in numbers forward, but the dyslexic group, although impaired in numbers reversed, showed significantly less impairment than the SLI group. This suggests that SLI has a more deleterious effect on executive function than dyslexia, although it is likely that both groups will show some level of impairment.

LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH.

The current studies have limitations in terms of the sample size which is not representative of the dyslexic population in Indonesia. Further statistical differences between the groups could emerge when a larger sample is employed. Therefore, a representative sample which can represent the dyslexia population and specific language impairment in Indonesia is needed for further study in order to generalize these results. Studies that

examined the longitudinal impact of these differences over time would be the most useful. Nevertheless, this could be an important preliminary study in a country where statistical research has traditionally been limited.

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The role of RAN and PA in predicting reading difficulties in multilingual population: evidence from Telugu native speakers

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Abstract

This study addresses how one can screen reading difficulties in children with a multilingual background when there is no standardized tool for diagnosis in their native language. Rapid automatized naming (RAN) and Phoneme awareness (PA) are two widely applied tools for predicting reading difficulties. The role of PA in transparent languages and multilingual population is still a conundrum. We took a novel approach in developing RAN and PA in Telugu and tested them on the age-matched dyslexic and non-dyslexic groups. We analyzed our data with an independent sample t-test and found a high significance on RAN between the groups, but less significant difference in PA ability. These results demonstrate that RAN is a better predictor of reading difficulties in Telugu native speakers with a multilingual background.

Keywords :   attenuated processing, bilingualism , multilingualism, orthographic
                  consistency, reading difficulties, transparent language

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Rapid automatized naming (RAN) and phonological ability (PA) are considered standard methods in predicting skills and deficits in reading across orthographies (Catts, et al., 2015; Frith, 1985; Georgiou, G.K, Parrila, R, & Liao, C.H, 2008, Goswami, 2012; Kirby, et al., 2003; Snowling, 2000; Tan, et al., 2005; Wolf, et al., 2002; Wolf & Bower, 2000; Wimmer, et al., 2000; Wolf, 2002). However, the effectiveness of PA is being debated in transparent languages, because it is not clear why dyslexia manifests in some children who perform well in PA (Vidyasagar & Pammer, 2010). Moreover, these is evidence that even children with PA difficulties with a family history of dyslexia do not always go on to demonstrate dyslexia (Snowling, 2012). Interestingly, studies have demonstrated that reading difficulties in terms of decoding are less prevalent in transparent languages with a multilingual background (Abu-Rabia & Siegel, 2002; Chinta, Sampath, Bipin, 2016; Karanth, 2004; Paulesu et al., 2001). Given this background, the present study explores the RAN and PA abilities in Telugu native speakers with dyslexia who are from a multilingual background. We also examine whether or not PA is a useful diagnostic test for a transparent orthography with a multilingual population.

Reading is a complex cognitive task. Many children develop accurate reading with basic instruction and then achieve automaticity with time and practice, but this is a daunting task for children with dyslexia. However, there is not any single test and no absolute criteria for diagnosing dyslexia in multilingual people, because there are multiple processes involved in reading, and a breakdown of any of them can lead to reading failure. Inaccuracy at any level of language processing or lack of automaticity in connecting any of these circuits can lead to poor reading (Deheane, 2009). RAN and PA tasks are effective because children can perform RAN tasks (naming familiar objects or colors) and PA (speech sound manipulation) well before they can read, and research has shown that both are strong predictors of later reading ability and particularly for reading fluency (Goswami, 2012). RAN has been shown to be the best predictor of reading difficulties among transparent languages (Korhoneu, 1995; Wimmer, 1993; Pennington, 2006), whereas PA has been shown to be most effective in alphabetic languages (Shankweiler & Liberman, 1989; Snowling, 2013).

However, the effectiveness of RAN and PA for multilingual people has not been addressed yet, though a study has found longer naming latencies and lower reading scores in multilingual children (Fawcett, 2016). The current paper explores the RAN and PA abilities of Telugu native speakers with dyslexia, as some studies have found severe RAN deficits and few phonological awareness deficits among transparent languages (Ibrahim, R. 2015; Siddaiah, A., & Padakannaya, P., 2015; Vidyasagar & Pammer, 2010; and Wimmer et al., 2000). However, although reading speed is typically found to be a better predictor of reading problems than decoding accuracy, this does not mean that these speed difficulties are not a consequence of phonological weaknesses. Nevertheless, the influence of phonological processing seems to vary across languages, and in this study focuses on Telugu, a relatively under-researched language, in an effort to shed some light on these potential differences.

As the study presented in this paper is focused on the Telugu language, we would like to provide some background and details of its writing system. Telugu is one of the four South Indian languages spoken by 70 million people in two states of India (Census 2001); and 8.8 million people in United States, Canada, Europe and South East Asia (The US Census, 2006-2008). Telugu is an Akshara / alpha-syllabic based writing system, which adopts characteristics of both alphabetic and syllabic system. Here the rules of the writing system differ from those of English. In the Telugu script, syllables are regarded as the unit of representation and consist of primary and secondary graphemes for vowels and consonants respectively. The Telugu script has 56 graphemes and allographs. The language curriculum focuses on mastering these 56 Aksharas by rote learning and not on phoneme-based instructions as in English (Vasanta, 2004, as said in Chinta et al., 2017). Hence, we explore the nature of reading difficulties in Telugu native speakers with dyslexia, and whether these are phonological in nature. We explore the hypothesis that RAN deficits underlie the reading problems in this population with greater impact than phonological deficits.

METHOD

Participants

Participants were forty-six right-handed children from two primary schools in Hyderabad (urban area). The participants formed two groups: one group of twenty-three children with dyslexia (all received a formal diagnosis of developmental dyslexia by a clinical psychologist at the primary level, and had a documented history of reading difficulties) with mean age 12 years ten months (SD = 0.26 years); and a second group of twenty-three chronologically age-matched group (CA) of non-dyslexic children with mean age 12 years six months (SD = 0.10 years). They were initially contacted via the school psychologist and special educator. With parental consent, we obtained the history of participants from school academic records, and excluded those who had autism, ADHD, and seizures. Inclusion criteria were checked after the first testing session, which were IQ ≥ 100, reading ability (1.5 SD below the mean) and Telugu being the native language with a multilingual background (all children had received formal instructions in three languages: Telugu, Hindi, and English). We also assessed their verbal and performance intelligence and reading abilities according to the norms of NIMH, Hyderabad. This included IQ (tested with MISIC - Malin's Intelligence scale for Indian children, an adaptation of WISIC); and Seguin form board (SFB)/CPM (colored progressive matrices). Reading and spelling age were assessed using Schonell spelling test (the reading and spelling ages were determined only in relation to English, but not to Telugu). The sample had a fair representation of similar SES group (middle social-economic status) – this information was obtained from the school records (based on the employment status of their parents and residential/neighborhood level). Table 1 illustrates the descriptive statistics of participant's profiles.

Procedure

Participants were seated comfortably in a quiet room in their school with minimum distraction and were administered the test on a one-to-one basis for both the groups on RAN and PA tasks respectively.

Task

Given the absence of a standardized RAN and PA testing batteries in the local languages, we created a RAN and PA test stimuli for this study by adapting two sources. The first is the Telugu test of articulation and phonology developed for speech-impaired children (TTAP; Vasanta, 1990), which uses picture-based test stimuli. In the present study, we adapted the same material, but with the textual content (25 pairs of minimal pairs and 10 cluster words) and not the pictures. The reason is that the image-based material is designed for primary school children, whereas in the present study the participants were all 10-13 years (past primary school) and they all had formal instructions to read and write in Telugu (see Appendix for the stimuli).

We take the essence of the PA is to test for phoneme and syllable awareness – an ability to manipulate individual speech sounds in a spoken word. As we do not have a PA test in the Telugu language, we created one for our study as follows. The PA tasks consist of four sub-tasks: substitution; deletion; segmentation and non-word repetition skills, with each sub-task containing 10 items.

We conducted the experiment after three practice trials. Participants were instructed to listen carefully to the words said by the experimenter and respond as accurately as possible. Responses were recorded in an MP3 player and later scored for the percentage of accuracies.

Syllable substitution
It is the ability to replace a speech sound of a word with another speech sound to form a new word. For instance upon hearing the word 'jaebu' (meaning pocket) and another speech sound 'ka', the participant has to replace the 'ja' sound with 'ka' sound and answer 'kaebu' – (a non-word).

Syllable deletion
It is the ability to eliminate a speech sound of a word to form a new non-word. For instance, upon hearing the word 'udayam' (meaning 'morning'), the participant is expected to remove 'u' sound and report the remaining word as 'dayam' (a non-word).

Segmentation
It is the ability to divide and count the number of constituent syllables in a word, and report them (but not the syllable names). For instance, in the word 'satram'(meaning

'choultry') the participant has to divide the word into 'sa' + 'ta' + 'ra' + 'm' and report as four syllables.

Non-word repetition

In this test, ten pronounceable non-words differing in a single Akshara were created from a familiar word. Participants were instructed to listen carefully to the experimenter and repeat the non-word as accurately as possible.

The second source, adapted for RAN stimuli, was the Comprehensive Test of Phonological Processing (CTOPP) by Wagner and colleagues (1999). We developed four sets of RAN stimuli (objects, numbers, alphabets, colors), commonly used on RAN measures of English, and also added Akshara to test the automaticity in the native language. Since this set of RAN tasks were developed originally in English; a pilot study was executed with five Telugu-speaking children to evaluate the face validity of the RAN tasks.

The following modifications were incorporated in the Telugu version of RAN: the letter naming task was modified to reflect Telugu Akshara that do not represent the single consonant sounds as they do in English.

For instance, Telugu Akshara 'క'-represents syllable /ka/ but not phoneme /k/ as in English. Second, the object-naming task was modified to reflect the vocabulary differences between English and Telugu. For instance, the picture of an onion can lead children to utter different words having the same meaning: urllagadda, ullipaya, or 'erragadda'.

After the pilot study, the final RAN task for this study was composed of five plates (Figure 1) that represent each of the five stimulus sub-tasks:

- ♦   Digit-naming tasks consisting of five numbers (1, 2, 3, 4, 5)

- ♦   Alphabet-naming task consisting of five letters (d, s, a, p, o)

- ♦   Color-naming task consisting of five colors (blue, black, green, red and yellow)

- ♦   Object-naming task consisting of five objects similar to English RAN (ball, book, cup, dog, and the sun)

- ♦   Akshara-naming task consisted of five Telugu aksharas (బ – /ba/; న – /na/ ;మ –/ma/; స –/sa/; గ – /ga/)

This test was designed in the PsychoPy software, and all the readings were recorded in the software through the external microphone component. The total time taken to
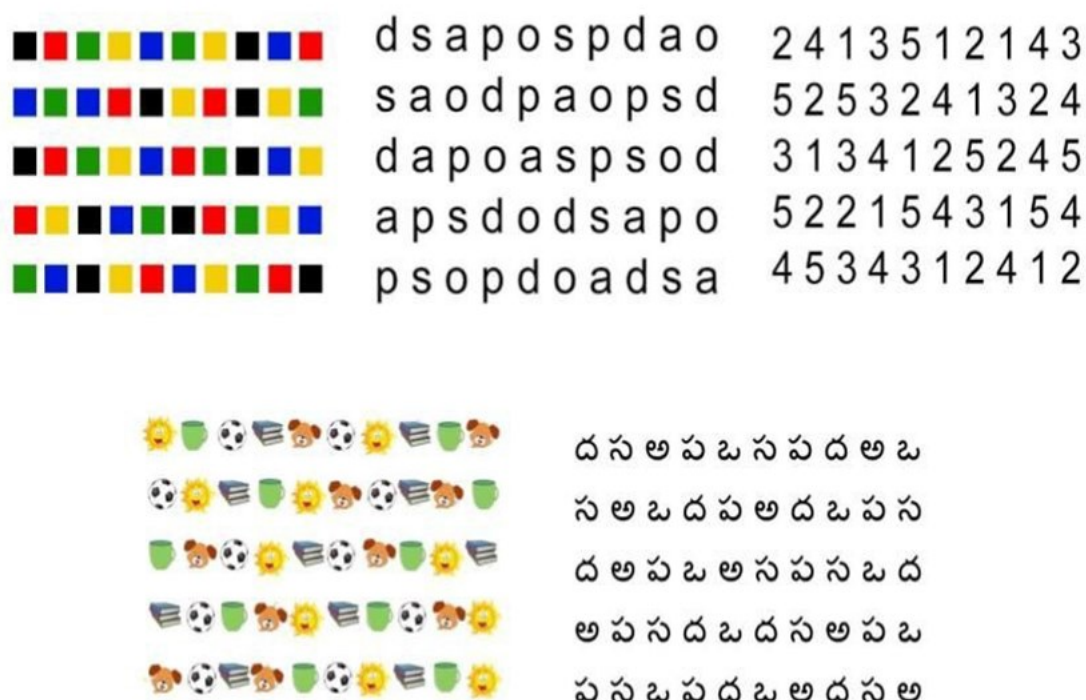
Figure 1. Stimuli for RAN, illustrating five blocks: colors, digits, objects, alphabets and Aksharas.

complete each task was measured. In keeping with the standard procedure for testing, each test was administered twice and averaged to obtain the mean scores (Park 2012). Test-retest reliability ranged from .915 to .994 (p < .001) and internal consistency scores (Cronbach's alpha) for each task ranged from .76 (Akshara naming) to .85 (digit naming).

ANALYSIS

The independent-sample t-test was conducted to determine whether dyslexic and non-dyslexic group differ in RAN and PA respectively. Pearson's correlation coefficients were used to examine inter-correlation between the five RAN tasks and relationship between all the variables in the RAN and PA tasks.

RESULTS

Table 1 illustrates the descriptive statistics of the groups on psychometrics. We found a significant group difference in the reading age and the spelling age with effect size, Cohen's d = 1.59 and 2.07, respectively.

Table 1. Descriptive Statistics of Psychometric Test: Mean, standard deviation, t, p, and Cohen's d.

We observed a response-time difference on the RAN task on all the sub-tasks (see Table

Parameters	Dyslexic M (SD)	Non-dyslexic M (SD)	T	P	Cohen's d
Chronological-age	12(1.3)	11.68(1.24)	.85	.39	.25
Reading-age	9.5(1.02)	11.68(1.64)	5.41	.001	1.59
Spelling-age	9.4 (.96)	11.68(1.20)	7.11	.001	2.07
ADHD.	16(1.2)	15.5(1.1)	1.47	.147	.43
IQ	102.8(1.03)	104.7(3.20)	2.75	.008	.79

Statistical Significance at 0.05
Notes: ADHD – Attention deficit hyperactive disorder; IQ – Intelligence Quotient.

2 for the descriptive statistics of RAN sub-tasks). There was a statistically significant difference between the overall response times of the dyslexic group (M = 53.29, SD = 3.63) and the non-dyslexic group (M =44.63, SD = 2.25): M = 8.66, 95% CI [6.86, 10.45], t (44) = 9.72, p < 0.05. As expected, the dyslexics were slower than their peer non-dyslexics on all the five naming tasks of RAN: color naming (p < 0.05, effect size = 3.77); alphabets (p < 0.05, effect size = 2.35); numbers (p < 0.05, effect size = 2.18); objects (p < 0.05, effect size = 3.44) and Akshara (p < 0.05, effects size = 2.6).

However, there was less statistical difference between the PA ability for the dyslexic group (M = 95.79, SD = 2.49) and the non-dyslexic group (M = 96.64, SD = 2.06): M = -0.85, 95% CI [-2.20, 0.50], t (44) = 1.26, p = 0.21. The dyslexics performed similarly to the non-dyslexics on all the PA tasks: substitution (p > 0.05, effect size = .46); segmentation (p >

0.05; effect size = .45); deletion (p > 0.05, effect size = .18); and non-word (p > 0.05, effect size = .15). See Table 2 for the detailed scores both RAN and PA tasks.

Table 2 Descriptive Statistics of RAN and PA: Mean, standard deviation, t, p and Cohen's d
Inter-correlation among the five RAN task

Parameters	Dyslexic M (SD)	Non-dyslexic M (SD)	T	P	Cohen's d
RAN-Color	64.08(3.2)	54.07(1.96)	12.75	.001	3.77
RAN-Alphabets	33.87(2.37)	29.39(1.28)	2.87	.006	2.35
RAN-Numbers	34.80(2.13)	30.47(1.82)	7.41	.001	2.18
RAN-Objects	64.79(2.7)	56.71(1.92)	11.69	.001	3.44
RAN-Akshara	68.94(7.79)	52.52(4.31)	8.84	.001	2.6
PA-substitution	96.32(1.52)	97.09(1.79)	1.53	.13	.46
PA- segmentation	93.90(6.1)	96(2.3)	1.54	.12	.45
PA- deletion	97.95(.65)	98.14(1.28)	0.59	.55	.18
Non-word	95(1.7)	95.36(2.9)	0.49	.62	.15

Note: Statistical significance at 0.05

Overall, RAN tasks were highly correlated. For children with dyslexia, the inter-correlation among RAN tasks ranged from .610 (alphabet naming with color naming, p < 0.05) to .535 (alphabet naming with Akshara naming, p < 0.05) and .443 (alphabet naming with Akshara naming, p < 0.05) and .443 (alphabet naming with digit naming p < 0.05). The strongest correlation was between the alphanumeric and non-alphanumeric tasks. Similarly, the inter-correlation among the RAN tasks for the non-dyslexic group ranged from .608 (alphabet naming with digit naming, p < 0.05) to .418 (Akshara naming with digit naming, p < 0.05) and .694 (Akshara naming with color naming, p < 0.05). However, we observed only a moderate correlation between the PA tasks, with a

Table 3 Correlation between RAN and PA tasks of Dyslexic and Non-dyslexic group.

Dyslexic	Numbers	Objects	Alpha-bets	Akshara s	Substitut ion	Deletion	Segment ation	Non word
Color	.553*	.548*	.610*	.627*	.374	- .099	.020	.097
Numbers		.454*	.443*	.388	.293	.218	.061	.117
Objects			.392	.328	.397	-.294	.279	.103
Alphabets				.535*	.300	-.247	-.043	.013
Akshara					.380	-.157	-.136	-.126
Substitution						.159	-.044	.229
Deletion							.525*	.358
Segment-ation								-.087
Non-dyslexic	Numbers	Objects	Alpha-bets	Akshara s	Substit-ution	Deletion	Segment ation	Non word
Color	.271	.425*	.169	.694*	.043	.219	.071	-.291
Numbers		.332	.608*	.418*	.052	-.105	-.007	-.287
Objects			.354	.654*	.068	-.206	-.295	-.189
Alphabets				.290	.156	.136	-.083	-.122
Akshara					.026	-.107	-.429*	-.480*
Substitution						.160	.364	-.079
Deletion							.397	.087
Segment-ation								.223

Note: * P<0.05

maximum significance level of 0.05 for both groups. For children with dyslexia, the inter-correlation among PA tasks ranged from .525 (deletion and segmentation, p < 0.05) to .358 (deletion and nonword, p < 0.05) to least correlation .229 (substitution and nonword, p > 0.05) to .159 (substitution to deletion, p > 0.05). Similarly, for non-dyslexics a correlation was observed ranging from .397 (deletion and segmentation, p > 0.05) to .087 (deletion and nonword, p > 0.05) and -.160 between (substitution and segmentation, p > 0.05) to .364 (substitution and deletion, p > 0. 05). (See Table 3.)

DISCUSSION

Numerous studies have shown that RAN and PA skills play a fundamental role in predicting current and later reading skills, and also in distinguishing proficient readers from poor readers in school-aged children (Bowers & Newby-Clark 2002, Wolf et al., 2000). Associations between RAN and PA reading scores have been documented in both alphabetic and logographic scripts (Leong et al., 2008; Ho & Lai 1999). However, there are not many studies on the performance on RAN and PA in transparent orthographies, especially with a multilingual background. Therefore, the present study investigated the potential differences in RAN and PA among multilingual Telugu native speakers with and without dyslexia.

Significant differences were observed in all the five RAN tasks between the groups. Despite the familiarity of items in the RAN tasks, dyslexics were slow in recalling and naming them, indicating a delayed processing. Differences in the speed of naming were also observed. The dyslexic group performance on the naming speed revealed this pattern: alphabet > digit > color > object > Akshara. For the non-dyslexic group, this was similar except the interchange of the Akshara and color positions, i.e., alphabet > digit > Akshara > color > object. The inter-correlation among the five RAN tasks was high, but within the group differences were observed. The dyslexic group showed a high correlation between alphanumeric tasks (alphabet and digit naming) . Interestingly, the strongest effect sizes here were found for the non-literacy based tasks, with both color and object naming more significant than the other RAN tests. Moreover, performance for both groups was slower on these tasks, suggesting that these might be particularly useful in screening, even prior to school age.

However, we did not find a significant difference in the sub-tasks of PA between the groups. Additionally, we observed a weak inter-correlation within the PA tasks. Qualitative analysis of the PA tasks found that the accuracy differences were negligible between the groups, but found a difference in response times. This indicates an attenuated processing in the dyslexic group, which could be a cause for deficits in naming too. This result supports Ibrahim., 2015 and Chinta et al., 2017.

Although phoneme awareness deficits are considered as causal factors for reading deficits in dyslexia, we did not find a significant difference between the groups. We

consider this important difference between the groups on the PA as an advantage of reading transparent languages, where the phonological representation is syllabic (i.e., the unit grain size is a syllable, and the phonological consistency is transparent (one-to-one mapping between grapheme and its constituent phoneme). Another factor is the consequence of being multilingual, which improves their cognitive, and word-level skills as they get exposed to different languages and adapted to different speech sounds, thereby enhancing their PA ability. This study implies that response time or naming speed (RAN) in the area of reading ability is a useful diagnostic tool for learning difficulties. Based on these results, we claim that it is more of an attenuated processing speed across all the activities among the dyslexic group and these results are consistent with the earlier studies (Bialystok, 2001; Cho & Chiu, 2015 and Oren 1981).

In further research it would be useful to explore further the reasons for this lack of significance for PA in Telugu. For example, the novel aspect of an akshara representing both syllable and phoneme information, may lead to differing influences of phonological processing in this language. Alternatively, the teaching method of focusing on rote learning reported as the method used in schools here, may lead to less emphasis on phonological decoding. Finally, the nature of the phonological tasks created may identify less differences between the groups, and alternative tasks might have been more useful. An excellent way forward here would be to explore some of these skills in younger children.

Given the absence of standardized screening test for dyslexia in native languages or in the languages that the child gets the instructions in a multilingual discipline, we suggest that RAN is the best predictor for early diagnosis reading difficulties. Although PA is considered a golden standard for diagnosis, it was not effective for transparent languages with a bilingual and multilingual backgrounds.

We summarize the current study as follows: First, the performance of the dyslexic group in five RAN tasks was significantly lower than that of the non-dyslexic group. Second, the number of accurate responses in the nonword repetition test showed moderately negative correlation with the object naming and the color naming tasks, indicating relative closeness between the alphanumeric and non-alphanumeric processing. By contrast, the correlation for the dyslexic group was very low.

Notably, there were good negative correlations for the non-dyslexic group between the naming speed for the Akshara, and non-word repetition, indicating that the faster a control student completed this naming task, the more rapidly and accurately that student repeated the given non-word. This pattern was not present for the dyslexic group, suggesting that they did not benefit from the familiarity of the akshara in their performance, or the similarities to known akshara in the non-word repetition. By contrast, the dyslexic group show a positive correlation between deletion and segmentation, suggesting that performance on these tasks are similar, as would be expected as they

are both syllable based. The strongest correlations for the dyslexic group were found between the naming tasks, most highly between color naming, Aksharas, alphabets and numbers in descending order, reflecting similar slowness in naming these categories. Here their pattern of performance is similar to, but slower than non-dyslexics.

Interestingly, Abu- Rabia and Siegel (2002) conclude that '*Phonological processing skills, as measured by pseudo-word reading, are highly correlated with word recognition skills in both English and Arabic. Disabled readers in Arabic show the same difficulties with phonological processing as do disabled readers in English.*' (page 675). In further studies it would be useful to consider non-word as well as word reading for this group. Nevertheless, this study implies that the parameters response time and naming speed are in themselves effective measures of reading ability. Analogous results have been found in other transparent languages, for instance, in German, Spanish, Chinese and Hungarian (Wimmer et al., 2000; Escribano & Katzir, 2008; Smythe, Everatt, & Salter, 2004). Interestingly, in the past RAN has been subsumed under phonological processing, and considered as either developing in conjunction with PA, or as a separate core deficit (Wolf and Bowers, 2000). Our results suggest that in an environment and language that does not favour the development and teaching of phonological awareness, processing speed overall may be more useful in early identification of dyslexia.

CONCLUSION

This study concludes that RAN is a better predictor of reading difficulties than PA in children with dyslexia. Limitation of this study is that it included only the Telugu native speakers in the urban area, further research is needed to explore the RAN and PA deficits among rural schools, where Telugu is the medium of instruction, for generalising the results.

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AUTHOR NOTE

APPENDIX : STIMULI USED FOR THE PA TEST

Substitution	Segmentation	Deletion	Non-word
1. ఈగ - ఉ	1. బాగుంది -బ+గ+ఉన్+ది	1. ఆకరు - ఆ	1. పట్టు -టప్పు
2. అల్లం - ఇ	2. అపాయం - అ+ప+య+ం	2. ఛందస్సు - చ	2. కళ్ళు - కచ్చి
3. ఆరు - య	3. నలుగు - న+లు+గు	3. మధ్యనం - మ	3. నల్లి - నబ్బి
4. డబ్బా -మ	4. ఉదయం - ఉ+ద+య+ం	4. కషాయం - షా	4. అతుకు - సతుకు
5. ఫలం - తె	5. వస్తువు - వ+స+తు+వు	5. విషయం - వి	5. అద్ది - అప్పె
6. పాలు -చ	6. నేరము - న+ఇ+ర+ము	6. పొధున్న - పొ	6. భయం - సయం
7. బటణి - న	7. పచ్చని - ప+చ+ని	7. రుచిగా - చి	7. డబ్బు - వబ్బు
8. జేటు - క	8. మామిడి - మ+మి+డి	8. విమానం - వి	8. లాభం -టాకం
9. చేప - మ	9. సమయం - స+మ+యం	9. పల్లె - ప	9. అల్లం - చిల్లం
10.పకోడి - ట	10. యంత్రం - య+న్+త్ర+ం	10. టిక్కెట్టు - టి	10.షీము - జీము

PRESCHOOL EARLY LITERACY INTERVENTION

DAS Dyslexia Association of Singapore

Specialised Educational Services
UNLOCKING POTENTIAL
Specialised Educational Services (SES) is a division of Dyslexia Association of Singapore.

OUR AIM

The SES Preschool Programme aims to help pre-schoolers at risk of having dyslexia or developmental delay in early literacy, acquire skills and strategies to become confident achievers when they enter primary school.

Aa Bb Cc De Ee Ff

ea meat
ch cheese
ee tree

COMPONENTS COVERED IN A TYPICAL LESSON:

• Spelling
• Reading
• Phonograms
• Alphabet knowledge
• Sight words
• Social-emotional learning

OUR APPROACH

Three key features of our approach:

1. Hands-on and multisensory activities: In teaching alphabet knowledge, phonograms and sight words.

2. Interactive and engaging lessons: When practicing skills and strategies in reading, spelling and writing.

3. Incorporation of Social-emotional Literacy (SEL) in sessions: To foster soft skills necessary for greater Primary 1 readiness.

RECOMMENDED FOR

K1 and K2 children attending kindergarten, childcare centre and/or EIPIC programmes who have difficulties in learning to read, spell and/or write.

Preschoolers in our programme will be advised to go for a School Age Psychological Assessment when they turn 6. Children diagnosed with dyslexia have the option to continue with the Main Literacy Programme.

For more info, visit www.das.org.sg

Exploring the effectiveness of the Family Literacy Programme with Singaporean preschool children at risk of literacy difficulties

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Abstract

Early literacy lays the foundation for the acquisition of conventional literacy skills, with lack of adequate literacy skills profoundly impacting on later school success. Family Literacy Programmes (FLPs) are interventions that promote active participation among families to improve their child's literacy. This research explored whether an FLP impacts on the early literacy achievement on Singaporean preschool children identified at risk of literacy difficulties. Two research questions were investigated: (a) Does FLP increase the early literacy attainment for preschool children, at risk of developing literacy difficulties, attending an existing literacy intervention programme? and (b) What were parents' perceptions of the effectiveness of FLP following workshops on early literacy? Participants included 8 parents and 9 preschool children from 4 to 7 years old enrolled in the DAS Preschool Programme. Data sources for analysis included pre- and post-test scores before and after intervention, post-workshop questionnaires and interview data. The research concluded FLP did not significantly improve the early literacy achievement of this group of children, although there was clear evidence of the impact of the programme overall. However, this masked differences between improvement on concepts of print for the experimental group, but only the controls for letter identification, key factors in early progress. Moreover, parents had a positive perception of the effectiveness of FLP, which provided skills and knowledge for parents to teach and guide their child in home-based literacy activities. Future research could look into the content and design of FLP in order to train parents more effectively, and provide literacy knowledge, skills and instructional strategies. In-depth and research-based evidence should be implemented to evaluate the long-term effectiveness of FLP.

        Keywords: early intervention, preschool, parents, family literacy programme

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INTRODUCTION

Research has shown that the development of emergent literacy skills at preschool is related to the development of conventional literacy skills required for academic success in later school years (Lonigan et al., 2013). Children with inadequate emergent literacy demonstrated poorer academic achievements, compared to their peers with competent literacy skills (Dennis and Horn, 2011; Duncan et al., 2007). Consequently, early intervention has been widely advocated to reduce the literacy gap. The earlier the child receives the intervention, the lower the likelihood that the child develops severe reading difficulties (See and Koay, 2014). Moreover, family environment influences a child's literacy acquisition.

A number of factors, including family income, parental occupation and educational qualifications strongly predict a child's literacy attainment (Feinstein, Duckworth and Sabates, 2008). Parents from low-income families were less likely than middle-income families to engage in conversations and book reading routines to promote literacy skills (Hoff, 2006). Children from low SES acquired lower literacy skills and higher risk for future literacy difficulties (Heath et al., 2014; Baroody and Diamond, 2012). These children's literacy attainment tended to be poorer compared to their more advantaged peers. Family Literacy Programmes (FLPs) were designed to encourage literacy development at home, based on the theories of Vygotsky and Bronfenbrenner.

LITERATURE REVIEW

Two well-established theories, Vygotsky's Sociocultural Theory (1978) and Bronfenbrenner's Bioecological System Theory (1977) underpin the Family Literacy Programme (FLP), a family intervention programme that promotes literacy to alleviate literacy difficulties.

Vygotsky's sociocultural theory (1978) described learning as a social process that is influenced by the interaction between people and sociocultural experiences. He proposed children developed language through interaction with a more knowledgeable other (MKO) that is any individual who has a better understanding or a higher ability than the child. Parent and child literacy interaction helped to scaffold and support their child's zone of proximal development (ZPD) which is the difference between what a child can accomplish alone, and what they can achieve with the support of a MKO (Shaffer, 2009). There are advantages of this theory. First, it is a child-centred approach where the child is an active participant in the learning process. Second, a MKO can scaffold, extend and enhance learning to increase their language and early literacy skills. Third, it recognised the importance of the child's environment. Differences in family environment such as parental education and household income have been found in a number of studies to contribute to a child's development of literacy skills (Heath et al., 2014; Baroody and Diamond, 2012).

Bronfenbrenner's bioecological theory (1994) also proposed that the environment, including genetics, affected an individual's development. It consisted of four components: Process-Person-Context-Time. The process referred to the interaction between the individual and his environment, the person referred to a child and his individual characteristics such as age, and the context and time. The context comprised of four systems: microsystem, mesosystem, exosystem and macrosystem. These consist of the following:

♦   **Microsystem**: Immediate institutions and individuals that the child interacts with. Examples include family and school. Proximal processes occur to produce and sustain development.

♦   **Mesosystem:** Interactions between the microsystem. Examples include neighbourhood, school, and religious or peer groups.

♦   **Exosystem:** The broader community the child lives in where the child rarely has direct interactions. Examples include educational system and government agencies.

♦   **Macrosystem:** The attitude and idealogy of the culture such as the laws, cultures, economic system, public policies.

The time dimension highlights changes over time affecting both the individual and his environment. There were advantages of this theory. First, it recognised differences in the individual's characteristics may affect development. Genes may make individuals at risk of developing literacy difficulties (Kendler and Baker, 2007; Parachinni, Scerri and Monaco, 2007). Second, different systems interplayed to influence the child's development. Dearing and colleagues (2006) found increased family involvement predicted an increase in the child's literacy achievement, especially for children at risk. With high family involvement, children from low income and low maternal education are able to gain literacy achievement.

Contribution of family literacy as an intervention towards literacy gains

Research has indicated that the Family Literacy Programmes (FLPs) are an effective intervention approach to promote active participation among families to improve their child's literacy development (Steensel et al., 2011). They create a literacy rich home environment that supports and manages literacy development.

A meta-analysis covering 16 FLP studies involving Kindergarteners and Grade 3 students reported parents who used specific literacy strategies made greater gains in reading achievement compared to parents whose involvement was limited to listening to their child reading (Senechal and Young, 2008). Furthermore, Sheridan et al., (2011) found

improvements in preschool children's language use, reading, and writing ability. Although both control and experimental groups made consistent gains during the first year of study, those in experimental groups continued to make gains during the school holiday period, arguably due to parents' continuous literacy engagement in the absence of a classroom. However, despite the positive contribution of FLP in literacy development, there are weaknesses in this field of research that must be considered here.

Brooks, Pahl, Pollard and Rees (2008) found there were few negative findings in a meta-analysis on sixteen FLP research studies conducted in the English language, predominantly from England, with non-English speaking countries; Malta, Turkey, and a Zulu-speaking area in South Africa, and bilingual program in Malta and Chicago, United States. However, this may indicate a potential bias in reporting positive findings because academic journals are less likely to accept negative findings. In addition, four studies using the gold standard in intervention research, randomised controlled trials, reported low significance for results on the effectiveness of FLP implemented in the United Kingdom and other countries. The four FLPs studied were Raising Early Achievement in Literacy (REAL), Dialogic Reading, the Even Start In-Depth Study, and Parent Empowerment through Family Literacy (PEFa) (Brooks et. al., 2008).

By contrast, Steensel et al., (2012) in a review of eight different meta-analyses on FLPs research from 2008 to 2010 concluded FLP contributed significantly to children's literacy skills. However, literacy gains ranged from large and negative scores to large and positive scores. Despite using well-designed research and meta-analyses on FLP, discrepancies in research findings could be due to challenges in methodology and implementing FLP.

The first challenge in based on participant retention as most FLPs comprised of families from low socioeconomic status whose family situation such as lack of caregiver, busy schedules and family commitments may limit their participation (McElvany and van Steensel, 2009). Second, the medium of instruction is usually English, which may not be a participant's first language. Language problems could have influenced the support rendered as it hampered the transfer of programme content from trainers to parents (McElvany and Steensel, 2009). Third, the amount of resources provided to participants was dependent on the type of literacy skills to be covered in FLP. An FLP that involved reading intervention required researchers to provide reading material and handouts about reading. It also involved researchers spending time to design the activities and program. These challenges would have to be taken into consideration when designing an FLP as it may affect the research findings.

Theoretically, deficits in phonological awareness and cerebellar processing contribute to dyslexia, leading to symptoms of difficulties in reading, writing and spelling (Fawcett and Nicolson, 2008; Spironelli, Penolazzi, and Angrilli, 2008). As phonological awareness is a core deficit observed in those at risk or diagnosed with dyslexia, most interventions

incorporate some of the principles: phonics-based, multi-sensory, cumulative and sequential learning and explicit teaching. It was found that preschool children in Singapore who were at risk of literacy difficulties made literacy gains when they received early intervention at DAS. The longer they were in the intervention programme, the greater the gain in literacy ability (Sim, Wong, Samsudin and Bunn, 2015). Interestingly, however, a study by Fong et al (2016) working with preschool children and parents in Singapore, found that parental support based on reading, spelling or flashcard support, seemed to have a negative impact on pre-schoolers' progress.

A limitation that Fong and colleagues (2016) noted for this study was that no training was given to the parents in how to provide support, and no attempts were made to measure the amount of involvement that parents had with their children's literacy. In order to improve a child's literacy development, an FLP could be introduced at the environmental/home level. FLPs were designed expressly to promote active literacy participation at home, with the goal of enhancing the child's literacy outcomes. The question arises, is support from parents who have received training via an FLP likely to prove more useful than untrained support?

Rationale

The aim of the research was to explore the effectiveness of an FLP on the early literacy achievement of Singaporean preschool children identified to be at risk of literacy difficulties. It was hypothesised that the FLP would lead to improvement in five early literacy areas: letter identification, concepts about prints, word test, writing vocabulary, and hearing and recording sounds in words. Two research questions guide this study:

- ♦ Does an FLP increase the early literacy attainment for preschool children at risk of developing literacy difficulties attending an existing literacy intervention programme?

- ♦ What are parents' perceptions of the effectiveness of the FLP following workshops on the importance of early literacy?

Participants

Preschool Children
9 Singaporean preschool children at risk of literacy difficulties participated in the study. They were enrolled in the DAS Preschool Programme. The control group consisted of 3 girls and 2 boys. The preschool children's ages range from 4 years 11 months to 6 years 5 months (mean age = 74.25 months). 4 were Chinese and 1 Indian ethnic race.

The combined family monthly income are as follow (see Figure 1), from which it may be seen that these are largely low income families in need of support.
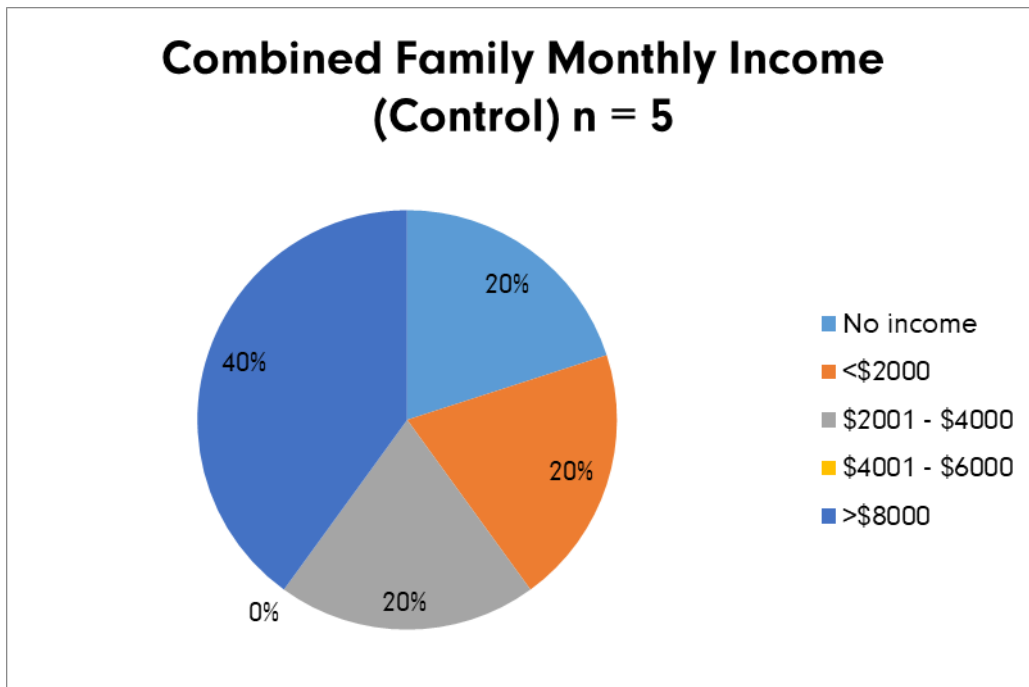
Combined Family Monthly Income (Control) n = 5

Figure 1: Combined family monthly income for control group n = 5.

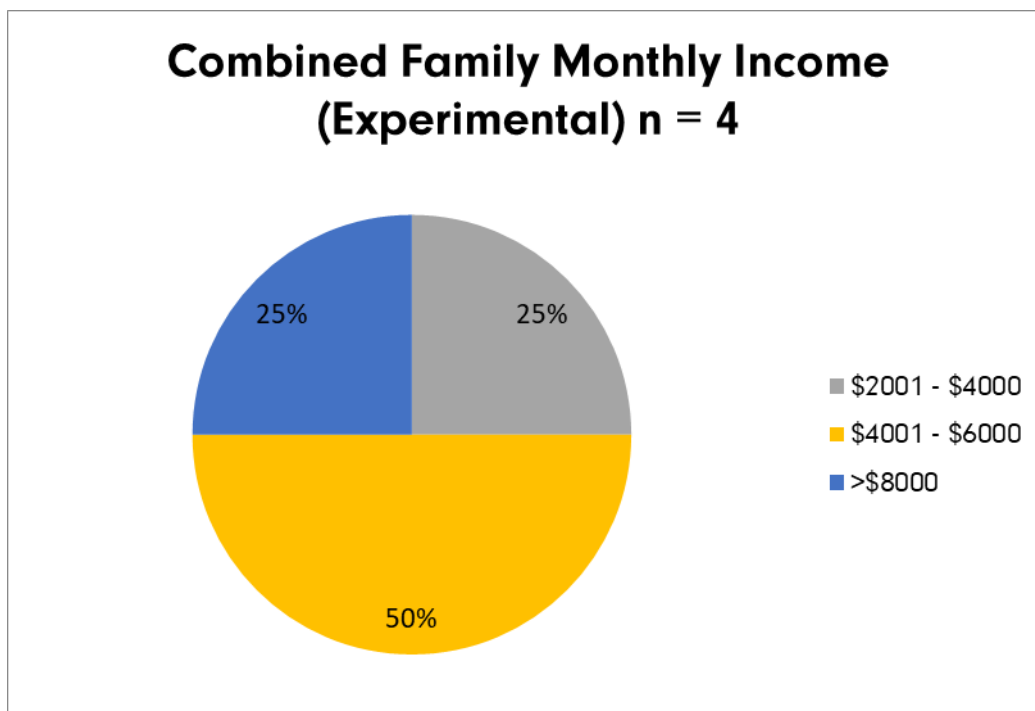## Combined Family Monthly Income (Experimental) n = 4

Figure 2: Combined family monthly income for experimental group n = 4.

The experimental group consisted of 4 boys. The children's ages range from 5 years 3 months to 7 years 1 month (mean age = 71.6 months). 2 were Chinese, 1 Malay, and 1 Indian ethnic race. The combined family income are as follow (see Figure 2).

Parents

A total of 8 parents and guardians had consented to be part of the study. They were all female. Their age ranged from 31 to 50+. 1 of the parents had 2 children who were enrolled in DAS Preschool Programme. Parent' highest educational qualification are as follow (Figure 3).
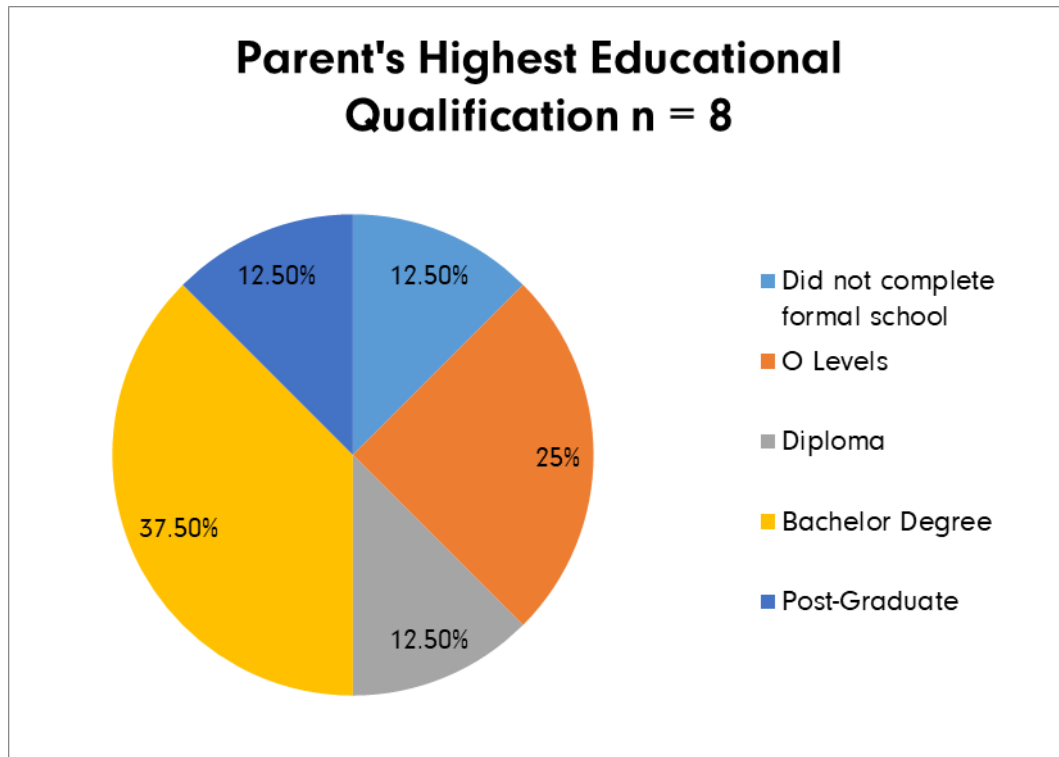
Figure 3: Parent's highest educational qualification.

Design

Both qualitative and quantitative methods were used in for this study. A pre and post-test quasi-experimental research design, questionnaire and phone interview were used for this study.

Measures

Family SES

Parents filled in a questionnaire by checking in the respective boxes to provide details regarding their gender, age group, race, marital status, language spoken at home, highest educational qualifications and combined family monthly income.

Log sheet

Each parent was given a log sheet to keep a record of the activities that were carried out at home, by recording dates and placing a tick on the respective column headings: recognising letters, recognising sight words, before, during and after reading strategies.

The Observation Survey of Early Literacy Achievement

The Observation Survey of Early Literacy Achievement was administered to all pre-school participants (Clay, 2002). This was conducted by the researcher. This was consistent at both pre and post-test. It is a standardized assessment tool to assess early literacy skill in young children from 5 years to 7 years old by recording their early reading and writing behaviour (Clay, 2002). The assessment tool had a reliability of alpha coefficient .87; split half .89, and validity of correlations greater than .70 (D'Agostino, 2012). The 5 components used to measure the child's early literacy skills were: Letter identification, concepts about print, word test, writing vocabulary and hearing and recording sounds in words.

Letter identification

Letter identification determined the letters the child knew and recognised. A list of uppercase and lowercase letters were printed on two individual A4 paper, using Comic Sans font 14pt. The child had to identify and call out the letters as the researcher pointed at each letter, working across the page, starting from left to right, in a non-alphabetical order. The uppercase letters, followed by the lowercase letters were shown to the child. If the child did not respond, the researcher prompted the child whether or not he knows the letter or the sound it makes. If the child does not respond to the first letter, the researcher pointed to the letters in the child's name and then goes back to the first line. A check is placed in the 'A' column for each correct letter response, a check in 'S' column for each correct sound response, and a check in 'I.R.' for each incorrect response. 1 point was awarded for each correct letter named.

Concepts about print

Concepts about print determined what the preschool child knew about the way spoken language is represented in print. The skills and concepts assessed include knowledge of book orientation, the directional arrangement of print, tracking of sentences, words, and letters, roles, and understanding of punctuation. The book entitled 'Stones' by Marie Clay that was developed for the purpose of this assessment was presented to each child. The child was asked a total of 24 questions from the checklist. 1 point was awarded for each correct response.

Word test
The word test determined if the child was building up a personal library of reading vocabulary words. These words are the most frequent words found in the text. The researcher chose List B, out of the 3 lists provided by Marie Clay Observation Assessment. There were 15 words in each list. Starting at the top of the page, the child reads each word, one at a time, as the researcher pointed to the word. 1 point was awarded for each correct response. The same list was presented at pre and post test.

Writing vocabulary
Writing vocabulary determined if the preschool child was building a library of known words that can be written in print form. The child wrote down as many words as they could on the paper given. The test had to be completed in 10 minutes. The researcher prompted the child by suggesting categories such as colours, animals, names and sight words when the child displayed difficulties with word writing. Each completed word spelled correctly scored 1 point. Reversed letters were marked incorrect as they could represent a different letter. Words that are written from right to left are marked correct even those containing a combination of reversed letters and correctly oriented letters. Capital letters are accepted as substitutions for lowercase letters. The score generated here is open ended depending on the knowledge of the child.

Hearing and recording sounds in words
Hearing and recording sounds in words assesses phonemic awareness by determining how the preschool child represents sounds in print form. To assess hearing and recording sounds in words, 1 out of 5 alternative sentences was selected to use in this study. A child is awarded 1 point for every phoneme written correctly. A total score of 37 can be awarded. Capital letters were accepted substitutions for lowercase letters. To avoid a practice effect, an alternative sentence was used for the post-test.

Post-Workshop questionnaire
Parents from the experimental group filled in a questionnaire to provide feedback for the FLP at the end of the second workshop. Parent had to respond on a 5-point Likert scale, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. Parents were also able to write down up to a maximum of three aspects of the content of the workshop that was most beneficial for them and other topics they would like to be included in future workshops.

Parents' interview at the end of workshops
Phone interviews were conducted six weeks after the FLP had ended. Questions focused on family literacy practices, parent's view of the FLP, and difficulties encountered while carrying out the activities with their child. The names of the participants have been changed.

Procedure

Recruitment of participants
Parents whose child were enrolled in the DAS Preschool Programme were invited to participate in the study. Only parents who were able to a) communicate in English as their first language, b) have access to internet or data connection, and c) possessed technological devices such as tablets, smartphones, and computers were recruited to ensure the successful administration of home literacy activities, and the ability to answer the online questionnaire. Parents were assured that their consent to participate or withdrawal from the research at any point of the study would not affect their child's intervention at the DAS Preschool Programme. Parents gave their informed consent and acknowledged each pair of children and parents was randomly assigned to control or experimental group. Parents were not made aware of their assigned condition.

Family Literacy Programme intervention procedures

The Family Literacy Programme intervention comprised of two 2h workshops.

Workshop 1—Letter play
The workshop started with a discussion on the importance of recognising letters and sight words. Activities involving identifying upper and lowercase letters, and sight words from Dolch List 1 to 6 were introduced to parents for them to carry out the activities at home.

Workshop 2—The importance of book reading
The workshop started with a discussion on the importance of book reading to increase print knowledge, vocabulary and language skills, followed by a demonstration on RAZ-Kids, an online book library made available for all preschool children enrolled in DAS Preschool Programme. Before, during, and after reading, strategies were introduced to parents. Before reading: Point to the front and back of the book, discuss the illustration on the book cover, mention the author and illustrator and identify the title of the book.

During reading: Track the words in each line with the index finger, prompt (who, what, when, where, why and how) questions, prompt and encourage children to make predictions, ask questions to increase knowledge, vocabulary, and comprehension. After reading: encourage the child to associate the story with personal experience, ask how they felt after reading the book, what did they learn, discuss and retell the story, ask their favourite section of the book, and why. A pamphlet containing questions to ask during, before, and after reading was provided for parents to carry out at home.

RESULTS

The results were collated and are reported in table 1.

Table 1. Table of mean scores for each child at pre and post test

Participants	Age	School Level	Letter Identification (Maximum Score 54)		Concepts about Prints (Maximum Score 24)		Word Test (Maximum Score: 15)		Writing Vocabulary		Hearing and Recording Sounds (Maximum Score: 37)	
			Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
E1	5	K1	51	49	4	8	0	0	0	0	0	5
E2	6	K2	53	53	10	16	13	13	9	16	27	28
E4	6	K2	50	52	12	16	5	8	2	8	15	16
E5	6	K2	52	52	10	11	6	11	10	11	20	17
Percentage			95.37%	95.37%	37.50%	53.13%	40.00%	53.33%	N.A.	N.A.	41.89%	44.59%
C1	5	K1	49	50	9	12	1	1	0	0	0	1
C2	6	K2	54	54	19	18	10	11	6	15	27	23
C3	6	K2	53	53	14	12	5	11	0	4	1	2
C4	6	K2	46	53	7	13	7	9	2	7	8	12
C5	6	K2	52	53	14	12	4	5	1	0	1	0
Percentage			94.07%	97.41%	52.50%	55.83%	36.00%	49.33%	N.A.	N.A.	20.00%	20.54%

A single factor between-subjects ANOVA was conducted on the difference between the scores for both pre-test and post-test to compare the effectiveness of FLP on the early literacy achievement on Singaporean preschool children identified at risk of literacy difficulties. The results for both groups for the pre and post tests were collated and a single factor ANOVA undertaken on the difference between the scores for both pre-test and post-test in order to establish whether there were any significant differences between the groups

Table 2. Table of mean improvement, statistics and effect sizes for experimental and control groups

Test	Group	N	Mean	sD	*ANOVA*	Cohen's d
Overall early literacy achievement	Experimental	4	10.25	4.99	F(1,7) = 0.15, p = .71	0.59
	Control	5	8.2	9.68		
Concepts of prints	Experimental	4	3.75	2.06	F(1,7) = 2.13, p = .19	*1.64*
	Control	5	0.8	3.56		
Hearing and recording sounds	Experimental	4	1	3.27	F(1,7) = 0.15, p = .71	*0.33*
	Control	5	0.2	2.95		
Vocabulary	Experimental	4	3.5	3.51	F(1,7) = 0.002, p = .97	*0.04*
	Control	5	3.4	4.03		
Word test	Experimental	4	2	2.83	F(1,7) = 0, p = 1	*0*
	Control	5	2	2.35		
Letter identification	Experimental	4	0	1.63	F(1,7) = 1.18, p = .31	-1.12
	Control	5	1.8	2.95		

There was no statistically significant effect of FLP on early literacy achievement, F(1,7) = 0.15, p = .71. Neither were there any significant results for any of the experimental tasks. The result suggested that FLP did not lead to an improvement in early literacy

achievement for preschool children identified as at risk of literacy difficulties and currently receiving literacy intervention programme.

The small number of participants in each group means that the intervention would need to be very effective in order to make a significant difference in this study. An effect size analysis was therefore undertaken in order to check for the impact of the intervention on the experimental group. An effect size of 0 means that the two groups are the same. An effect size of + or – 1 means that the intervention group is around 1 standard deviation better/worse than the control group. In terms of the statistical significance of effects sizes, 0.20 is considered low, 0.50 is moderate and 0.80 is high (Cohen 1967). If the group used is small with little variability within it, effect sizes will be artificially larger, because the standard deviation – the number used for division - will be smaller. Nevertheless, this approach can provide useful information where results are not significant overall, including identifying which aspect of the intervention has been most successful.

Parents' feedback after attending FLP

All parents had positive feedback after attending the FLP. From the parents' interview at the end of the workshop, it was noted that the hand-outs, materials, discussion and hands on activities helped parents in their understanding. They agreed they were confident in carrying out home-based literacy activities after attending the FLP. All parents agreed they were confident in carrying out before, during, and after reading strategies. The content covered in the workshops were also useful to them.

Parents' perception of the effectiveness of FLP

Three themes were identified through the qualitative data analysis. The three themes were: awareness, knowledge and social support.

Awareness
Overall, parents who received the FLP had positive feedback on the FLP. They agreed they were confident in carrying out home-based literacy activities. During the workshops, tips and strategies were shared with them. One parent, P1 commented the "strategies were useful and I could apply them at home" and another P2 commented, "teach children how to play with letters and reading". Another parent, P3 commented, "the material given are useful". Parents had a better awareness of how to support their child by applying strategies and using the resources to help support their children.

Knowledge
Swain et al., (2014) found through FLP, parents gained the knowledge of how to interact and converse with their child. One parent, P1 commented "the workshop provided the knowledge how a child progresses from reading and spelling simple word pattern. It managed her expectations towards her child's literacy". She also mentioned "the list of

sight words acted as a guide and she was able to chart the child's progress in recognising sight words." The activities that she carried out become more purposeful as she "wanted the child to read independently". She was more aware of the intention of carrying out a particular activity.

All parents recommended a repeat of the workshops to other parents because the "workshop can help parents to teach and guide their children", and "increase their awareness of what they can do to help their child improve". One parent suggested to get parents to "share some of their problems at the start or end of the workshops so the workshop can be focused on tackling the issues faced by pointing the parents to the right direction to start the programme depending on child's level and abilities". Another wanted a workshop that focused on behavioural management to "manage their child's behaviour towards and during learning, as he tend to be uncooperative and forgetful".

Social support

During the workshops, it was observed parents shared the difficulties they had encountered with their child and the strategies they had adopted to manage their child's literacy or behavioural issues. It has been noted in other studies that parents learned from and supported each other during the FLP sessions (Swain et al., 2014). Anderson and Morrison (2007) suggested that although parents recognised the role of the teacher in helping to develop their understanding of concepts, parents also learned from each other. It highlighted the importance of providing social support so parents were aware they are not the only ones encountering difficulties in supporting their child in literacy activities.

Three other parents also requested future workshops to include topics on managing a child's behaviour towards learning. During the workshop, one parent, P1 complained that the application of some reading strategies, such as independent reading, would not work for her because her child preferred to have an adult reading to him. Another explained her child would look at the pictures but not the text. Due to the small group setting of the workshops, and the environment created by researcher and parents' participation, parents raised important issues that could influence the effectiveness of applying strategies with their child (Anderson and Morrison, 2007).

DISCUSSION

This exploratory study sought to examine the impact of the FLP on children's progress in literacy, as well as solicit parents views on the usefulness of the approach. It is interesting to note that there are large differences between individual children and between individual tests on the level of proficiency at pre-test. The pre-tests themselves seem to be set at an appropriate level for this age group, with pre-test scores for the experimental group ranging from 37.5% correct, to 95.3% correct. It was notable that the 5 year old children were much more variable in their performance. Overall, the

experimental and control group were well matched, although there were clear differences in hearing and recording sounds, based on scores of 0 or 1 for 2 of the control children.

Even though the findings did not reach statistical significance, these findings had practical value. It seems likely that the small sample size made it difficult to differentiate the two groups on the basis of their progress in literacy. Moreover, individual differences in how children approach literacy at this early age, would be enough to ensure that no significant results would be found. However, it may be seen from table 2 above that overall, the FLP intervention had a moderate effect size on early literacy achievement, suggesting that these results could well have been significant if a larger sample size had been employed. Interestingly, there are extreme differences in the impact of the intervention of different subskills, ranging from very large to non-existent to negative. So, the largest impact is on concepts of print, there is a small effect on hearing and recording sounds, but no effect at all on either vocabulary or the word test and a negative effect on letter recognition, with the controls showing better results. This is because the experimental group showed exactly the same score at pre and post-test (51.5 out of a possible 54), whereas one of the controls had made substantial improvement. These results to some extent reflect the relative difficulty of the tasks, with the word reading and writing vocabulary amongst the hardest Concept of print is the earliest level in literacy, simply recognising the orientation of a book, and the concept of beginning and end in telling a story.

Interestingly, however, a number of important themes emerged from the questionnaire and interviews with the parents, relating to awareness, knowledge and social support. In the area of specific learning difficulties, these findings could influence the way professionals manage the partnership between Singaporean preschool children and their parents, for those children identified as at risk of learning difficulties.

IMPLICATIONS OF THE STUDY

First, contrary to earlier research findings that FLP led to literacy improvements (Sheridan et al., 2011; Senechal and Young, 2008), FLP did not lead to improvements in early literacy in this study of Singaporean preschool children at risk of literacy difficulties. This could be attributed to the small sample size. In Senechal and Young's (2008) research, they covered a bigger sample and wider age range, as opposed to a small group of participants in the current research. Second, the duration of FLP intervention was too short as it was only six weeks long. Third, the pre-schoolers here have been identified at risk of literacy difficulties, thus, they required extensive or explicit remediation.

Phonological awareness was one of the core deficits presenting in those at risk of literacy difficulties. Nicolson and Fawcett (2006) found almost all children with dyslexia displayed impairments in phonological awareness, and that children with phonological impairments at five years old will continue to develop difficulties in reading and spelling. As a result, effective intervention should incorporate the following principles: highly-structured and

phonics-based, multi-sensory, explicit teaching, sequential and cumulative learning, with overlearning to achieve automaticity (Reid, 2009). These preschool children were identified to be at risk of literacy difficulties, hence they respond better when teaching and learning adopt these principles. The Orton-Gillingham (OG) approach is a multi-sensory, systematic, sequential and cumulative phonological-based intervention that is used in Singapore. Educational therapists trained in the OG approach use explicit instructions to teach phonological awareness, letter-sound knowledge and other literacy skills. Lim and Oei, (2015) found Singaporean students with dyslexia between the ages of 6 to 15 years old demonstrated improvements in reading and spelling. More useful in this context however, are the findings by Fong, Lim, Alam and Lim, (2016) that found home support did not lead to literacy development in a sample of children and parents in Singapore receiving support at the DAS. By contrast, children in Fong et al's study whose parents provided support made less progress than those who did not. Parents of these children could have their own anxieties that created a negative learning environment based on frustration and angers, thus, the way home support was measured might have different effects on a preschooler's literacy development. In addition, the parents of these preschoolers may have similar literacy difficulties, hence, they may be limited in their provision of support, thus creating a reverse in their child's literacy development (Fong, Lim, Alam and Lim, 2016). This is reflected in the current study by some of the parents who reported difficulty with behavioural issues while undertaking the FLP with their children.

It seems that even the addition of training for parents, as provided by the FLP in the current study was not sufficient to improve literacy outcomes. Nevertheless, it is interesting to note that there is no evidence here for children deteriorating following parental support, unlike the earlier study by Fong et al., with a similar group of children in Singapore. This suggests that there have been subtle positive effects that may be difficult to measure on this group of children in this study.

Using the OG method on individuals with dyslexia or at risk of dyslexia leads to significant improvements in word attack, decoding, reading and spelling (Ritchey and Goeke, 2006) This pattern has also been found in Singapore following intervention at the DAS (Lim and Oie, 2015; Sim et al., 2015). However, implementing interventions based on the principles requires training, and the programmes can be used only by trained individuals (Reid, 2009). This finding implied that as the parent participants in the experimental group were not trained in the knowledge of the OG principles, only in the benefits of literacy support, it could even have hampered the teaching and learning process, and thus was not reflected in the improvement of overall early literacy skills measurement. This finding highlighted the need to look into how to support parents of preschool children with literacy difficulties more effectively. We need to consider whether teaching parents the principles or basic theoretical knowledge of teaching and learning are more effective than conventional participation in workshops.

However, parents had a positive perception of the effectiveness of the FLP. One parent commented it "provided the knowledge" and "materials provided aided in her supporting her child's literacy". Parent participation in the experimental group also gave positive feedback about the workshops. Overall, they would recommend the FLP to other parents because it empowered them to "teach and guide their children" and "increase their awareness of what they can do to help their child improve [their literacy skills]". Even though FLP did not lead to improvement in overall early literacy achievement, parents viewed the FLP as beneficial for them. They gained knowledge, skills and confidence that would help them interact effectively and improve their child's literacy development (Timmons and Pelletier, 2015). This finding reinforced the fact that parents do want and need to play an active role in their child's literacy progress. Parents learn best when experiences are meaningful to them (Patel, Corter and Pelletier, 2008). This finding highlighted that educators or FLP developers need to solicit parents' opinions and needs on the topics of interest with which they needed support, when designing the content of FLP. The FLP can not only meet the parents' objectives for attending the intervention programme but provide them with the theoretical and practical knowledge to apply in their daily interactions with their child.

Finally, managing a child's behaviour was a common theme raised while conducting the workshops and was indicated in the questionnaire conducted at the end of the workshop. During the workshop, parents exchanged tips on how they manage to overcome their child's behaviour while carrying out home-based literacy activities. This finding implied that parents encountered behavioural challenges that could possibly hinder the success of carrying out literacy activities. The results highlight that FLP developers would need to equip parents with a variety of instructional techniques such as effective rewards and praises, to support their child's literacy development (Terlitsky and Wilkins, 2015). When the child responded positively to their parents during literacy activities, parents experienced more positive interactions with their child (Robinson, 2012). These reciprocal effects fuelled both parent and child's motivation to engage in home-based literacy activities that contribute to their literacy skills development. In exchange, parents become more engaged in their child's learning and development. It is important to look into the development of the content of FLP, and to consider teaching both literacy activities and instructional techniques as part of FLP to empower parents.

Hence, the future FLP could be improved by looking into the content that covered theoretical and practical knowledge of literacy development, catering to parents' needs and topics of interest, and providing instructional techniques to manage challenging behaviour.

RECOMMENDATIONS

There is a need to provide well-informed training and support for parents. Crosby et al., (2015) proposed teachers and professionals need to help parents learn the necessary

skills should they want parents to carry out literacy activities with their child. In addition, ongoing support must be rendered in their work with their child. Second, teachers and professionals need to look into the topics of interest that will engage parents in FLP participation. Parents want to help their child in literacy development. Hence, there is a need to use evidence-based methods that have been proven to be effective. This was one of the principles proposed by Rasinski, Padak and Fawcett (2009) that promoted effective parental participation in FLP. When parents and children are able to experience positive interaction while implementing home-based literacy activities, parents become more engaged. Both positive outcomes create a cyclical effect that promotes literacy development.

LIMITATIONS

There were three limitations of this present research. The first limitation was the small sample size of parental and child participation. Due to the small sample size, there was no even distribution of demographic representation of the sample group in both experimental and control group in proportion to the population. It is worth exploring the possibility of conducting research by recruiting participants from different demographics to ensure the representativeness of the sample in DAS Preschool Intervention Programme. Second, there was subject inclusion where only parents who used English as their first language could participate in the research. Singapore is a multi-racial society where bilingualism is practiced. Thus, English proficiency varies among different families. According to the Department of Singapore Statistics (2016), only 23% of the population aged 5 years old and above used English as their first language. 77% of the population used their mother tongue language that includes; Mandarin, Chinese Dialects, Malay, Tamils and others as their first language at home. Bearing in mind there is a large presence of families with English as a second language, these families could benefit from the FLP. Third, more controlled variables for both experimental and control groups could be put in place. These could include the number of weeks the preschool child has been receiving literacy intervention at DAS Preschool Intervention Programme, the other literacy interventions the child receives outside of DAS, and the amount of time spent on literacy activities at home. This would help to control for external factors that could affect the validity of the study.

FUTURE DIRECTIONS

To conclude, the study seems to suggest that FLP is not effective on the overall early literacy achievement of Singaporean preschool children identified at risk of literacy difficulties. There is some evidence that concepts of print improved for the experimental group, based on a strong effect size, but any improvement in letter recognition was lower for the experimental than the control group. However, the FLP has reversed the negative impact found in earlier research (Fong et al., 2015), when parental support seemed to hinder rather than help children to progress. Moreover, parent participants had a

positive perception of FLP and would recommend it to other parents as it gave them the knowledge and skills to support their child's literacy development. Even though there was no significant improvement in overall early literacy achievement, effective FLP could still be an approach to improve a child's literacy. Parents play an important role in their child's acquisition of early literacy skills. As discussed, there are limitations to the present study. This study can be replicated with greater consideration for larger sample size, involving families from English as a second language background, ensuring an even distribution of demographic representation for both experimental and control group in proportion to the population in DAS Preschool Intervention programme, and more controlled variables to extend the reliability and validity of the research findings. For future research, it is important to look into the content of FLP that emphasise the importance of providing parents with training in literacy development, as well as in instructional strategies and how it impacts early literacy skills development (Capentieri, Fairfax-Cholmeley, Lister and Vorhaus, 2011). Researchers could also consider conducting follow-up interviews every three months, to understand the ongoing changes in parents' perception and practices of FLP. More in-depth and evidence-based research should be implemented over time and evaluated in order to evaluate the long-term effectiveness of FLP.

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Robots and children learning differently: A brief review of robot applications for young children

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Abstract

With technological advancements, children today may learn in ways that can be radically different from how their parents did. Considering the learning differences, the purpose of this review is to explore robot use for its potential benefits in educating today's children who need to be learning differently from the generation before. As children are growing up in an increasingly tech-savvy world, this review would serve to raise the awareness of robot applications developed for young children, so that more people can be sensitized to the adoption of robots for early childhood education. The studies and reports included in this review are a selection of robot applications used with children in the general population of early childhood (0 - 8) years. Based on collaborative efforts in function and design such as the use of puppetry, as well as curriculum design in areas such as behaviour modification, social or motor skills, numeracy, language and literacy through storytelling and/or games, the robot applications reviewed here have been found to present with great potential for a dynamic way to educate the young. Implications for use with children with special needs are discussed.

Keywords: Robot applications, young children, learning differently, general population.

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INTRODUCTION

Many children today will likely grow up into a world that is radically different from what their parents know and may be in professions that have not even been heard of yet. The idea that traditional professions can be potentially transformed due to the use of robots has lately been highlighted for many people. It is truly amazing how the roles of robots have evolved from traditionally carrying out mundane heavy duty or hazardous work in factories such as those in the automobile industry, to interactive service roles such as those in the education, hospitality and service sectors and even in the home of the man on the street. Driving such changes could be the shift in consumer preferences in an increasingly digital world. According to a recent Forrester Report (see Vitec Inc., 2016), only 28 percent of U.S. online consumers "prefer to contact companies via telephone or e-mail rather than using a company's website to get answers to their questions". As younger generations form the greater part of this market segment, they are likely to drive up the proportion of people who would prefer not to interact with humans for support (Vitec Inc., 2016), but to deal with a computer.

Due to the similarities between the two, virtual agents may be perceived by many as robots; hence, it is necessary to start with a technical distinction between them. According to Looije, van der Zalm, Beun, and Neerincx, (2012), a virtual agent is not a robot but an animated virtual character (usually with anthropomorphic appearance) with artificial intelligence that is generated by a computer. The authors pointed out that embodiment is the key difference between a virtual agent and a robot. The similarity, on the other hand, as pointed out by Vitec Inc. (2016) is that both are embedded in a program with predefined scripts and responses. They can be powered by a knowledge base, which contains a wide-ranging list of possible different questions, answers and gestures, allowing them to respond to human input in a somewhat human way.

Reportedly (see Coninx et al., 2016), robots not only have the core advantage over virtual agents in terms of real world interaction and manipulation (Stiehl et al., 2009; Shibata, 2011), but the physical robot is also more appealing to user perceptions (Komatsu & Abe, 2008; Wainer, Feil-Seifer, Shell, & Mataric, 2007). There is also the unconscious effect of the presence of a physical robot, as studies such as the one by Looije, van der Zalm, Beun, and Neerincx (2012) showed that the frequency and length of gaze of fifth grade children is greater for a real robot than a virtual form of the same robot. Coninx et al., (2016) also reported that when using real robots, the benefit to performance or other outcome is shown in ta number of contexts: learning (Bartneck, 2003; D. Leyzberg, Spaulding, Toneva, & Scassellati, 2012), motor skills (Kose-Bagci, Ferrari, Dautenhahn, Syrdal, & Nehaniv, 2009), and long-term behaviour change (Kidd & Breazeal, 2008).

With the advantage of embodiment over virtual agents to suit the context, the use of robots with young children is explored here for its potential benefits in educating today's children who need to be learning differently from the generation before. As children are

growing up in an increasingly tech-savvy world, this review would serve to raise the awareness of robot applications developed for young children, so that more people can be sensitized to the possibilities of adoption of robots for early childhood education. The review of studies and reports here is a selection of those applications used for children in the general population of the early childhood (0 - 8) years. The features of the review besides this brief introduction to robots are the type of robot used in the study and the context of use. The review concludes with a discussion on the implications and limitations found in the studies, as well as the implications for us with children with special needs. A quick overview of the robots discussed here and the research on which the findings are based is tabulated in Appendix 1.

LITERATURE REVIEW

Robots as programmable toys

Children learn through play, especially in preschool. Starting with simple robots that young children are familiar with, such as a toy car robot which can be programmed to move in various directions, forwards or backwards, left or right, etc., children can be taught the skills and language of giving directions to a robot. Problem-based learning (PBL) can be woven into the task. This involves problem-solving using executive function skills in planning the steps to take, such as getting to a specific location on a map. Language, literacy, numeracy or other subjects to be taught can be incorporated into the PBL curriculum.

To illustrate, an objective of a lesson may be to program the robot to travel to a spot on a map that has a corresponding alphabet for a letter sound, or a number that is the symbol for a given quantity. The children would therefore need to first find the answer to the question and then identify the number parameters on the map that has it. Then, they can be taught the skills in programming the robot to travel a number of squares in a prescribed direction on the map to the correct location. These ideas are not entirely new, and date back to the seminal work of Seymour Papert, who devised the Turtle, a small robot directed by young children using a simple computer language Logo in the 1970's (Stager, 2016). Clearly, the technical specifications of the current robots have benefitted from an explosion in the capabilities for interaction and application.

Robots such as the Bee-Bots and Pro-bots (from TTS Group Ltd, UK), the KIBO (from KinderLab Robotics, USA) and the KIWI robotics kits (from Tufts University, USA) are examples of programmable robots used in studies on preschool-aged children. In a study by Highfield (2010), Bee-Bots and Pro-bots were used as a catalyst for mathematical problem solving in an Australian classroom. Eleven of the children were aged 3 and 4 years and they were from a metropolitan pre-school. The brightly coloured Bee-Bot on wheels is apparently appealing to little hands and the plastic covering works well for easy cleaning in child care hygiene.

More recently here in Singapore, Play@TP, an experimental kindergarten in Temasek Polytechnic used the KIBO robotics kit as a tool for 35 of its preschoolers to acquire specific learning goals such as using programming skills to solve problems, as well as to tinker with technology (see Ng, 2015). Initially, the children made Chinese New Year cards with LED stickers and copper strips, and connected electrical circuits to power light bulbs and mini fans, to familiarize themselves with the potential of technology in play. In the study, the children created a sequence of instructions by scanning the wooden KIBO blocks to tell the robot what to do as it travels on its wheels, using buttons or an iPad program. This pilot study found that the children's concentration and perseverance in the face of difficult tasks improved with the use of this tool, and their co-operation in problem solving increased. For the KIWI robotics kit, a study on preschool children in the USA was done by Sullivan and Bers, (2016). The robot was also used like a vehicle as it has wheels. The children in the study successfully programmed their robots to go from point A to point B using number parameters on a map. The novelty of some programmable robots such as these is that they can do even fancier moves like dancing, spinning or producing flashing lights, sounds and music.

Learning how to pre-programme a robot to perform tasks autonomously has its advantages overusing a remote control to manipulate a robot's actions and movements which is more commonly known. Although a robot response can be elicited more spontaneously with a joy stick or a button control, this may result in unwanted human error or impulsive moves. Such issues can be avoided with careful pre-planning of an autonomous sequence of actions in relation to the environment. While the joystick cannot be shared and children may squabble over who gets the control, programming provides the platform for them to make shared decisions and for the work to be divided into different focal areas to start with, thus curriculum time can be better optimized. Besides, teaching such programming language uses the executive function skills of problem-solving in sequencing, estimating and planning which have been identified as a key factor in successful early learning.

Programming toy robots can thus be a novel way of helping children understand the elementary workings of industrial robots such as the autonomous forklift used in the logistics sector, and other autonomous or self-driving vehicles adapted for use on land, and even air and sea as well. Consequently, children are given early exposure to STEM (Science, Technology, Engineering and Mathematics) education through the use of such robots in their curriculum. This would make them potentially more able to contribute to the development of robotic solutions to overcome constraints in resources in our world. Robots as teachers

The drive for the research and development of robots has resulted in increasingly more complex robots being developed, so robots do not just perform laborious physical tasks but can become socially interactive as well. Such robots may take on human-like forms, so that young children are less likely to be afraid to interact with them. Robots that take

on human-like forms are known as humanoid robots. The use of remote control with robots can be very helpful when the robot is used to take the role of a teacher. In this role, the robot can be much bigger than a toy bee or car; hence the risk of damage caused by child mishandling is reduced. The other plus factor is that the control of the robot is in the hands of the human teacher instead of the student.

With remote control, humanoid robots can be used as a tele-presence tool to deliver lessons from a remote location, thus becoming like an avatar for the teacher. These robots have more complex abilities than the toy robots designed to be manipulated by children. To alleviate the workload of teachers, additional robot functions have been developed for robots to present learning materials, and even carry out administrative, entertainment, and/or social roles. The EngKey English teacher 'robot' from the Korean Institute of Science and Technology (KIST), South Korea is one such an example. This robot functions as a tele-presence tool that brings English teachers located in the Philippines to the schools in South Korea (see Grzybowski, 2013). Besides its popularity with the children, EngKey has also helped to address the shortage of qualified native-English speaking teachers in South Korea.

Humanoid social robots

Humanoid Social Robots (HSRs) have also been developed to function autonomously. One of the earliest autonomous HSRs used experimentally with children in early childhood is Infanoid (from the National Institute of Information and Communications Technology, Japan), which had worked with a sample of children averaging 5 years old (see Kozima , Nakagawa, and Yano, 2005). This robot is an upper-torso humanoid robot as big as a 3- to 4-year-old human child. Each of its two hands has four fingers and a thumb, just like a real child, for a variety of functions such as pointing, grasping, and other hand gestures. It is also capable of producing various facial expressions, like surprise and anger with its lips and eyebrows. Hence, Kozima et al (2005) pointed out that with Infanoid, children could progress from perceiving the robot as just a mindless moving thing, to realizing that it can operate not only as an autonomous system, but as one that initiates motion based on the attention and emotion it possesses.

Following Infanoid, Robovie (see Kanda, Nishio, Ishiguro, and Hagita, 2009), another HSR, capable of human-like expressions was also used experimentally with a large sample of young children (this time aged 6-7 years old; including 59 boys and 60 girls). Robovie (from ATR Intelligent Robotics and Communication Laboratories, Japan) is an upgrade from Infanoid as it has a much larger repertoire of expressions, consisting of 100 different behaviours (70 interactive, 20 idling and 10 moving) to engage children in daily communications. On top of this, Robovie also has the additional function of recognizing individuals using ID equipment. Reportedly, the children enjoyed interacting with the robot, and some even expressed sympathy for it. Kanda et al., (2009) highlighted that it was one of the first studies that provided evidence of children rapidly adapting to an

interactive humanoid robot and developing relationships with it. The humanoid robot has also been improved to look more life-like, such as the Hanson Robokind Zeno R50 (from University of Sheffield, UK). Compared to Infanoid and Robovie, Hanson which has a realistic silicon rubber ("flubber") face that can be reconfigured is not only more life-like as a peer, but is also more toy-like as a smaller HSR that can be placed on a table. Children were engaged in collaborative play in the game of "Simon Says" and facilitating helping behaviors towards robots in the experiments with this robot (see Cameron, Collins, et al., 2015; Cameron, Fernando, et al., 2015).

Another small HSR that functions more like a peer is NAO (from Aldebaran Robotics, France). It has also been used experimentally with young children, playing various roles in projects around the world. In one study under the ALIZ-E project, NAO was used for engaging children in a quiz game, an imitation game and a dance game. This robot was able to initiate, participate, and collaborate in the interactions (see Belpaeme et al., 2012). In another study under the ALIZ-E project, NAO's role was to act as a peer for a diabetes-related education through play programme in a hospital environment (see Coninx et al., 2016). Apart from the ALIZE-E projects, NAO was also used in the L2TOR project as an early childhood second language tutor (see Belpaeme et al., 2015). Nao is so versatile that it was even used as a dance robot tutor in the context of creative dance as well (see Ros & Demiris, 2013).

Nao has also been used as a teacher-assistant in other studies under the KindSAR project (see Fridin, 2014), where it performed tasks such as assisting teachers by engaging children in educational games and by telling pre-recorded stories to small groups of children while incorporating song and motor activities in the process. In another KindSAR project as a teacher-assistant, Nao was used to collect data on children's development over time with respect to their performance of specific tasks and responses to specific situations (see Keren and Fridin, 2014). More recently, Nao has even been put to work with another larger humanoid robot called Pepper (from Aldebaran Softbank Robotics, France). Pepper, with an embodiment like C-3PO from the Star Wars movies, was used with NAO for experimentation on collaborative play and interactive storytelling in a preschool project in Singapore (Info-communications Media Development Authority, 2017).

Using the learning-by-teaching paradigm, Nao has also played the role of a facilitator to encourage collaboration among young children. Harkening back to the days of Infanoid, only the upper-torso of NAO was used in this study, as it provided more stability for NAO to be placed on a table top in an attempt to showcase the versatility of its use (see Chandra et al., 2015). Young children with handwriting difficulties had also benefitted from the use of NAO as a learner in "Learning by Teaching a Robot: The Case of Handwriting". This study was also based on the learning-by-teaching pedagogy, for the learning of the psycho-motor skill of handwriting (see Lemaignan et al., 2016).

Autonomous social robots as child-minders

Autonomous social robots have also been featured in reports for their role in child-minding and preventing child-care accidents. One such model is the hybrid humanoid H3 robot from Advanced Industrial Science and Technology, Japan (see Simo, Nishida, and Nagashima, 2006). This robot is a hybrid because the robot's autonomous control can be superseded remotely with a combined fish eye camera and the parent's voice (via robot speakers) - used on the basis that it would be more familiar and appeal to the child better. In this way, it can be tweaked to overcome the limitation of the child ignoring the robot's articulated words during the experimentation of interactive storytelling.

For the very young, a small (11 inches tall) yellow snowman-shaped tabletop robot called Keepon (pronounced, "key-pong") has been experimented with 0-year-olds (from 6 months of age), 1-year-olds, and over-2-year-olds. Keepon (from the National Institute of Information and Communications Technology, Japan) is designed to perform emotional and attentional exchanges with children especially, in the simplest and most comprehensive way (see Kozima, & Nakagawa, 2007).

PaPeRo - "Partner-type-Personal-Robot" from NEC Corporation, Japan, is another model of small HSRs (see Osada, Ohnaka, & Sato, 2006). With an embodiment like R2-D2 from the Star Wars movies, PaPeRo has popularly been used in children's groups at day-care centers/homes, kindergartens and elementary schools.   This robot is purported to be capable of recognizing and verbally communicating with people, sending images by mobile phone, as well as playing games and singing along with others.

Sized a little larger than PaPeRo is iRobi from Yujin Robots, South Korea.   With telepresence functions, iRobi is commonly used as a teacher's aide there (see Palk, 2010). Originally designed as an educational toy, iRobi has an expressive digital face and an interactive LCD screen on its torso. It can be programmed to perform dances, tell stories, take digital photos, and maintain a virtual organizer. According to the CNN report by Palk, 2010, iRobi and a robot dog named Genibo have been helping out pre-school teachers in the city of Daejeon, and South Korea had aimed to introduce eight hundred and thirty of these types of robots into pre-schools by the end of 2010, with the goal of having them in kindergartens nationwide by 2013.

Creature-like robots

Robots that are creature-like, such as Sony's three models of 4-legged robotic dogs known as AIBO, were studied before, with young children by Stanford University, USA (see Okita & Schwartz, 2006). The sample consisted of thirty-two children from a university day care program with an age range of 35-66 months. The Sony AIBO robotic dogs from Japan, which came before South Korea's Genibo, were used in the study which focussed on young children's understanding of animacy and entertainment robots.

Other than taking on the embodiment of a dog, there is a robot with the embodiment of a cat. This should come with no surprise as such animal embodiments would make robots appealing to children as common domestic pets. Genibo was originally invented to play the role of a pet robot, but was redesigned to teach dance moves and gymnastics instead. The cat robot study used a robot known as iCat (from University of Birmingham, UK), which is a social robot that plays the role of a game companion for children using an electronic chessboard (see Castellano et al., 2013). Twenty-six Portuguese elementary school children (8 - 10 years old) took part in the study. It was found that iCat's empathic behavior, generated as a response to the user's emotions, positively affected how the children perceived the robot. They not only perceived the robot as a more engaging and helpful companion, but also provided higher ratings in terms of self-validation.

Other creature-like robots developed and experimented with children had plush features. These include the Show & Tell Robotic Puppets for preschool education (from NTU, Singapore) (see Causo et al., 2015), the DragonBot (from MIT Media Lab, USA) - an 18" dragon-like squash-and-stretch robot covered with a plush skin designed in collaboration with an expert puppeteer (see Kory & Breazeal, 2014) and the Tega robot (also from MIT Media Lab, USA) - a personal robot for social purposes (see Westlund et al., 2016). Both Tega and DragonBot (designed as a social character that interacts with children as a peer rather than a tutor or teacher) take those creature-like robots used experimentally with children to a higher level because of their interactive social features. Tega actually worked collaboratively with a virtual agent in the study, and accompanied the child participant on a pretend trip to Spainto learn new words in Spanish together. The DragonBot on the other hand, was programmed to play a storytelling game, introduce new vocabulary words during the game, and model good story narration skills. Data was also recorded to find out if the children learnt the target words from the experiment, and whether their language ability had improved overall after playing with the robot. The children's language was also transcribed and analyzed for content and structure. This included measures such as the number of words spoken and the language complexity.

DISCUSSION AND CONCLUSION

In this review, there are robot applications for the following uses: a) to teach children how to program a robot to execute physical movements and/or producing light and sound effects (e.g. KIBO and BeeBots); b) to administer a service (e.g. physical/social companionship, entertainment, teaching and/or child-minding). For the latter, the robots can be pre-programmed to autonomously respond to stimuli in both the physical and social environments. Such robots may be fitted functional hardware such as a camera for emotional recognition, playback for text to speech, motors for motion execution and microphones for speech recognition for its interactive functions. Although the repertoire of such robots can be limited, the development of hybrids with remote control to override the programmed functions is one way to overcome certain limitations.

Yet, hybrids may not be a fail-safe option as the social context for interaction can be unpredictable; hence, their adaptation to the child's needs can still be inadequate. For instance; a child-minding robot may still fall short of recognition and active responding in situations where it's job it so prevent imminent accidents (Osada, 2006). Therefore, even with remote control over-riding options, collaborative human efforts are still needed to ensure that children can remain engaged with the use of the robot so that the objective(s) set can be met.

With the advantage of embodiment over virtual agents, robots can be human-like or creature-like in form, and be constructed with hard coverings, human-like skin or animal fur-like covering. Hence, as with product design, the form, size and material used are factors to be considered for practicality of use in terms of durability, hygiene maintenance, context and appeal. For instance, the Bee-bot with its bright yellow hard covering is attractive and easy to clean. In addition, it is small enough for young children to manipulate it like pressing the buttons with their little fingers. With respect to the appearance of the robot, there is considerable potential to work in collaboration with experts. For example, the DragonBot was designed in collaboration with an expert puppeteer.

Generally, the robots reviewed here have proven to be popular with the children. An expert at KIST reported that "Children feel the robot is their friend. Robots are very helpful to enhance the concentration capability of children in class" (see Palk, 2010). As for teachers' feedback, some of the key takeaways are from those found in the TEGA robot study (see Figure 1 below - Westlund et al., 2016): "Consider how the study activity can complement curricular goals; teacher experience with the robot matters; be prepared early; identify and involve stakeholders from the beginning; make time to pre-pilot with stakeholders; involve teachers while respecting constraints on their time and attention; teachers are the experts in their classrooms; minimize disruptions; one-on-one and small group robot interactions can add value to the classroom; share with the whole class; promote curiosity."

Figure 1 - Lessons we learned during research in preschool classrooms, and where this advice applies to the research cycle (Westlund et al., 2016)

In choosing an appropriate robot application for teaching, other than considering an appropriate robot size and appearance to appeal to children or prevent misuse, the functionality of the robot needs to be aligned to one's objectives in using the robot. A robot's functional abilities may be limited in toy robots such as the KIBO or Bee-bot as they are not social robots and the repetitive nature of the activity can cause the novelty of the robot to wear off. Mishandling of small robots by children is a factor to consider as the damage can be costly and lessons may need to be cancelled or modified in replacement.

In comparison, social robots are more versatile than toy robots that are just for children to tinker with programming, as social robots have a repertoire of social interactive behaviours. Besides considering the social repertoires, another factor to consider is the size appropriateness for children's use, especially the very young. For example, in the study *Personalizing robot tutors to individuals' learning differences*, Keepon, the small tabletop robot, was chosen because of its size and the fact that it was particularly well suited to expressive non-threatening social communication (Leyzberg, 2014). To illustrate the latter - if the puzzle-solving strategy lesson in the experiment needed to be repeated, Keepon would start by apologizing for repeating itself by saying, "I'm sorry to repeat this hint but I think this will help." (Leyzberg, 2014, p3).

In designing the curriculum for subject areas such as behaviour modification, social or motor skills, numeracy, language and literacy through storytelling and/or games, there is the potential for collaboration with parties (storytellers, game designers, dance choreographers, etc.) who have the relevant expertise as well. With the structured, consistent and non-threatening or non-judgmental style of robot behavior, special-needs children, such as those with dyslexia or autism, would stand to benefit as well from a customised curriculum developed in collaboration with specialists. Hands-on activities such as programming a toy robot to travel to find an answer, dancing, playing games, quizzes with a robot or teaching a robot how to write would very likely pique their interest in learning! What's more, robots such as Nao can collect developmental data on changes over time, the DragonBot can analyse speech and language to investigate spoken communication. The future potential in reinforcing learning in an effective and appealing fashion could well be limitless.

Almost a decade ago, it was reported that technology curricula were unavailable and specific technological tools for special needs education was scarce in Finland (see Virnes, 2008). This was even as special needs education recipients made up almost a third of the school children between the ages of 7 and 16. The researcher implored: "The increasing number of special-needs children and the need for early intervention challenge teachers and researchers in this field to discover new and more effective solutions to the problems of special-needs children. Robotics, in the form of programmable construction kits and social robots, could make as great a contribution to improving the quality of special needs education. Technologies of this kind could enable

educators to recognize children's individual needs at an early stage of education and to compensate for their diagnosed disabilities. Robotics could also empower special-needs children to experience success in the learning of those technical skills that are central to our technology-oriented society" (Virnes, 2008, p30).

There appears to be much interest in the use of robots for educating children by authorities around the world now. Under the Infocomm Media 2025 Plan in Singapore, technology-enabled toys have been introduced progressively to 160 pre-school centres to foster creativity and problem-solving skills among children, through its Playmaker programme (see Info-communications Media Development Authority , 2017). Back in 2010, CNN had reported that the South Korean government was pressing ahead with plans to expand its "R-learning," (robot learning) program. Should we fear that governments would attempt to substitute real teachers with robots? The report mentioned that the South Korean government has no such intentions but plans to develop robots that provide assistance to teachers that meet expectations. Besides, the experts mentioned in the report expressed doubts that a robot will ever be better than a person. The reason given was that teaching is probably the most challenging role for artificial intelligence as it is a creative role and to teach well, one really has to understand the person being taught. Therefore, it was reported that a real fundamental leap in ability would be required before robots are capable of leading a classroom on their own.

To conclude, the studies reviewed here show that all over the world, there is a myriad of uses for robots for children in the early childhood years. As with other disruptive technologies, the adoption of robot applications may be challenging, but users' feedback would be helpful to help researchers improve the functionality of robots in by meeting the objectives set for children's learning. Therefore, the contribution from existing studies and the on-going pursuit of knowledge in child–robot interaction (CRI) is expected to continue to drive research and development of robots for children to greater heights.

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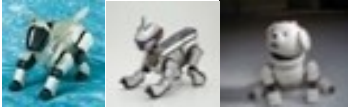
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APPENDIX 1: ROBOTS

FUNCTIONS	FINDINGS	AGE GROUP
1. AIBO ERS-210, ERS-220A, ERS-311A‡).		
3 behaviors the dogs could complete; Kick, Dance, Stand Still. Used on young children's understanding of animacy and entertainment robots.	The results showed that the children would not confer animistic properties evenly. Also, the children attributed intelligent behavior more than biology and agency.	32 children from a university day care program. Range 35-66 months
2. BEE-BOT AND PRO-BOT		
Used to perform 3 different types of tasks: structured tasks (teacher-directed tasks designed to develop particular concept or skills); exploratory tasks (structured to allow application of knowledge, exploring concepts and skills more freely); and extended tasks (open ended and child-directed tasks with which children engaged for an extended period of time, and with limited teacher scaffolding.	A combination of structured and exploratory tasks allowed students to develop and apply skills in programming and controlling the robotic toys. Extended tasks provided opportunities for students to attend to multiple mathematical focuses simultaneously.	33 children, of whom 11 were aged 3 and 4 years from a metropolitan pre-school. 22 Year 1 children from a nearby state school.
3. DRAGONBOT		
The robot It is designed as a social character that interacts with children as a peer, not as a tutor or teacher. It will play a storytelling game, during which it will introduce new vocabulary words, and model good story narration skills, such as including a beginning, middle, and end; varying sentence structure; and keeping cohesion across the story.	Children learn more from a robot that adapts to maintain an equal or greater ability than the children, and they will copy its stories and narration style more than they would with a robot that does not adapt (a robot of lesser ability).	20 children ages 4-6. Figure 1: Two social, interactive robotic characters, called dragonbots, used as language learning companions for young children.

FUNCTIONS	FINDINGS	AGE GROUP
4. ENGKEY		
A tele-presence tool that brings English teachers located in the Philippines to the schools in South Korea. The instructors in the Philippines communicate using embedded microphones and speakers.	The robot controlled by teachers abroad was used to communicate using embedded microphones and speakers. The EngKey's small display with a woman's face mimics the facial expression of the teacher, who has cameras in his/her room.	A pilot pre-school class.
5. GENIBO QD - AN AUTONOMOUS PET ROBOT		
The Genibo QD can identify itself and the surroundings using its sensors, camera, and voice commands and share feelings with the user. With input information, it forms Emotion/Mood/Intelligence/Character/Intimacy' to feature unique character and AI.	Nil.	A pilot pre-school class.
6. HANSON ROBOKIND ZENO R50		
Used for collaborative play - Simon Says. Hanson Robokind Zeno R50 has a realistic silicon rubber ("flubber") face, that can be reconfigured, by multiple concealed motors, to display a range of reasonably life-like facial expressions in real-time.	The results provide new evidence that life-like facial expressions in humanoid robots can impact on children's experience and enjoyment of HRI. The presence of expressions could be seen to cause differences in approach behaviors, positive expression, and self-reports of enjoyment.	37 male and 23 female; M age = 7.57, SD = 2.80

FUNCTIONS	FINDINGS	AGE GROUP
7. HYBRID HUMANOID H3 ROBOT		
To prevent child accidents with "on demand" interaction between the robot and the child in the relevant context that the robot is used (preventing child accidents). This is achieved through an active attraction of child attention as well as passive interaction.	The combined fish eye camera in the sensorized environment and a robot onboard camera made it possible to override remotely robot's autonomous control and allowed a very high accuracy of control. We noticed that the child was ignoring sometimes robot's articulated words, and therefore thought that the parents' voice (via robot speakers) would be more familiar and appeal to the child better.	1 girl aged 3 years, and her mother,
8. ICAT		
A peer or co-learner, which adopts empathetic behaviours towards the child [19 - where children play chess two hours per week as part of their school curriculum.	The results showed that children perceived the robot as more engaging and helpful and also provided higher ratings in terms of self-validation.	26 Portuguese elementary school ages between 8 and 10 years old.
9. INFANOID		
Infanoid has two hands, each of which has four fingers and a thumb that are capable of pointing, grasping, and a variety of other hand gestures; it also has lips and eyebrows to produce various facial expressions, like surprise and anger.	The children changed their ontological understanding of Infanoid in recognizing the robot as a moving thing, then as an autonomous, subjective system that possesses attention and emotion as an initiator of the motion. They also recognize the robots as an intersubjective companion with which they can exchange or coordinate their attention, emotion, and actions.	14 normally developing children (about 5 years old on average).

FUNCTIONS	FINDINGS	AGE GROUP
10. IROBI		
Irobi robot is a commercial robot which can offer different services including remote interactive communication and guarding for children.	iRobi marked the students' attendance and used a face recognition program to ask children about their mood.	Pre-school children in the city of Daejeon, South Korea.
11. KEEPON		
The creature-like robot, Keepon (pronounced, "key-pong") is designed to perform emotional and attention exchange with human interactants (especially, children) in the simplest and most comprehensive way.	0-year-olds: The interaction was dominated by tactile exploration using hands and mouth. The babies did not pay attention to Keepon's attention. 1-year-olds: The babies showed awareness of Keepon's attentional and emotional expressions. Some mimicked the robot's emotional expressions (by rocking and bobbing their bodies). 2-year-olds: They socially interacted with Keepon by showing toys. When the robot's response was meaningful to the babies, they often soothed the robot by stroking its head (See Fig.).	23 normally developing babies in three different age groups, namely 0-year-olds (from 6 months of age), 1-year-olds, and over-2-year-olds,
12. KIBO ROBOTICS KIT		
A tool for children to acquire specific learning goals such as programming skills to solve problems and tinker with technology.	The children displayed greater concentration in completing their tasks and would persevere even on difficult challenges. They also were keener to problem-solve using the toys and tried to help their friends to find solutions.	35 children from Play@TP, an experimental kindergarten in Temasek Polytechnic, Singapore.

FUNCTIONS	FINDINGS	AGE GROUP
13. KIWI ROBOTICS KIT		
A tool for children to acquire specific learning goals such as programming skills. On a basic map on the floor, children programmed their robots to go from point A to point B using number parameters	Results show that beginning in pre-kindergarten, children were able to master basic robotics and programming skills, while the older children were able to master increasingly complex concepts using the same robotics kit in the same amount of time.	N = 60 children in pre-kindergarten through second grade from an urban, public, early education school that serves children in Pre-K through third grade in Boston, Massachusetts
14. NAO		
NAO as a dance robot tutor with children in the context of creative dance	In general, the children responded in a very positive way. They liked the robot and the way it moved. They engaged with the robot copying or creating movements and they understood the movement concepts.	17 children divided in four groups between 8 and 9-years-old
15. PAPERO - "PARTNER-TYPE-PERSONAL-ROBOT		
Papero. It is capable of recognizing and verbally communicating with people, sending images by mobile phone to persons far away, as well as playing games and singing along with others.	Nil	Nil
16. PEPPER		
Used in collaborative play and interactive storytelling	A report documenting the usage scenarios, challenges and considerations, as well as the benefits for preschoolers and teachers will be produced. This will provide insights on how we can extend and scale the use of robots to more pre-schools in the future.	2 pre-school centres; My First Skool Jurong Point and MY World @ Bukit Panjang

FUNCTIONS	FINDINGS	AGE GROUP
17. ROBOTIC PUPPETS		
Robotic puppets as playtools found inside a classroom that would be able to (1) rotate its body horizontally, (2) rotate its head vertically and (3) open and close its mouth by rotating the upper jaw.	The results of the study indicated that when playing with the robotic puppets, the performance of the children with respect to thinking and learning, creativity and imagination, and social interaction and independence, is comparable to other traditional playtools.	52 children aged 5 to 6 years, from 2 community-based kindergartens in Singapore, 20 from the first (9 girls and 11 boys (same class) and 32 from the second (16 girls and 16 boys (3 separate classes).
18. ROBOVIE		
A humanoid robot capable of human-like expressions and recognizes individuals using ID equipment (robot peer and partner - 2 interactive humanoid robots that only speak English in a Japanese elementary school to imitate the arrival of an international transfer student to encourage foreign language study	Children enjoyed interacting with the robot, and some even expressed sympathy for it. The authors believe that this is one of the first studies that provides evidence of children rapidly adapting to an interactive humanoid robot and developing relationships with it.	6-7 years old, 59 boys and 60 girls); 11-12 years old, 53 boys and 56 girls.
19. TEGA ROBOT		
A social robotic learning companion created for a particular learning task - The robot and the virtual agent each took on the role of a peer or learning companion and accompanied the child on a make-believe trip to Spain, where they learned new words in Spanish together.	The key lessons learned about conducting child-robot interaction research in children's preschool classrooms were as reflected in the teachers' feedback. For e.g. Consider how the activity can complement curricular goals.	3 "special start" preschool classrooms at a public school in the Greater Boston Area; 34 children ages 3–5, with 15 classified as special needs and 19 as typically developing.

Should 'developmental dyslexia' be understood as a disability or a difference?

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Abstract

This paper questions current views of the phenomena of 'developmental dyslexia', and offers a discussion of the various models of disability that are currently used in society, and whether they are suitable to use when discussing 'dyslexia': The Medical model, the Social model, the Affirmative Model, the Psych-Emotional model, the Psych-Social/Bio-Psycho-social model, the Social-Relational model are all discussed, each with their own perspectives.   Valeras's model (2010) is offered as an alternative to understand 'hidden disabilities' like dyslexia, diabetes and epilepsy etc. The term 'bi-abilities' is introduced to understand how such groups can have strengths in both the disabled and non-disabled worlds, and that such groups often reject any affinity with disability as they argue they are 'able-bodied'. The paper then investigates how dyslexic individuals whilst experiencing trauma at school can also experience growth from such experiences, through a discussion of 'Post-Traumatic Growth-PTG' to understand positives coming from experienced trauma e.g. school-based trauma, arguing Valeras's 'bi-ability' model to be more relevant to the dyslexic experience.   The paper concludes by applying the 'bi-ability' model to dyslexia. The main themes are:

   ♦   *Disability is a strong word – rejecting an infinity to a term that has negative public perceptions*
   ♦   *I'm more than in the middle – falling in the middle of two identities but rejecting both*
   ♦   *We don't have a box – traditional social groups do not describe who they are*
   ♦   *I didn't want to be different – it wasn't their choice to be born this way*
   ♦   *Not even consciously. But it's so hardwired – survival instincts naturally kick in*
   ♦   *To Tell or not to tell, it's the elephant in the room – the stress of not disclosing to others*
   ♦   *It's a piece of my identity, but it's not my identity – being different is not all consuming*

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INTRODUCTION

This paper investigates the phenomena of 'developmental dyslexia' (specific reading disability), defined by Rose (2009) as a specific learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling. Whilst there are many characteristic features of dyslexia, these focus on difficulties with phonological awareness, verbal memory and verbal processing speed. As dyslexia occurs across the range of intellectual abilities, it is best thought of as a continuum, not a distinct category, with no clear cut-off points. A good indication of the severity and persistence of dyslexic difficulties can be gained by examining how the individual responds or has responded to well-founded intervention. Whilst there are many theories to the cause of developmental dyslexia, many believe phonological deficits are a core function (Snowling, 2000; Thomson, 1996).

The author questions how this phenomenon should be defined in society, whether it is a disability and by understanding this question, how it should be understood in society. Later parts of this paper introduce both a 'bi-ability' (Valeras, 2010) model to argue that those with 'hidden disabilities' can reject a disability model, and use 'Post-Traumatic Growth-PTG' (Calhoun, Cann & Tedeschi, 2010) to understand that post-school success can come 'despite' and not 'because' of mainstream educational experiences.

What is a Disability? What is 'Normal'?

The World Health Organisation's International Classification of Disease (WHO, 1980, p.29) separates the concepts of Impairment and Disability as follows:

Impairment: Any loss or abnormality of psychological, physiological or anatomical structure or function.

Disability: Any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being.

Individuals are perceived to be 'normal' in society when they are: male/female, able-bodied, heterosexual, and these are believed to be the default membership for all in the absence of any visual/behavioural cues that would alert them otherwise (Abberley, 1993; Davis, 1995). Goffman (1963) has called this 'virtual social identities', however some individuals do not fit into this category and are the subject of this investigation.

Disability in UK Schools

Education systems in the UK and most western countries are based on standardisation and whilst this may be suitable for the great majority of children, for groups of Special Educational Needs and Disabilities-SEND, estimated by Warnock (1978) to be 20% of

children (who will experience impairments at some point in their school career), it is argued is not. National Statistics (2017a) indicate the level of SEND in mainstream education has fallen from 21.1 to 14.4% in the last 7 years (2010 to 2017), however this must be understood to reflect the 'level of provision and funding by schools' not the actual 'level of need' (SEND Code of Practice, 2015). Such groups are perceived as being 'abnormal' and according to the 'Medical Model of Disability' (World Health Organisation, 2002), where individuals are defined as having 'impairments' causing barriers to their learning and limiting their access to services, they are segregated and provided with interventions to achieve according to their peers.

Runswick-Cole and Hodge (2009) argue the SEND term is an administrative label in current educational policy and legislation, and continues to locate the problem within the child, using the Medical Model of Disability. Cole (2004), Hodge (2006) and Runswick-Cole (2007) argue that SEND pupils are excluded within school practices and that the 'SEND' term contributes to such exclusion, as they are classed as the 'other' group supported by professionals and specialists; and thus, other children perceive children with SEND being 'different and deficient' (Rorty, 1989). Cole (2008) counters this by arguing pupils are only limited by the abilities of their teachers to adopt teacher and school flexible approaches to learning, teaching and assessment, rather than the child being expected to fit into pre-existing structures. Recent UK government reports highlight an 'unfit for purpose' SEND educational policy in schools resulting in a 'postcode lottery' of inconsistent support for pupils with SEND in mainstream schools (OFSTED, 2010; Bercow, 2011; Scott, 2016).

'Medical' vs 'Social' Models of Disability

The 'Medical' model suggests that those with a disability have dysfunctional bodies that require medical intervention to return to society's concept of normality (Finkelstein, 1980). By contrast, the 'Social' model suggests that it is the environment that causes any disability and this needs to be modified to be inclusive to all needs (Oliver, 1996; Barnes, 2003). Interestingly Barnes and Oliver (1993) suggest that the 'medical' model was created by non-disabled researchers to understand abnormal populations and the 'social' model was created by disabled researchers to make sense of 'normal' populations as part of 'social oppression theory', as it is argued that '*non-disabled researchers have consistently failed to address the question of disability as perceived by disabled people whether young or old'* (p.3). Lang (2001) notes the 'Social' Model was born out of the disability movement finding a means to create a political platform to secure the 'rights of disabled people in society. Lang goes on to suggest the 'Social' model '*should not be considered as a monolithic entity, but rather as a cluster of approaches to the understanding of the notion of disablement'* (p.2). Lemert (1962) and Goffman (1963) talk about disability as a social deviance causing a stigma, mark or blemish to describe a 'moral inferiority'.

The empowerment and politicisation of disabled people is a defining principle in the social model, making it a force for 'social action' (Finklestein, 1996; Oliver, 1997; Swain, Griffiths and Heyman, 2003), as it emphasises social oppression and barriers which limit what a disabled person can 'be' and 'do' (Thomas, 1999; Reeve, 2004), in a society that discriminates against people with impairments and excludes them from involvement and participation. Additionally, that all people have a unique set of strengths and weaknesses that society needs to recognise, empower and utilize (Union of Physically Impaired against Segregation, 2009). This is also reflected in the 'Positive Dyslexia' model advocated by Nicolson (2015), making use of the 'Positive Psychology' movement (Seligman, 2011).

Charlton (1998, p.27) argues that the oppression experienced through the medicalisation of disability; has *'prevented people with disabilities from knowing: their real selves, their real needs, and their real capabilities and from recognising the options they in fact have'.* Barton (1996, p.8) furthermore suggests disabled people have historically been oppressed through institutional discrimination by: *'horror, fear, anxiety, hostility, distrust, pity, over-protection and patronizing behaviour'.* However, there are other models of disability that should also be considered.

The 'Affirmative Model of Disability' (Swain and French, 2000) develops the 'Social Model', from a deficit to a positive stance, to be *'essentially a non-tragic view of disability and impairment which encompasses positive social identities, both individual and collective, for disabled people grounded in the benefits of lifestyle of being impaired and disabled'* (Swain and French, 2000, p.569). The 'Affirmative Model' argues that *'far from being necessarily tragic, living with impairment can be experienced as valuable, interesting and intrinsically satisfying. This is not to deny there can be negative experiences resulting from impairment, but to make the point that this is not all that impairment is about'* (Cameron, 2011, p.110).

Lastly, the 'Psycho-Emotional Model of Disability' (Thomas, 1999) offers an understanding of the emotional impact of disability, *'being made to feel of lesser value, worthless, unattractive or disgusting'* (Thomas, 2004, p. 38), that the oppression individuals with impairments experience from society is internalised/absorbed, and this affects their self-belief about what they can do - a form of 'learned helplessness' (Seligman, 1991), defined as a condition in which a person suffers from a sense of powerlessness, arising from a traumatic event or persistent failure to succeed. It is believed to be one of the underlying causes of depression.

The above definitions of disability have been argued to be largely based around those with physical disabilities (as expanded versions of the Social' model), however as will be discussed, dyslexia and other conditions such as Diabetes, ADHD, and Epilepsy, are not based on physical barriers, and this can create a perceived hierarchy to the term disability in both disability groups and in the public arena (Reeve, 2004; Shakespeare and Watson, 2002).

Critics of the 'Social' Model of Disability

Morris (1991) suggests the 'social' model effectively denies any physical, emotional pain, and suffering experienced by disabled people due to their impairments having an impact upon their practical daily living, hence the model is perceived as 'lacking' by commentators in the disability community (Hughes and Paterson, 1997; Crow,1996).

Adding to this, Shakespeare and Watson (2002) argued that the 'social' model is outdated as it was created in the 1970's, and nearly 50 years later society has developed, and *'by arguing against the social model we are not denying that for much of the time the priority remains to analyse and campaign against social barriers, merely that we require a more sophisticated approach to disability'* (p.24). They offer three reasons why it is outdated:

(1)   Impairment and disability are not dichotomous, but
(2)   Disability should not be reduced to a medical condition. It should not be overlaid with negative cultural meanings. Neither should it be reduced to an outcome of social barriers alone, however important these might be in people's lives.
(3)   Intervention at physical, psychological, environmental and socio-political levels is the key to progressive change, yet one cannot be a substitute for the other. Social change remains the most expedient measure to remove the problems presented by impairment and its consequences.

Lastly, arguing any *'failure to follow a social model line, or join with the disability movement, may be less of a failure of particular individuals, and more a limitation of the model or movement itself'* (p.25).

Lang (2001) notes that Crow (1996) and Morris (1991) along with Hughes and Patterson (1997) argue that the 'Social' model has focussed on social change over that of the experience of those with disabilities, and 'denies' the physical and emotional pain, and suffering experienced by disabled people in their daily lives. Reeve (2004) argues that there is a public perception of what a disabled person 'looks like' and how they should 'act', focussed on physical impairments, and that those individuals 'without' physical impairments are frowned upon if they try to gain allowances for their needs: leaving them *'feeling ashamed, vulnerable and invalidated'* (p.87). Morris (1991) argues that disabled people are surrounded by myths and stereotypes which underpin prejudices, with terms such as 'too blind to see', 'out of your mind', 'words falling on deaf ears', 'haven't got a leg to stand on' that support the concept to be of value one must be physically, psychologically and mentally fit (Thomas, 1995).

Regarding individuals without physical barriers, who could be classed as having 'hidden/ invisible impairments'; they constantly risk their disability status being publicly revealed,

forming the basis for their *'negative psycho-emotional reasons for concealment'* (Thomas, 1999, p.55). Reeves (2004) found that those who 'passed' disclosing their impairment were seen as *'traitors by others within the disabled people's movement'* (p.92) as they were actively rejecting their disabled identity (Kanuha, 1999). It suggests there is a perceived 'hierarchy of impairment', as found by Reeve (2004, p.92) *'one of my participants did not feel she was seen as a 'real' disabled person because she was not a wheelchair user and did not have one of 'the biggies' like cancer, arthritis, multiple sclerosis or visual impairment. Consequently, her identity as a disabled person was challenged by other disabled people in the organisation'.*

Grewal, Joy, Lewis, Swales and Woodfield (2002) identified that just over half of people with impairments surveyed did not identify themselves as disabled. Reasons varied: they did not think they were ill or incapacitated enough to count as disabled, their health problems were part of an illness or getting older. The negative images they associated with disability caused many to be too embarrassed to identify as disabled, as they felt it was believed to be connected with a physical impairment: typically affecting mobility, was visible, led to dependency, incapacity issues, and was a permanent condition. They also dismissed their own impairment as they felt they were mobile and capable, and they saw themselves being 'normal' (Watson, 2002). It is argued by Reeve (2004) that the 'Psycho-Emotional Model of Disability' offers a more sophisticated tool to understand the breadth of experiences from disability and any associated issues of disability identity.

The 'Psycho-Social/Bio-Psycho-social Model of Disability' (interactional) proposed by Erikson (1959), talks about a psycho-social crisis in the development of the identity in a disabled person, which causes them to recognise and face the barriers of their impairment through their interaction with their social (e.g. cultural understanding of 'normality'), biological (e.g. having an impairment that needs medical intervention e.g. insulin) and psychological factors (e.g. the stress or anxiety caused by bullying at school by peers or being misunderstood by teachers).

The 'Social-Relational Model of Disability' (Shakespeare and Watson, 2001; Crow, 1994) asserts that *'to accurately comprehend disabled people's experiences, there needs to be a focus on how both disabling barriers and impairment interact with each other'* (MacDonald, 2017, p.11). That individuals are disabled by their bodies and social barriers, and by recognising/focussing on the impact of one alone (e.g. their bodies) without the other (e.g. their environment) would be wrong. Shakespeare (2013) argues that 'reality' exists in four domains (sociological, psychological, biological and molecular) and any theory of disability must acknowledge all four domains. Thus the 'Social Relational Model of Disability' refers to disabling barriers from structural exclusion, social oppression, and impairments that affect a person's life course.

As the Medical, Social, Affirmative, Psycho-Emotional models of disability could be argued as focussing on the negative aspects of impairment and disability (oppression in

society and their impacts), it is such concepts which are problematic for many with invisible disabilities/differences such as those with dyslexia who question if they are actually disabled, and reject a disabled identity.

As Sutherland (1981) argued, *'a more radical approach is needed: we must demolish the false dividing line between 'normal' and 'disabled' [meaning impaired] and attack the whole concept of physical normality. We have to recognise that disablement [impairment] is not merely the physical state of a small minority of people. It is the normal condition of humanity'* (p. 18). A new paradigm shift is needed to understand those with hidden disabilities/differences such as dyslexia.

To conclude, it could be argued that neither the 'Social' or 'Medical' models of disability encapsulate the experience of those with non-physical and non-visible differences/disabilities, therefore such groups may reject a 'disabled' label, as they would find it hard to argue that the environment (e.g. school, workplace, society) is disabling to them.

A New Perspective

Valeras's (2010) paper 'We don't have a box: Understanding hidden disability identity' offers a new perspective to understand those with 'hidden disabilities', which dyslexia falls into along with individuals with Diabetes, Coeliac Disease, Juvenile Rheumatoid Arthritis, Epilepsy etc. Her paper investigates individuals that might look normal but also have impairments that can affect their lives, investigating six individuals with borderline identities that contradict, interact, inform and implicate each other; as they have the ability to transcend and travel between two worlds - the disabled and the non-disabled. *'They live on the edge of social, cultural, and political lines and adapt to any situation that they encounter to emphasise or de-emphasise various aspects of their identity depending on the pressures of the social context'* (p.16). Whilst her sample is small, other researchers support this concept (Yee, 2013; Burke Valeras, 2007; Gillespie, 1996; Roman, 2009; Stone, 2005; Sturge-Jacobs, 2002). As Gabel (1999) suggests *'If... I experience my body as a disabled body, regardless of what others think of me, then I am disabled. In contrast, if I do not view my body or myself as disabled, then I am not disabled, even though others may disagree'*. (p.42).

Higgins, Raskind, Goldberg, & Herman (2002) found any labelling for a disability was for many individuals a lengthy process that often resulted in conflicting diagnoses, with individuals confused as to which labels to accept and which to reject. In response, some individuals simply reject any label as inaccurate, offering their own explanation for their challenges (e.g. emotional problems that interfered with learning). Furthermore, Santuzzi, Waltz, Rupp and Finkelstein (2014) argue that a clinical diagnosis of a condition may not be sufficient to warrant a legal definition of disability in the employment contexts; therefore, even if you identify with a disability you may not be covered by disability/equality legislation.

According to Valeras's (2010) 'bi-ability' model, such individuals found:

'Disability is a strong word' and isn't a term they feel encapsulates them, as they are more than a disabled person. They believe they are able-bodied, and that *'disability has negative connotations'.*

'I'm more in the middle' defines more of what or who they are, and that they can empathise with both groups equally. This is based on a perception that the need by society for clear demarcation between people with visual markers (perceived as disabled) and people without visible markers (perceived as non-disabled) is a defensive strategy and denies the human frailty that we all have (Davis, 2005). This denotes a perceived stigma towards those with physical disabilities, as having a greater human weakness then they have (Nussbaum, 2004).

'We don't have a box' describes that they feel that they are an 'other' group, but there isn't an 'other box' featured on forms. They believe they have the ability to tick both boxes if they felt like it - having the ability to 'pass' and look normal to those around them. This ability to 'pass' can be found in many instances of race, class, gender and sexual orientations. (Ginsberg, 1996; Schlossberg, 2001; Leary, 1999).

'I didn't want to be different' describes that they want and do look 'normal' but in their need for accommodations they also need to disclose a disability, something they do not recognise being a part of their identity, resulting in others questioning their 'disability-ness'. The requirement to be alert to the 'impressions and reactions' to others means that they are hyper-alert to avoid situations that would highlight any behaviours or situations that might reveal a symptom of any disability.

'Not even consciously, but it's so hardwired' describes the ability to pass or disclose their ability to others that can be both a 'blessing and a curse', resulting in a constant private struggle to sustain both a private and public self (Cavet, 1998). This means that such individuals may be reluctant to access accommodations, people, places, situations because they might draw attention to their disability (Cavet, 2000; Fitzgerald, 2000) and at times suffer pain and impairment to uphold an identity of the 'non-disabled' person (e.g. by polio sufferers walking).

'It's always that elephant in the room' argues that many such individuals are reluctant to disclose their disability to maintain their self-esteem/self-identity, and any needs are constantly forgotten by others as they maintain zero visual clues to remind others that they might need accommodations. Goffman (1963, p.57) describes the dilemma *'to display or not to display, to tell or not to tell, to let on or not to let on, to lie or not to lie'.* The sharing of such information means that their invisible condition become visible and so would be their 'differentness' to others.

'It's a piece of my identity, but it is not my identity' describes the dilemma many experience as having an impairment but not recognising it as a disability; and that such an impairment is only a small part of who they really are. Likened to wearing glasses, they argue that they are *'a person with a disability or a disabled person'*. Many choose the former as it describes *'a part or piece of their identity, not who they are'* (p.15).

These individuals have flexible identities which are argued cannot be *'squished into a box….they exist in the space between, travelling in and out of two juxtaposed identity categories'* (p.16). Valeras along with Darling (2003) argues that a 'bi-ability' exists because of such individuals that can exist in both disabled and non-disabled worlds, and that neither category is a perfect fit.

The Social Model of Dyslexia and Neurodiversity

A question can be posed, is 'bi-abilities' the same as 'neurodiversity' (Cooper, 2008, 2009, 2011; Pollak, 2009; Walker, 2014), what are their similarities and differences? It could be argued that 'neurodiversity' embraces disability and whilst it aims to diversify labels so that an individual could be 'dyslexic with ASD ADHD traits', the author argues it is very much centred on the biological elements of disability. In locating the many aspects of a person's difficulties or disabled profile, as an educational professional (a SENCO in a mainstream primary school) it makes planning targeted interventions extremely hard and whilst teachers are now finally gaining a handle on what dyslexia is, to bombard them with a multiple of sometimes conflicting impairments, best conceptualized as a 'fruit salad' of impairments can make their jobs much harder.

Neurodiversity like the concept of bi-abilities promotes the strengths of individuals, however Neurodiversity differs from bi-abilities in its biological basis that aims to combine many learning difficulties into a collective force for political gain, with strong support from the 'Autism Rights Movement' (Soloman, 2008; Autistic UK, 2017) to advance the needs of autistic individuals. Therefore, it is argued by the author that the Neurodiversity movement is a 'social' model concept that aims to deliver environmental change, whereas the 'bi-ability' concept rejects the concept and label of 'disability' as they see such individuals as neither 'dis-abled' or 'abled-bodied' as no label currently exists that best describes them, but able to use a number of strategies to work successfully in many environments.

The Dyslexic Experience and Hidden Disability

In the case of the dyslexic individuals encapsulated in the authors previous works (Alexander-Passe, 2010, 2012, 2015a, b) one finds that many do not recognise they have a disability and try very hard to camouflage any difficulties to promote a sense of 'normality'. The constant hyper-alertness for situations that might highlight any deficiency is seen as highly stressful and adds a secondary stress to that of their primary difference/impairment.

The school-aged young person with dyslexia recognises they look normal but are impaired at school (e.g. reading, writing, spelling), however many also recognise their strengths (e.g. drawing, drama, debating) which is confusing, an oxymoron, as if they were actually disabled they would firstly according to society have a physical indication of disability and secondly such an impairment would affect all areas of their life with no apparent strengths.

This dilemma or paradox causes many young people with dyslexia to question their place in their families and see themselves as being 'abnormal', as their parents, sibling and peers do not have this strange selection of strengths and weaknesses. This causes them to question their identity and their 'otherness' causing them to isolate themselves as a form of self-protection, some relate to the 'Spock' character in Star Trek (Alexander-Passe, 2010).

Schools are generally bemused by students who can look and act normally, but struggle in learning settings. As they show strengths/focus in many subjects (commonly vocational), many teachers believe such a student is being lazy and not applying such strengths/focus to their subjects (commonly core subjects of English, Maths and Science). The lack of substantial impairment means many such students are overlooked for diagnosis of underlying difficulties, however the examination access arrangements (Joint Council of Qualifications, 2016) for formal school examinations (e.g. GCSE) adds to this confusion by allowing students to receive allowances (e.g. extra time, use of a laptop to overcome handwriting difficulties) without any need for a formal diagnosis. This demonstrates an 'other' group who have impairments but are not disabled at school.

This dilemma is also seen in UK schools where children are added to the school's Special Educational Needs-SEND Register when they are receiving additional interventions, however without the actual diagnosis of a disability or a SEND (SEND Code of Practice, 2015), this change reflects the provision being provided by schools rather than the actual needs of pupils. Therefore, children with a known disability (e.g. high functioning autism) are not added to the SEND register as they are not actually receiving any intervention/provision. Also, if a school is unable to fund enough SEND provision, then they will only record the frequency of SEND in school that they can actively provide, which could be argued to camouflage the actual frequency of SEND need.

The young dyslexic adult is faced with leaving school lacking the academic results of their siblings and peers. Their lack of perceived impairment (commonly perceived as physical) means they are misunderstood as being lazy and unfocused, rather than struggling with 'hidden impairments'.

The ability to look and act 'normally' means they are overlooked as having underlying difficulties. However, they are faced with a dilemma, the application forms they must complete ask about disabilities, ask a range of questions: Do you have a disability?

Do you believe you have a disability? Do you have a disability covered under the United Kingdom's Equality Act (2010)?

This causes them to question if they actually have a disability, do they believe they have a disability, and what advantage/disadvantage a disclosure might bring? It also poses other questions: Will I have a better chance to get through the first round of sifting of applications if I disclose or not? At what point should I disclosure their dyslexia or difficulties? At the application, interview, when offered the role, or after starting the role? (Alexander-Passe, 2015, 2017, Scott, 2004)

As mature adults, many adults with dyslexia have developed a sense of their strengths and weaknesses, and use these to develop careers that are fulfilling, but interestingly they do not recognise such strengths as a disability but a learning or working difference. In these situations, using the term disability would be alien to them and might have negative connotations.

To conclude, it is argued that using a 'model of disability' to describe the experiences that many dyslexic and individuals with 'hidden disabilities' undergo may be inappropriate, as they can be argued to be negative and deficit models, focussing on what individuals 'can't do, rather than what they can'. The 'bi-ability' model (Valeras, 2010) offers a positive model that many 'hidden disability' individuals can relate to, while allowing the conceptualization of an identity that is both 'disabled' and 'non-disabled' and the internal emotional struggle that come from sitting in both camps and not truly being comfortable in either.

Successful Dyslexics – Where does this fit into 'Bi-abilities'?

Alexander-Passe (2016a, b) investigated successful individuals with dyslexia and two theories were suggested 'The Disability Paradox' and 'Post-Traumatic Growth-PTG', to understand individuals who were successful in their post-school careers achieved through:

- ♦ Demonstrating strengths that others do not have (many found as children/ teenagers).
- ♦ Not indicating their dyslexia to others – passing.
- ♦ Demonstrating exceptional resilience and motivation.
- ♦ Developing a healthy attitude towards failure – that it is part of the journey towards mastery or success.
- ♦ Success came post-school, and after facing adversary, trauma and negative schooling

All the above could be argued to fit into the 'bi-ability' model as they all indicate the ability to take strengths where they exist, some coming from their dyslexia and others from their non-dyslexic abilities. Again, being dyslexic is only part of who they are, so the

ability to harness the strengths from each part of their personality means they can bring unique skills and abilities to problems and the workplace.

Exceptional resilience and motivation could be argued to come from always being on the lookout (having sensors) for situations that might highlight their difficulties, and the ability to bounce back from set-backs (forced disclosure of difficulties) and the motivation to avoid such forced disclosure in the future.

Interestingly, the ability to see 'failure as part of the journey to mastery' is part of their unconscious coping or defence mechanisms developed at school, and linked with resilience, the ability to play the 'long-game' and recognise that they will need longer to gain certain skills, and that knowledge learnt through failure can be as good or better than that learnt first time (as argued through the 'Growth Mindset' by Dweck (2012). If a machine never fails, there would be no need to develop a better model, so if one always gets things right first time there would be no motivation to question if it's the best model for the job. The inquisitive mind is more likely to make leaps of faith to solve problems, asking the 'what if' questions.

Growth from Shattered Lives

For many decades, the concept of trauma derived from incidents related to neurosis and negative manifestations requiring interventions as per the 'Medical Model of Disability' (World Health Organisation, 1992) e.g. stays in mental asylums and electric shock treatment (Mind, 2016). More recently the 'positive psychology' movement spearheaded by the esteemed Professor Martin Seligman has aimed to rethink trauma. This movement aimed to understand any positive manifestations that might come from trauma, and several theories have developed under this umbrella (Seligman, 1991, 2011). Nicolson (2015) is now developing such themes within the realms of dyslexia, called 'Positive Dyslexia' along with other researchers who campaign for the recognition of the strengths that can come from dyslexia (West, 1997; Alexander-Passe, 2016a, b).

Post-Traumatic Growth-PTG (Calhoun, Cann & Tedeschi, 2010) argues that growth can be triggered by a single or multiple highly stressful life event/s that poses a significant challenge to an individual's assumptive belief about the world. Beliefs that the world is predictable, controllable, and ordered that to that point have been relied upon to guide behaviour and to make sense of the world. PTG is argued to come from the impact of these 'shattered' beliefs and how individuals choose to piece them together or interpret them. It is argued that using an analogy of a shattered vase, individuals can try and piece together their shattered pieces but will fail as they can't return to how it originally was (perfection), and develop depression/withdrawal when they see their efforts are pointless; alternatively, they can reuse the pieces to construct something new and different - not trying to replicate the former vase's beauty, but to create something new, maybe a sculpture or a mosaic. The 'growth' comes from using a trauma positively and the

motivation to become more engaged in life e.g. being resilient to future trauma, to help others who have been through trauma, change careers, take a trip or course that was always put off, or to have a new lease of life etc. Thus, making sense of the trauma and developing new characteristics and strengths as a result.

Organismic Valuing Theory-OVT (or adversarial growth) is a more developed PTG theory (Joseph & Linley, 2005). It argues that following a significant trauma, humans have an inherent tendency to try and comprehend and integrate such experiences in a meaningful way while striving towards emotional and psychological well-being. The theory proposes three outcomes:

1. 'Assimilate' the trauma-related information by 'integrating' the experience into their beliefs they held before the trauma – they recover but return to their pre-trauma state
2. 'Accommodate' the trauma-related information by 'modifying' the beliefs they held before the trauma: (a) if accommodated in a negative way (e.g. bad things happen and there is nothing I can do about it) then they can develop helplessness/depression.
3. But (b) if they accommodate in a positive way and modify their beliefs appropriately (e.g. life is unpredictable, so it should be lived to the fullest) then they can experience psychological growth following adversity.

In this model, positive benefit-finding and psychological growth is facilitated by many factors (the need for affiliation, autonomy and competency) along with supportive social environments.

Pulling the Discussion Together

Pulling the two aspects together (models on disability and models from trauma) to form a theoretical basis for this paper. The concept of 'bi-ability' (Valeras, 2010) stands out in offering an explanation of the following: how individuals with dyslexia can function and succeed in both the dyslexic and non-dyslexic worlds (disabled and able-bodied worlds), why individuals with dyslexia suffer from mental health issues and self-doubt, and how they can choose when, where and with whom they disclose their dyslexic difficulties, which allows them to develop successful careers despite suffering in educational environments.

The Psycho-Emotional Model of Disability is useful in expanding the dyslexia experience, in how the public perception of disability (being mobility and incapacity-based) has meant that many individuals with dyslexia reject a 'disability label' and this causes problems when accessing services designed to assist them in gaining employment, causing secondary stress and anxiety.

However, the 'Organismic Valuing Theory' (Joseph & Linley, 2005), an advanced version of PTG is also very helpful in understanding the reasoning dyslexics make from their experienced school-trauma/educational neglect and their personal journeys using 'assimilation' or 'accommodation' in changing their values and beliefs, and how this has allowed many to find new meaning in what they do, embracing risk, and creating successful careers as a result. However, others have accommodated their school-trauma negatively and have developed helplessness leading to depression and withdrawal as a result.

Applying the Bi-Ability Model to Dyslexia

The 'Bi-Ability' model has the following main themes which will now be discussed to see if they are relevant to the dyslexic samples as found in this research. The main themes are:

- ♦ Disability is a strong word – rejecting an affinity to a term that has negative public perceptions.
- ♦ I'm more than in the middle – falling in the middle of two identities but rejecting both.
- ♦ We don't have a box – traditional social groups do not describe who they are.
- ♦ I didn't want to be different – it wasn't their choice to be born this way.
- ♦ Not even consciously. But it's so hardwired – survival instincts naturally kick in.
- ♦ To Tell or not to tell, it's the elephant in the room – the stress of not disclosing to others.
- ♦ It's a piece of my identity, but it's not my identity – being different is not all consuming

Disability is a Strong Word

When it comes to dyslexic individuals whilst many will associate their dyslexia with difficulties in reading, writing, spelling, organisation and short-term memory, they do not see themselves as disabled by their dyslexia. They do not see dyslexia as a disability, and thus will reject this label. However, they do realise to gain certain allowances at work and at university provide them additional rights, accessible software and training they must identify with a difficulty that is covered under the 'Equality Act' (2010) and US 'Disabilities at Work Act' (Equal Employment Opportunity Commission, 2008). It could be argued that individuals with dyslexia and those with other 'hidden disabilities' reject a disability label, however will claim under such allowances when it is advantageous to them. Thus, a paradox exists.

I'm more than in the middle

It could be argued that many individuals with dyslexia reject a 'disability' label, but many

of them also reject a 'dyslexia' label. They see their difficulties or differences as being 'just how they are' and they feel they don't fit into a 'dyslexia' label as they have learned to read and write, and can function in the workplace with a meaningful job - thus many believe they are cured of their dyslexia as they look and act normally. However, in rejecting their dyslexia, they are also rejecting any help on offer or employment protection. Alexander-Passe (2010, p.250) noted a participant regarding a late diagnosis *'If I managed to gain a degree and a job without diagnosis, how much more could I have gained with a diagnosis and the help it would offer'.* This suggests their own rejection was confirmed by others around them, in that teachers at school and lecturers at university had seen them as 'needing more time and effort to achieve' rather than fighting against a 'hidden disability'.

We don't have a box

According to many job applications and the UK census, you are either disabled or you are not. The questions posing 'do you believe you are disabled' suggests that the person completing the form must take ownership of any difficulties. Answering yes to 'are you disabled under the Equality Act (2010)' would mean that you are covered by such legislation, however it pains many individuals with dyslexia that they need to say yes. To say no, be offered the post and then have difficulties could be argued that you withheld information that might have meant you might not have been offered the post.

The absence of an option 'are you covered by the Equality Act 2010 but do not perceive this will affect your ability to do the role' means a possible employer might shy away from even offering the individual an interview. Alexander-Passe (2015a) found that many individuals with dyslexia avoid disclosure of their dyslexia in the workplace, and those that do are hit by experiencing misunderstanding and unfair treatment/discrimination in the workplace.

I didn't want to be different

It is believed that only a third of dyslexics are diagnosed at school, another third at university or in the workplace, and the last third go through life undiagnosed (Alexander-Passe, 2017). Many individuals go through school being told 'they are slow, lazy or immature, they need more time to get things'. They just need to get used to their siblings and peers overtaking them at school and in the workplace; and they will need to be 'contented' with manual vocational jobs that offer a low salary. They were told early on that this is 'just how they were made' and that it was okay to be different, and in some cases a second-class citizen.

Recent UK government statistics (National Statistics, 2017a, b) found Specific Learning Difficulties, a common educational term to include dyslexia (Rose, 2009) rose from 10.8% in primary school to 23.3% in secondary school, suggesting that their learning difficulties

had been dismissed in primary school as substantial enough for a diagnosis. Alternatively, there is a tendency for teachers to assume that 'it will come' given time, and only in secondary school is it accepted that there is a continuing problem. However, inside most dyslexics are individuals with dreams and passions to 'show the world they have value' and that those around them e.g. parents, teachers, and peers have got it wrong about them. This motivation to prove others wrong is a feature found in successful dyslexics (Alexander-Passe, 2016a, b) and is extremely powerful, however it is only outside the confines of mainstream education that many such individuals can shine.

The countless individuals with dyslexia found in the creative professions (e.g. actors, designers, artists) are able to bring unique skills to the workplace, but are these skills or compensations? Have they developed these skills as a coping strategy or are they hot-wired with them at birth? Are they more kinaesthetic as they can learn 'vocational' education faster than by reading and writing? This was investigated by the author (Alexander-Passe, 2010b) in an edited work with many leading educationalists and artists, however no definitive verdict was reached.

Not even consciously. But it's so hardwired

Alexander-Passe, (2006, 2008, 2010, 2016b) discusses the educational trauma that many teenagers and children with dyslexia experience in mainstream education and the many strategies developed to cope at school, from avoidance or passing, that allow them to survive in mainstream mixed-ability classrooms. This changes school into somewhere to survive, rather than enjoy or demonstrate their potential. Before long, sensors to possible dangers are developed and finely tuned to avoid any form of detection of their difficulties, so that they are spared humiliation at school for their inabilities to read, write and spell as well as their peers. These become unconscious and they serve the dyslexic well to survive, but at what costs? The cost may be the ability to develop their potential?

To Tell or not to tell, it's the elephant in the room

As mentioned above, individuals with dyslexia develop finely tuned sensors to avoid all situations that will expose them to humiliation and embarrassment in the hands of their peers. However, the need for such sensors make living with a difficulty such as dyslexia very exhausting, as the author (Alexander-Passe, 2010) found in a study of twenty-nine adult dyslexics. This makes many dyslexics believe they are living a double life, like that of a spy, in that they are always keeping up a pretence, and lying constantly to come up with decent reasons to avoid doing many chores (e.g. I have forgotten my glasses so I can't read the menu; I can't find my diary so please tell me the date, sorry; I have a bad memory; did I lock the door, could you go and check please etc.) (Alexander-Passe, 2010; see also Scott, 2004)

In the same study, the author (Alexander-Passe, 2010) found that many participants noted

they had been the most truthful about their dyslexia and difficulties in their interviews, not even telling their parents, siblings and partners the truth. Living a 'double-life' meant living a 'double-lie' and on top of having a poor short-term memory as part of their dyslexia, they were likely to be found out, and this was highly embarrassing. Moreover, some also linked the experience of being dyslexic with that of experiencing being gay in society, where both are stigmatised in the workplace.

It's a piece of my identity, but it's not my identity

Speaking with adults with dyslexia one finds that their dyslexic identity was a contentious issue. Those who disclosed their dyslexia early on in the dating process, normally in the first date, do so to explain why they choose certain paths and why they might do a few quirky things (Alexander-Passe, 2012). However, it is framed as one part of who they are, as per wearing glasses or being tall, short, thin or overweight.

However, those who are reluctant to disclose their dyslexia in the dating process, which also reflected their reluctance in the workplace, perceive their dyslexia as affecting all aspects of their life, and something that can be blamed for their difficulties gaining a long-term partner, employment and a family.

In the case of successful individuals with dyslexia (Alexander-Passe, 2016a, b) they perceive their dyslexia bringing them great strengths and they embrace these as coming from living with dyslexia in mainstream education. The 'chip on their shoulders' developed as a reaction to their experiences, and they use these powerful motivations to bring about career change and enhancement. They have 'dyslexia' but are not 'dyslexic', so could be argued as having the traits without being all-consumed by it.

It could be argued that much that is presumed to stem from dyslexia are the reactions to how society has made them act (as per the 'Medical Model of Disability'). If their workplace is not inclusive, then they must work harder to achieve their goals.

What is important is to compartmentalize any dyslexic difficulties and view these in the arena of an individual's strengths and weaknesses. Only through this can dyslexia be seen as a 'part' and not the 'whole' of a person's identity.

CONCLUSION

This theoretical paper takes an interesting look at dyslexic experience, and asks if the highly politicised 'social model of disability' is valid in understanding the needs of such a group.

Mainstream education is clearly centred on the 'medical model of disability', in that all individuals are taught the same curriculum, expected to attain to the same level, and if

one is found to be unable to achieve this, interventions are given to overcome any deficiencies (in essence so they are fixed or cured). UK and international schools are judged with league tables, which are designed to demonstrate to current and prospective customers (parents) the school's ability to 'add value' to a child, no matter their educational starting points.

Due to the changes in the SEN Code of Practice (2015), the change to record SEND in school from 'provision' to 'need' has resulted in most schools reporting a significant decrease in SEND in pupils over the last 7 years. This is argued to have resulted from many schools only listing pupils on a SEND register when they are actually receiving 'provision', therefore if a school is unwilling to provide sufficient provision for 'vulnerable' pupils, then such pupils simply disappear from school records. This view is supported by Scott (2016), Bercow (2011), OFSTED (2010) and the Audit Commission (2002) of a 'postcode lottery' with 'piecemeal' inconsistent provision in schools.

Whilst schools can be applauded for their aims to be inclusive to all learners through differentiation of lessons and making sure buildings are accessible to those with physical difficulties, there is much to be done to improve the teacher's ability to both screen for learning difficulties and offer effective differentiations. UK teacher standards will next year make differentiation and SEND awareness core elements mandatory in Initial Teacher Training courses following the Carter Review (2015), confirmed by Department of Education (2016).

The 'social model of disability' is often found in the workplace, with schemes such as the UK's 'Access to Work' helping to make workplaces more accessible through assisted software and hardware. However, whilst 'social models' are implemented in the public sectors, this is not often found in the 'private sector', forcing many dyslexic individuals to hide their dyslexia and their ability to 'pass' as non-disabled is essential to their career development.

Various models of disability were discussed and these help to understand the interaction between society and those with disabilities, however arguments against the 'social model ' emphasise that it lacks cultural and experiential dimensions, in essence how the disabled individual feels (the 'lived' experience) as a reaction to society's perception of them. It is argued that it is hard to relate aspects of these models to those with 'hidden disabilities' as many with dyslexia and other hidden disabilities reject the concept that they are disabled.

Valeras's Bi-ability model (2010) offers an understanding of the 'hidden disability experience', in that they reject any disability identity and the ability to 'pass' as normal in society means they can achieve more in society. The use of passing has been used by many groups (race, gender, sexual, disability) who feel they would gain more by blending into society (e.g. Polio sufferers walking despite intense pain, a gay person pretending to

be heterosexual, a mentally ill person acting without any symptoms to be accepted by the public). Many powerful examples can be seen over the last few centuries of passing to gain certain freedoms, and it can be argued that the dyslexic child avoiding certain tasks at school (reading and writing) can be identified with 'passing' and this means dyslexic groups can be discussed in a wider disability, gender and race context. It could be also argued that the ability to pass by dyslexic individuals allows them to be successful in industry and entrepreneurship.

This paper finishes by looking at the various elements of the 'Bi-ability' model in the context of dyslexic individuals: Disability is a strong word – rejecting an affinity to a term that has negative public perceptions. I'm more than in the middle – falling in the middle of two identities but rejecting both. We don't have a box – traditional social groups do not describe who they are. I didn't want to be different – it wasn't their choice to be born this way. Not even consciously. But it's so hardwired – survival instincts naturally kick in. To Tell or not to tell, it's the elephant in the room – the stress of not disclosing to others. It's a piece of my identity, but it's not my identity – being different is not all consuming

The strength of Valeras's paper comes in its ability to cross race, gender and disability, and improves understanding the dyslexic experience for both dyslexic and non-dyslexics groups, and it could be argued that 'passing' allows the dyslexic through the 'workplace' front door, and this allows them space and security to demonstrate the strengths and skills which will make them successful.

LIMITATIONS

The author notes that whilst the study of Valeras (2010) was only based on 6 research participants, and therefore conclusions should be treated with caution. However, other researchers have reported similar themes, which the author believes gives weight to Valeras' theory. The author also notes that the field of study that looks at the 'Social' model of dyslexia is extremely broad and only a summary of the arguments can be included in this paper.

IMPLICATIONS FOR ASIA

The author of this article is writing in the UK, where support and recognition for dyslexia is well-established, and there is legislation in place to provide good outcomes, despite recent changes in SEND that have impacted on this. How far is this article relevant for the Asian context, where some countries have no legislation, no provision in education, little public awareness and dyslexia may be seen as a stigma, making the issue of disclosure even more pertinent? Even in Asian countries where dyslexics are now supported within the education system, identification and provision remain patchy and

the numbers identified are far below the predicted levels for the population, suggesting untapped cases that require support. At the same time, there is a growing interest in the region in the strengths of dyslexia, and how these strengths should be understood within the context of disability. The concept of dyslexia as a difference rather than a disability outlined in this article resonates more readily with this movement and with the aims of this journal.

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Technology Advancing Education

Geetha Shantha Ram[1*]

1. *Dyslexia Association of Singapore*

Abstract

Education has made great strides in the last decade with a deliberate effort to increase the access to and use of technology in the teaching of learners with Specific Learning Needs. International research has continued to demonstrate the benefits while shifting the conversation from a basic use of technology to a high quality and purposeful implementation of technology in learning environments. The Dyslexia Association of Singapore (DAS) has gone through a similar transition in its efforts to provide support to learners with dyslexia and other SpLDs, aiming to address edutech use through Teachers, parents and students. This talk will review studies conducted and explore various edutech initiatives that the DAS has implemented in a bid to advance SEN educational potential.

Keywords: Education Technology, SpLD, dyslexia

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Profiling Children at-risk for Language, Literacy and Learning Difficulties in Heterogeneous Bilingual Populations

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Abstract

Early identification of language, literacy, and other learning is especially challenging in heterogeneous bilingual populations (Hammer et al., 2014; Kohnert, 2010). This is because young bilingual children need to be assessed in both their languages on a wide range of tasks in order to determine the most accurate picture of individual strengths and weaknesses. In Part I, we will explain the theoretical background and the design of the tasks included in our CLAP (Cognitive Linguistic Assessment Profile) assessment battery which comprises Teacher and Parent report forms, and a series of linguistically and culturally appropriate tests with norms for three groups of 4 to 6 year-old bilingual children in Singapore (English-L1/Mandarin-L2, Mandarin-L1/English-L2 and Malay-L1/ English-L2). The tests include measures of receptive and expressive vocabulary in two languages, sentence imitation, speech processes (articulation and phonology), short-term and working memory, nonverbal cognitive abilities, phonological awareness, reading and spelling skills, and socio-emotional processing. In Part 2, we will then present profiles for a selection of case studies conducted in local preschools, and explain how bilingual children's difficulties can be differentiated by teachers and clinicians before they decide which approach to intervention will be the most effective. These case studies will include children with English as a Second Language (ESL), Speech Sound Disorder, Intellectual Disability (ID), Autism Spectrum Disorders (ASD), Developmental Language Disorder (DLD), as well as Dyslexia.

Keywords: Language Development; Early Intervention; Assessment Tools

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Exploring Assistive Technology to Support Students with Dyslexia. Introducing Possible Solutions.

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1. *National Institute of Education, Nanyang Technological University*

Abstract

In recent years, there has been an increasing number of assistive technology devices available to meet different disabilities. Many individuals with dyslexia have difficulty in reading, writing and spelling. The present pilot study explored the use of assistive technology to improve access to reading for individuals with dyslexia. OpenBook, Voice Dream Reader and Read2Go were considered. Under consideration are such features as text-to-speech with word tracking, font size adjustments, colour settings and word spacing. Given the scarcity of studies on the usefulness of these assistive technology solutions as a learning tool for students with dyslexia, three teachers of dyslexia were each engaged to participate in a pilot study. Teachers were asked to evaluate the features with a general assistive technology evaluation rubric. Additionally, teachers were also interviewed qualitatively on their perspectives on the features of the software. Findings obtained from the pilot evaluation will be discussed with reference to features documented in the British Dyslexia Association Style Guide and in the relevant scholarship to be dyslexia-friendly. Findings will also be discussed in the context of literature that claim a reading continuum positioning rather than reading deficit account for individuals with dyslexia.

Keywords: assistive technology, text-to-speech, print modification

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Relationships between language and literacy development and academic self-efficacy and resilience

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Abstract

Learning to read underpins success within educational settings: difficulties with reading impact on all areas of a curriculum where reading is the key to independent learning. Poor educational achievement can lead to negative feelings about education, to poor self-concept and to behavioural problems, which may impact negatively on general well-being: individuals with literacy learning difficulties are also more likely to experience emotional and mental health problems. The current research has been investigating such relationships between literacy and psychosocial development, as well as ways to support literacy learning while targeting factors associated with poor self-concept and negative behaviours in children who experience significant challenges in their literacy learning. The research has involved adults and adolescents with assessments of dyslexia, as well as early and late primary school children with evidence of reading/writing difficulties. In most cases, the data were consistent with relationships between academic self-concept/ self-efficacy and measures of language and literacy as early as the children's first year of school. Such relationships were larger for students with language and phonological difficulties, suggesting that those with a broader range of difficulties may suffer negative impacts on psychosocial development more than others. Interventions targeted at slightly older primary grade students has looked at ways of building resilience to challenges in learning, as well as providing strategies for overcoming reading/writing difficulties and for maintaining self-efficacy and reducing off-task behaviours. These results will be discussed to inform further developments in intervention work that considered well-being as well as academic achievement.

Keywords: Dyslexia, self-concept, negative behaviours, resilience

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The Imagery-Language Foundation: Teaching All Children to Read and Comprehend

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1.   *Lindamood-Bell, United States of America and Australia*

Abstract

Based on 32 years of instructional experience with 45,000 at-risk readers, we know that the dual coding of imagery and language is critical for language comprehension and word reading (Lindamood-Bell Learning Processes, 2017). Imagery is a basic sensory-cognitive function connecting us to the language we hear and the print we read. There are two distinct types of imagery—symbol imagery and concept imagery—intrinsic to word reading, orthographic processing, and reading comprehension. This presentation examines the effect of imagery-based, sensory-cognitive instruction on word reading and comprehension in children with reading difficulties. A consistent, repeated finding is that students with reading difficulties have shown significant word reading and comprehension improvements with imagery-based sensory-cognitive instruction. Do these same improvements hold true for students diagnosed with dyslexia or autism spectrum disorders? Behavioral and neurological research validates the imagery-language connection resulting in lasting effects on word attack, word recognition, comprehension and specific areas of brain function in at-risk readers, including students with dyslexia or autism spectrum disorders (Eden et al., 2004, Oulade et al., 2013, Krafnick et al., 2015, Murdaugh et al., 2015, Murdaugh & Maximo et al., 2015, Christodoulou et al., 2015, Romeo et al., 2017). Supported by Dual Coding Theory (Paivio, 1979), key research findings, and 32 years of instructional experience, this session reveals that imagery is a primary sensory-cognitive power source that can be developed and brought to consciousness for reading independence in children, including struggling readers, and those previously diagnosed with dyslexia or autism spectrum disorder.

Keywords: Sensory-Cognitive Instruction, Imagery-Language Connection, Reading
Intervention, Symbol Imagery, Concept Imagery

Also Presented as a Poster

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Madras Dyslexia Association (MDA) - a 25 years journey

D Chandrasekhar[1]*

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Abstract

Madras Dyslexia Association was formed in 1992, when there was very limited awareness on dyslexia and a minimal support system to help the children. Initial periods were spent in creating awareness amongst parents, teachers and public. Little later, the parents started looking for trained special educators We started training of special educators and part time remediation outside school hours. When we saw no relief for severely dyslexic children we created the full time remediation centre. We ran this arrangement for quite a few years. We realised that we were hardly scratching the surface. Our federal state alone has nearly 2 million dyslexic children and 700,000 of them were educated in Tamil medium, which is the local language. India has 22 official languages The problem is not purely academic and is life long. We started resource rooms in schools by training the school teachers, and monitoring these resource rooms for a period of two years and hand over this to the school. We created a kit for the special educators. We developed TVP to provide screening and remediation techniques for those learning in Tamil language. We created a kit for them also. We started setting up resource rooms in Tamil medium schools using TVP and kit. We realised the need for training large number of teachers. Hence we increased the frequency of our training. We started doing something We realised technology is the solution and we decided to digitise our training programme. We developed a software to track the child and give the feed back on the methodologies used. We are creating software to help remote monitoring of the resource rooms. We understood that Dyslexia is life long and requires attention from birth to adulthood. We have started pre primary screening/remediation for children of less than 5. We are planning to start work with grown up dyslexics in the near future as we look for the newer challenges.

Keywords: MDA Evolution Meeting challenges Multilingual Volume

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Effectiveness of Reading Comprehension Instruction for Primary School Learners with Dyslexia

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1. *Dyslexia Association of Singapore*

Abstract

Reading comprehension not only involves the ability to read and recognise words, but also to be able to make meaning from what was read. Reading comprehension tasks can be a very challenging task to a learner with dyslexia as they experience difficulties in word recognition, a precursor to text reading. In addition, they also lack a knowledge of reading strategies to help them cope with their difficulties. Reading comprehension passages are an area which learners with dyslexia have great difficulties in when tackling the Primary School Leaving Exam (PSLE), a high-stake national examination to gain entry to secondary school. Chinese learners with dyslexia at Dyslexia Association of Singapore (DAS) are taught comprehension strategies developed through incorporating Bloom's Taxonomy and Singapore primary school's textbooks. This study is set out to evaluate the effectiveness of the reading comprehension curriculum developed at the DAS using these reading comprehension strategies through a structured learning process of modelling, scaffolded practice and independent practice in increasing a learner's ability to answer reading comprehension questions. The questions set encompasses 6 types of questions, namely, knowledge, comprehension, application, analysis, synthesis and evaluation question types. Students in this study are aged between Primary 3 and Primary 5. Pre and post intervention survey will be done with the students. Their class work will also be collected for analysis. Feedback for classes are also collected from the educational therapists. The findings of the study would be used to inform current intervention and possible future developments in reading comprehension in Chinese for learners with dyslexia in Singapore.

Keywords: Chinese, Reading Comprehension, Structured Literacy

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Effects of Executive Attention Deficits in Children with Dyslexia: Beyond Phonology in bilingual dyslexics

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Abstract

Reading is one of the cognitive tasks that require high alert states; many studies around the world demonstrate that frontoparietal regions of the brain are involved in the reading process. Parietal regions are also mandated to alert states, disruption of parietal regions leads to disruption of attention mechanism. Considerable evidence has shown that dyslexics have a disruptive attentional mechanism, which in turn influences the reading process. In our previous studies, we observed attention deficits among children with dyslexia (CWD). In this study, we explored the attention and phonological abilities of bilingual children with dyslexia. These abilities were examined with Attention Network Test (ANT) and phoneme awareness test (PA) respectively. Data were obtained from twenty-two children with dyslexia and compared with twenty-two age and IQ matched normal readers with an average age of 12 years (SD = 0.25 years). Observed the statistically significant difference in an ANT with no interaction effect. The group difference on alerting network implies an inability to enter into and maintain an alert state in activities that require high attention. The deficit on orienting network implies lesser or no reaction to the target cue, that in turn affected the performance. Finally, the deficit on the executive network implies an effort full control of attention, error monitoring and interface control. Therefore, a disruptive attentional mechanism in dyslexics could be one of the reasons for higher reaction times and lower accuracy compared to normal readers. Additionally, we observed a marginal difference in gender, which indicates a slight difference in performance levels of girls and boys. However, ANT male disadvantage was well pronounced, and the effect of gender was especially positive for boys who were dyslexic. But on word / non-word reading tests, we observed longer duration. To sum up, by directly addressing both attentional and phonological deficits with the same sample, it has been possible to test the applicability in rehabilitation contexts less frequently studied in the literature. Our results show a clear role of prominent attentional deficits and attenuated phonological processing. This deficit is not a general attention deficit; rather, it is specific to the process of alerting and executive attention. Consequently, strategies designed to enhance these attention networks should be considered while developing remedial training programs for children with dyslexia, to increase their success in academic and behavioral domains. At the same time, interesting venues for future research for the exploration of gender differences in dyslexia is apparent from these data.

Keywords: alerting- network, dyslexia, executive- network, orienting- network, and phonology.

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Rolling out an evidence-based Intervention for struggling learners and providing professional development for teachers through a global partnership in India: A pilot project.

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2.   *Anjali Morris Foundation (AMF), India*
3.   *University of Toronto, Canada*

Abstract

We describe a pilot partnership between the Hospital for Sick Children's Empower™ Reading Program (Toronto, Canada), a set of research-based literacy programs for children with reading disabilities, and the Dr. Anjali Morris Foundation (AMF) (Pune, India), a leader in services for Indian students at risk for LD and in teacher professional development. In June 2016, 10 AMF teachers were trained by the first author in the Empower™ Reading Decoding and Spelling (DS) program, which focuses on foundational literacy skills. Implementation of this 110-lesson program was conducted at AMF with 60 struggling readers. Pre-, mid- and post-program results are available for 40 students who completed the program. Standard scores on the W-J Letter-Word Identification and Word Attack subtests demonstrate considerable improvement in decoding and word identification skills, with average standard scores on Letter-Word Identification increasing by more than a standard deviation, and by almost two standard deviations on Word Attack. By post-testing, students improved by an average of 28 test words on an experimental measure of multi-syllabic word reading. These positive results led to the scale-up of Empower's teacher PD starting in June 2017; 21 additional teachers from AMF and five schools are being trained and three AMF teachers are being trained in the Comprehension and Vocabulary EmpowerTM Program. Preliminary results of this expansion will be available by June 2018. This partnership may inform future literacy intervention practices globally, providing programming and teacher PD in low- and middle-income countries, and building capacity to help those who struggle with literacy learning.

Keywords: scaling up; global partnership; literacy; reading; struggling readers;

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Resource Room – Remedial education for children with SLD within the school premises – the need of the hour.

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Abstract

Children with Specific Learning Disabilities need timely remedial support/ intervention in their school going years to optimize their academic performances lack of this support creates increasing discrepancy between their abilities and performances.Children fail to perform to their full potential despite being of average to above average intelligence. They flounder and is lost. Such remedial support is not easily accessible but when established within the school environment can make a vital difference to this scenario and is beneficial in multiple ways. This presentation advocates the inclusion of a Remedial center in the mainstream school to support the education process of a child with Dyslexia to ensure that no child to fall through the cracks. First it highlights how such a centre can create a Dyslexia Sensitive Educational Environment. It focuses on the need to identify and to provide remediation to the child with Specific Learning Disabilities within the school milieu. Then the paper uses case studies of SLD children in mainstream schools where MDA has set up resource room centres to demonstrate the positive impact of the project on critical stakeholders like the management of the school, parents and teachers and importantly details how the strategies used for teaching the students have universal implications and could valuably benefit all students in the classroom. The paper lastly discusses the process of setting up of such a centre.It presents evidence to show that running a remedial centre within the school campus is sustainable, scalable, replicable and is pivotal to supporting students with SLD in their critical years of learning.

Keywords: Specific Learning Disabilities, Remedial Centre Mainstream, Inclusion

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Dyslexia and learning – the triangle hypothesis as an explanatory framework for dyslexia.

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Abstract

For many years, our research has been tracing the deficits in dyslexia to a problem in learning, in automatisation, procedural learning and in delayed neural commitment, and this evidence has been presented internationally. Recently, we have argued that it is important to recognise the positive aspects of dyslexia, that can compensate for many of these deficits, the peak of the triangle in this new theory. In this talk, I shall introduce our latest hypothesis, and complete the triangle hypothesis of dyslexia, presented for the first time at this conference. The triangle hypothesis proposes a 2nd ongoing source of problems for learning in dyslexia, based on consistent mishandling of the learning issues, by lack of awareness of the manifestations of dyslexia in education. An emphasis on rote learning and a rigid approach, that fails to recognise learning differences, exacerbates and compounds the underlying problems, creating learned helplessness in dyslexic children, who may therefore never fulfil their potential. This theory suggests that early recognition and appropriate support is the best way forward to ensure that dyslexic children develop resilience, flourish and manifest their many strengths, rather than giving up the lifelong struggle for success. The talk will be illustrated with experimental findings and evidence from research over a 30-year period.

Keywords: procedural learning, automatisation, delayed neural commitment,
             positive dyslexia, the triangle hypothesis,

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An Evaluation of the preference-based teaching approach for children with dyslexia and challenging behaviours

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Abstract

Dyslexia is characterised by difficulties inaccurate and/or fluent word recognition, reading comprehension, written expression and poor spelling. Research studies have mainly focused on helping students' diagnosed with dyslexia through educational remediation. However, little research has been done on increasing on-task behaviour and attentiveness while reducing behavioural problems for students' diagnosed with dyslexia. In Dyslexia Association of Singapore (DAS), students' diagnosed with dyslexia tend to get disengaged in the classroom setting. This small-scale qualitative case study used a non-concurrent multiple baseline design across three participants and was conducted at DAS between August 2016 to March 2017. Its goal is to examine the effectiveness of a preference-based teaching approach. A preference-based teaching approach involves identifying student preferences within the classroom setting and designing teaching programmes for each student in consideration of these preferences. An evaluation of the preference-based teaching approach was carried out through a video observation of 15 teaching sessions and questionnaires. Analysis of the questionnaires revealed that the participants enjoyed the sessions and found the preference-based approach fulfilling. The video recorded sessions were analysed by the researcher and the Inter-observer agreement (IOA). The sessions revealed that all three students' performed 100% on-task behaviours and active engagement from sessions eight to 12. The study concluded that the preference-based teaching approach had an effect on the on-task behaviour and attentiveness level for all three students' diagnosed with dyslexia. The findings of this study can be used to improve teachers' lesson planning skills with the aim to increase students'' on-task behavior and active engagement levels.

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Effect of Exposure on self esteem of Dyslexics

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Abstract

Dyslexia has long been perceived to be a barrier for students not only in academic pursuits but in creative pursuits as well. This can be linked to the psychological trauma these students go through because of their academic shortcomings especially in traditionally study oriented societies in the Asia-Pacific region. A constant emphasis on their learning disability disheartens them and also imbibes in them the idea that scholastic achievement is the only metric for meritocracy. The situation is worsened when these students in mainstream schools observe students around them. However, it has been historically proven that students with dyslexia often possess latent talents and skills in fields that are not necessarily academically oriented, that measure up, if not supercede those of other students. It has long been the belief of MDA that such talents in vocational and creative activities are what must be utilised and tapped if we are to create students who can go on to better themselves and the society around them. With this simple idea in mind, MDA launched Dyslexia Week, a festival for awareness and talent based competitions designed to unearth hidden talents amongst dyslexics. With a healthy participation of 450 students, the festival is now looking to collaborate with organisations around the world. Our message is simple: It is not how smart students are, it is about how they are smart

Keywords: Self esteem of Dyslexics

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Speech, Language and Communication Needs - Case Studies

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Abstract

Case Study 1: A six-year-old Kindergartner was occasionally difficult to understand due to speech that was not as clear as that of his classmates. He enrolled in speech-language therapy where he participated in fun and interactive activities focusing on correct placement and practice of the target sounds. The boy's marked improvement in speech made him much more intelligible.

Case Study 2: A seven-year-old student in Primary1 made speech errors which were either unusual or not appropriate for his age. Certain sounds, such as /k/, /g/ and /r/, were initially not stimulable. Through speech-language therapy, he was later able to produce these sounds either in isolation or in words through multisensory and visualization activities to learn correct placement and production of target sounds.

Case study 3: A seven-year-old Kindergartner diagnosed with moderate-severe language disorder possessed a limited vocabulary. During speech-language therapy sessions, a combination of direct intervention techniques was used to improve vocabulary acquisition in a small group setting. Results show an improved recall and understanding of words targeted, as well as a slight gain in non-targeted words.

Case study 4: A nine-year-old student in Primary 3 with language impairment presented with errors in in syntax. In speech-language therapy sessions, direct intervention in explicit teaching of sentence structure and the use of connectors were employed to facilitate improvement in both receptive and expressive language orally and in writing.

Keywords: Speech and Language Intervention

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Impact of Multiple Intelligences on the emotional wellbeing of the child with Specific Learning Disabilities (SLD)

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Abstract

Typically a child with Specific Learning Disabilities is pushed from pillar to post in the process of identification and remediation of their difficulties. This along with the constant focus on their negatives leaves the child emotionally stressed and unable to perform academically. A vicious circle of underperformance follows. This paper focuses on the use of Multiple Intelligences as a complimentary method in exploring the unique potential of these children and its impact on their emotional health. It primarily focuses on the methods used at HYDRA – a Multiple Intelligences based resource centre, where the unique natural potential and competencies of the SLD child are identified and nurtured. The paper starts with a short introduction to Dr. Howard Gardner's theory of Multiple Intelligences. It will then take a look at why the use of Multiple Intelligences is vital for children with Specific Learning Disabilities. The practical aspects of how the process unfolds at HYDRA will be explored, through videos. Next it will take a detailed view at the impact this process has on the emotional wellbeing and self-esteem of the child, through a few case studies Finally the paper aims to explore the further action points that can be taken in the use of Multiple Intelligences in creating a nurturing, harmonious environment that empowers and enables the child with SLD in realising his potential.

Keywords: Multiple Intelligences, Dyslexia, empower and enable, complimentary technique, Dr Howard Gardner

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The Development of Education for Students with Learning Disabilities in Taiwan

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Abstract

In Taiwan, the child with Learning Disabilities had been provided the special education service acted by the Special Education Regulations in 1977. The term, learning disabilities, is a broad term used to define the child who exhibits significant learning difficulties in one or more of these areas: listening, speaking, reading, writing or calculation. The current definition and identification was required in the Regulation of Students with Disabilities and Giftedness by the Ministry of Education in 2013. The education for the students with learning disabilities has been developed for 40 years. The Ministry of Education in Taiwan has been publishing national statistics pertaining to special education annually since 1999. Those data come from the national Special Education Transmit Net that collects special education related information across the whole country. This report will present the tendency analysis with the incidence rate, education placement, gender and related issues for the students with learning disabilities in Taiwan.

Keywords: Learning disabilities, Education, Incidence rate, education placement

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Music Teachers and Dyslexia: Perceptions, Understanding and Observations

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Abstract

Academic studies that focus on primary teachers' knowledge of dyslexia are relatively scarce; however some sources indicate that many teachers hold a number of misperceptions and varied interpretations of the nature of dyslexia and that these impact on expectations of classroom performance, (Soriano-Ferrer, Echegary-Bengoa & Malathesa-Joshi, 2015). Areas of deficits were identified in domains including general information, symptoms/diagnosis and effective interventions/ support. In music, there is a focus on sequencing, pitch, rhythm and links have been made between these and phonological awareness (Goswami, Huss, Mead, Fosker & Verney, 2012, Crispiani & Palmieri 2015). Overy (2003) refers to current theories suggesting that timing deficits may be a key factor and dyslexic children have been found to exhibit timing difficulties in domains such as language, music, perception and motor control. Thus, music teachers are a unique position to observe weaknesses and strengths in their students' performance, based on a secure, research based knowledge about dyslexia. In this presentation I will provide some background to this field and provide an overview of my findings in relation to the responses a small group of teachers made to a survey about their knowledge, perceptions and observations in relation to aspects of dyslexia. The intention is to use the findings to inform professional development programmes, providing music teachers with appropriate research and knowledge to support their observations and interventions.

Keywords: Teacher knowledge, non-language indicators of dyslexia, common
                        misperceptions

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Going Beyond Instructional Technology Integration Models in Instructional Designs with EdTech

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Abstract

Almost every educational institution day is attempting to begin or already on their journey to incorporate educational technologies into the lesson designs. The instructional designers or educational technologists of these institutions would have had looked at various prominent instructional technology integration models such as the TPaCK, SAMR, RAT, TAM, TIP and TIM, some of which this presentation will cover in greater detail. The question remains though, on what makes a model valuable to instructional designers and educators. Instructional technology integration models are extensively used in trainings for educators as well as educational research in understanding and evaluating pedagogical integration of educational technology in educational institutions. Just as theoretical constructs are embraced and applied into practice and research, one should note that they are diverse and appear to be chosen under uncritical, tribalistic (Kimmons, 2015; Kimmons and Hall, 2016) or anarchic (Feyeraband 1975) ways. Some technology integration models have had the advantage of greater dispersion and thus seem more prominent such as the TPaCK. For example, the TPaCK is very popular amongst researchers whereas the SAMR model is more popular among instructional designers and educators but what is not as clear are 1) what are the elements underlying this dispersion of preference; 2) what characteristics of such models make them importable by various groups of users and 3) how these models should be adopted, adapted and critically assessed with regards to other models. Analytical discussions about such theoretical pluralism will limit advocacy for generalist theoretical constructs which most people in the field of educational technology are familiar with without ignoring those that we are not. This presentation will therefore critically analyse some of the instructional technology integration models, of which some come from the same theoretical constructs, to suggest how models can be brought together to create a unique approach for the educational institution. This is because the needs, focus and preference of each stakeholder (researcher, educator, policymaker, administrator, etc.) within the same institution is diverse and it is unrealistic to expect a single theoretical construct to meet these needs and objectives satisfactorily.
Keywords: technology intergration

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Case Management Discussion - Supporting Challenging Learners

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Abstract

Learning difficulties may arise from learning disorders such as dyslexia, attention deficit hyperactivity disorder (ADHD), specific language impairment (SLI), dyspraxia, dysgraphia, sensory processing, auditory processing and many others. In addition, emotional and behavioural issues can also lead to barriers to learning. The situation can be made worse if a student diagnosed with any learning disorder displays emotional and behavioural issues. In an increasingly complex world, teachers have to be aware of which diagnosis is impacting more on the learning difficulties of students as this would suggest on how the learning needs are to be met and how a class with such students can be managed efficiently. Teachers teaching a class of various profiles of learners would find classroom management demanding as behavioural challenges surface. It is well-documented that a teacher will not be able to teach efficiently if he/she has to handle emotional and behavioural issues of students. At the Dyslexia Association of Singapore (DAS), Educational Therapists (EdTs) with students who display challenging literacy and behavioural needs are supported by a group of Educational Advisors (EAs). These students are observed for their learning needs and strategies are implemented to mitigate their difficulties. Action plans and goals are set for the semester as a form of progress monitoring towards specific achievement. Case management discussions when done right, result in the most satisfying and comprehensive support for students and teachers, whose lives we aim to enrich and empower. With the benefit of a multidisciplinary team and their varied perspectives, we can plan, coordinate and review the care of our students.

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Phonological processing skills for typical and atypical readers in Singapore

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Abstract

Phonological awareness is a strong correlate and predictor of reading across languages (Melby-Lervåg & Lervåg, 2011; Kidd et al., 2015;). Difficulties with phonological processing are a hallmark of dyslexia (Snowling, 2000; Stanovich, 1988), leading to the predominant view of the phonological core deficit model for dyslexia. This is in spite of alternative multiple deficit models (Pennington, 2006). Moreover, most research on dyslexia is of Western origin, and has only recently broadened to other regions and contexts. Etiology and diagnosis often are founded upon the phonological core deficit view, but questions remain about the suitability of this emphasis across various contexts. In this study based in Singapore, we compare the performance of dyslexic children with typical child (aged 6 -10) and adult (aged 19-34) readers on subtests of the CTOPP2. Phonological awareness tasks (blending and phoneme isolation), rapid naming tasks (for letters and digits), and a memory task (forward digit repetition) were administered to the groups, along with English word reading. Using ANOVA, we find that the groups did not differ on phonological awareness performance. For the rapid naming tasks, the adult readers performed better than the children, and the adult group performed better than the dyslexic children on the memory task. Correlational analysis showed that word reading was related to rapid naming and memory scores for the children altogether, while word reading by adults was related to phonological awareness as well as rapid naming and memory scores. Results are discussed with implications for diagnosis of reading disorders.

Keywords: Phonological awareness, rapid naming, phonological memory, dyslexia

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Getting Reading Right with SMARTER*phonics in Sarawak, Malaysia: Empowerment of Preschool children in English Language

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Abstract

Literacy is the ability to read, write and learn. Because of its "multiplier effect", literacy helps eradicate poverty, reduce child mortality, curb population growth, achieve gender equality and ensure sustainable development, peace and democracy. In 1947, UNESCO recognized the acquisition of literacy as a fundamental aspect of an individual's development and human rights (UNESCO, 1947). Its 'Education for All' movement is a global commitment to provide quality basic education for all children, youth and adults. An approximate three percent of the total number of primary school children in Sarawak was said to have failed to achieve the minimum criteria of English language in the Literacy and Numeracy Screening (LINUS) Test in 2016 (State Education Department, 2017). Although there has been no systematic research, it is suspected that a significant proportion of these failures has risk for dyslexia and/or other learning disabilities. The SMARTER*phonics program was developed by the Dyslexia Association of Sarawak to empower all emergent readers, with and without risk for dyslexia and other learning disabilities, with basic decoding and encoding skills in English. It is currently being adopted by all preschools in the state. This article presents the outcomes of a six-month implementation of SMARTER*phonics among 740 preschool children (aged 5-6 years old) in terms of comparative analysis of scores from pre- and post-tests. In addition, the post-test scores obtained by these children will be compared to a control group of 99 children who were not exposed to the program at the end of the school year. The outcomes point to the importance of phonics-based instructional programs which are structured, cumulative, specific and multisensorial to teach preschool children to read and write in English.

Keywords: Reading in English Language, SMARTER*phonics

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Constructivist-oriented approach for Teaching and Learning for children with special needs in the mainstream primary school.

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Abstract

This is an autoethnographic inquiry into the quest to explore the impact of constructivist-oriented teaching on children with special needs in a mainstream primary school in Singapore. Situated in a social constructivist paradigm of inquiry and using a variety of qualitative methods for information generation, this research is two-fold. By employing information gleaned from multiple interviews with both students and teachers, the research explores the current issues and problems faced by this particular group of children in their learning in the mainstream classroom. Rising from the input of this initial generation of information, this research further explored the autoethnographical journey of the researcher as a teacher who started as a novice in constructivist-oriented teaching, illustrating the researcher's attempts to use the elements of constructivist-oriented teaching to resolve the issues and problems of children disabled in learning in her classes. The researcher's journey continued four years later, with her being a more experienced constructivist-oriented teacher. Her mode of teaching is grounded on Lev Vygotsky's social constructivist views, especially those articulated in his theory of dysontogenesis, which emphasises the empowerment of individuals rather than a focus on their impairments or deficiencies, suggesting how children with special needs should be offered the opportunity to maximise their potential. Information generated from this research is presented as an autoethnographical novel, which is a detailed appraisal-based description of the educational experience. This part of the research concludes that constructivist-oriented approaches offer a viable platform for the teaching of children with special needs, making them more enabled, although all educational stakeholders have to be adequately equipped to sustain such approaches. A framework is then proposed for teachers who can exercise multiple roles to effectively work with children with special needs.

Keywords: special needs, constructivist-oriented teaching and learning

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Executive functions and its relation with Dyslexia: exercises to improve planning and self-regulation

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Abstract

Difficulties in executive functions, with particular reference to neural circuits, whose functionality requires effective exchange between the hemispheres, forms the basis for our Cognitive Motor Training (The Crispiani Method) utilising cross pattern exercises as part of a larger research programme. Based on the prompt activation (incipit) of important early markers of executive functions such as planning the directionality from left to right, visual tracking, cognitive control, self-regulation, organization in space and time, inhibitory processes and monitoring the state of alertness, our children improve their performances and everyday living: walking, riding a bike and in many higher order functions, relating to school performance, and academic skills such as reading, writing and maths.

Keywords: executive functions, planning, self regulation, cross patterns exercises

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A Stitch in Time

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Abstract

KEY : Our main aim at Ananya is to identify the child who may be at risk for possible learning difficulties and to facilitate the child in the way best suited for him or her, without labelling him or her. There is a very old and powerful saying, 'a strong foundation is the key for a good building'. Education is not only about imparting what we know, but also about understanding the uniqueness in every child, and providing a fair chance for the holistic development of the child, depending on his strengths and needs. As the child grows, lets be involved and pay attention to the developmental progress and difficulties the child undergoes. We can nurture, support and provide resources to maximize the child's abilities, as early as possible, so that no vital links are left unnoticed. To acquire any skill, first the pre-skills develop. Then, with constant stimulation the skill is exhibited by the child appropriately. If there is a lag in the development of a pre-skill, then automatically there will be a lag followed in the areas connected to that pre-skill. It is extremely important to try and bridge this gap in order to pre-empt any future failure the child may face. The paper will focus on:-

1.   The vitality of early intervention and why it should not be over looked.
2.   The areas to look out for while conducting the informal assessment at the pre primary level.
3.   How to make connections of the child's skills displayed today with the future development of his skills.
4.   The possible cause of any academic delays.
5.   How this timely intervention will provide a platform for the caregivers to make a unique structured plan and work towards the overall development of the child, thus bringing out the best in him and make school a happier place.
6.   Early intervention to address learning delays can make a crucial difference in the child's life.

Keywords: Early intervention, holistic development.

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Full Time Pull out Remedial Centre Model for Children with Specific Learning Disabilities

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1.   *Madras Dyslexia Association , India*

Abstract

The paper presents the model of a full time pull out remedial centre, "Ananya" of Madras Dyslexia Association. MDA was started by a few parents and educationists 25 years ago to help children with Specific Learning Disabilities. This model caters to needs of SLD children who have a wide gap between their performance and grade requirements and need intense remediation on a full time basis which is typically unavailable in a mainstream school setting. In this model the child is "pulled out" from the school for a year or two. During his tenure at Ananya, the child is equipped with academic skills and executive functionary skills for a smooth onward journey in main stream school and life . At Ananya a team of experienced special educators, therapists, counsellors and parents work on specially crafted program that remediates difficulties even as it enables to bring about the holistic development of a child. Once the child has acquired the necessary skills, the parents are guided and mentored on a regular basis in the child's journey into the main stream environment. The paper concludes by elaborating how with years of working in this area, the centre has evolved into a " action research program" developing specialised resources, methodologies, continuous implementation with progress monitoring strategies for children with Specific Learning Disabilities

Keywords: Full time Pull out centre

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A 360 Post-Sec Pact - Know, Find, Learn

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1.   *Dyslexia Association of Singapore*

Abstract

The post secondary landscape in Singapore has evolved over the past decade and increasingly, more attention is being paid to learners with dyslexia attending Institutes of Higher Learning (IHL). Existing policies and funding cover students with more "visible" disabilities but miss out on students with the hidden handicaps ike dyslexia. Following consultations with various IHLs, it quickly became clear that to best support post-secondary learners with dyslexia, a holistic support model must be employed that combines raising of awareness, formal investigation of needs and training for teachers to identify and support learners in school.

This presentation shares a vision - a 360 Post-Sec Pact, which individuals and schools are encouraged to consider if they are keen to empower post-sec learners. This pact is based on a framework that effective intervention begins with internal awareness raising, a formalised and systematic screening and identification effort and teacher readiness. Besides elaborating on this pact, this presentation will share some identification tools such as checklists as well as metacognitive strategies aimed at improving self awareness and executive functions to begin this process with post-secondary learners.

Keywords: Post-secondary, Dyslexia, Support framework, Dyslexia awareness, Identification, Screening checklist Intervention, Executive Functions, Metacognition, Teacher readiness

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Exploring the effectiveness of the English Examination Skills Programme on struggling non-dyslexic learners

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1.   *Dyslexia Association of Singapore*

Abstract

The effectiveness of sequential, cumulative and multisensory intervention programmes on learners with dyslexia has been proven in multiple academic literature. This study serves as a follow-up on a previous research which explored the classroom practices of the English Exam Skills Programme (EESP). In comparison between students with dyslexia and a control group, the study found significant progress in their grammar, vocabulary and comprehension components of their English examination paper after intervention. Aligning with Universal Design for Learning (UDL) framework, the EESP is postulated to benefit all learners, including struggling learners with or without a diagnosis of SpLD or any learning disorders, and are scoring below 65% in their school English Language examination papers. This study seeks to investigate the possible effectiveness of the EESP on a group of struggling non-dyslexic learners after a 20-week intervention.

Keywords: English Exam Skills, structured intervention, dyslexia, struggling learners, UDL

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Identifying dyslexic-type difficulties in English-Chinese learners in Singapore

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1.   DAS Academy, Singapore

Abstract

With the increasing awareness of dyslexia in both monolingual and bilingual countries, there is a need for screening procedures that are valid for different languages and reliable to identify dyslexia differentiated from inexperienced second language learners. Although phonological deficit has been the consensus as being the underlying cause of literacy difficulties across languages and bilingual populations, other cognitive factors related to the different scripts of the languages should be considered for a more practical purpose of assessment development as well as a more appropriate educational support. Hence, there is a call for screening measures or analytical tools from a bilingual perspective that provides for a spectrum of dyslexic-type difficulties in two languages. The methodology follows the test development protocol suggested by Tashakkori and Teddlie (1998; cited in Teijlingen & Hundley, 2001), which involves a qualitative study exploring potential factors contributing to the construct under study, followed by the development of items, pilot testing, and finally a validation. The research is currently ongoing and the first phase has been conducted using qualitative case study approach. The objective of the case study is to identify the Singapore dyslexic-type difficulties bilingual learners have in either / both English and Chinese languages. Analysis of qualitative data adopts the grounded theory (Charmaz, 2006) to present a framework to explain how dyslexia affects learning of English and Chinese languages and its symptoms manifested in each language. The findings will form the basis for the development of the bilingual dyslexia screening tool prototype, which will be constructed and validated in a follow-up study.

Keywords: bilingual, English, Chinese, bilingual dyslexia screening
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Test of the Double Deficit Hypothesis of dyslexia: Comparison in two Japanese writing systems

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1.   *University of Tsukuba*

Abstract

The Double Deficit Hypothesis (DDH; Bowers and Wolf, 1993), suggests that dyslexia results from a combination of phonological awareness and naming-speed problems. Papadopoulos, et al., (2009) reported that the degree of transparency in a writing system affects the level of dyslexia in Latin and Greek languages. In the present study, we investigated how the writing system affects the DDH using Hiragana and Kanji. Hiragana is quite transparent, while in contrast, Kanji is an opaque writing system. The participants were 564 children in elementary school from first to sixth grade. We conducted cognitive ability and reading tests of Hiragana and Kanji in all the participants. In Hiragana, four groups were found based on the scores in phonological and naming-speed test: double-deficit group (DD; n = 1), phonological deficit group (PD; n = 4), naming deficit group (ND; n = 3), and a group we could not classify based on DDH (Other; n = 1). On the other hand, in Kanji, three groups were found: PD (n=6), ND (n = 1), and Other (n = 11). We could not find DD in Kanji. We could find a single naming speed deficit group in both writing systems, however the DD group did not show the severest reading difficulty, in comparison with other groups in Hiragana, as would be predicted by the DDH. Our data suggested that the degree of transparency may not explain the results of dyslexia based on the DDH.

Keywords: The Double Deficit Hypothesis, the degree of transparency in a writing system, Japanese speaking children, Kanji and Hiragana

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Impact of DAS Maths Intervention: An exploratory case study of struggling primary school learners without dyslexia

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1.   *Dyslexia Association of Singapore*

Abstract

DAS Maths has been helping our existing students with dyslexia since 2009 as a 3rd hour programme, conducted once a week. While the programme has been known to benefit our students with dyslexia (Yeo, Bunn, Abdullah, Bte Shukri & Oehlers-Jaen, 2015), there is little information on whether the same type of intervention would be of any benefit for non-dyslexic students who are also having difficulties in mathematics. This case study aims to investigate the impact of conducting the DAS Maths intervention on struggling learners without dyslexia and at the same time, explore the profile of these learners whose scores improved after going through the remediation. Two students of Primary 3 and Primary 5 were selected to undergo a 20-week intervention with a group of students with dyslexia in their own respective class. A pre and posttest at the start and end of each term were conducted and teachers were interviewed to state their observations about how their teaching instructions were received by the two students. The two students made considerable improvements which were parallel to their peers in the same class. The results showed that there are profiles of struggling learners without dyslexia who could also benefit from the DAS Maths remediation. Analysis on their profile is still in progress. Additionally, observations made by teachers will also have implications for future understanding of teaching practices.

Keywords: non-dyslexic, maths, intervention, remediation, primary school learners
without dyslexia, struggling learners
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A Qualitative Study of Collaborative Practices between Allied Educators and Teachers in Mainstream Primary Schools

June Siew[1*]

1.   DAS Academy, Singapore

Abstract

Inclusive education in Singapore is relatively new (see Lim, Wong, & Tan, 2014; Tam, Seever, Gardner, & Heng, 2006; Weng, Walker, & Rosenblatt, 2015; Yeo, Ching, Neihart, &Huan, 2016). To support inclusion in mainstream schools, Allied Educators for Learning and Behaviour Support or AED(LBS) have been deployed to schools since 2005 with the responsibility of supporting children with mild special educational needs (SEN) such as dyslexia, attention deficit hyperactivity disorder (ADHD) or autism spectrum disorder (ASD) (MOE, 2016). To date, there is at least one AED(LBS) in each primary school and in 92 secondary schools (MOE, 2016). Yet, the number of children with SEN in mainstream schools is quickly rising (Lim, 2016). To allow effective penetration of SEN support, AED (LBS) increasingly need to engage the support of mainstream teachers to ensure every student can thrive in an inclusive classroom. In this context, collaboration between AED (LBS) and teachers becomes a cornerstone of successful inclusion in mainstream schools. In the absence of any local published studies which focus on collaborative practices between AED(LBS) and teachers in the local mainstream schools, this study seeks to examine the current collaborative practices between AED(LBS) and teachers and identify the factors that enable or impede these practices. It is anticipated that these findings can lead to improved practices in our relatively new inclusive education system. This is an ongoing study and preliminary results will be presented.

Keywords: collaborative practices, collaboration, inclusive education, inclusive classroom, inclusion, allied educators

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Parent Advocacy - A Success Model

Tina Tan[1*]

1.   *Society for Promotion of ADHD Research and Knowledge, (SPARK) Singapore*

Abstract

As a representative of SPARK, I will be speaking on how parents can better advocate for their ADHD children in the school context in order to build a collaborative working relationship with shared expectations and reduced pressure for all parties.

Keywords: Parents, Coping, Collaboration, Success definitions, Pressure

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Evaluating the MOE-Aided DAS Literacy Programme

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2.   *Dyslexia Association of Singapore*

Abstract

Dyslexia is a learning disability that hinders the accuracy and fluency of word reading, spelling and writing, despite average or above average intelligence and adequate educational exposure (Peterson & Pennington, 2012; Thompson et al., 2015). Affecting over 700 million people worldwide, it is one of the most prevalent learning disability (Dyslexia International, 2014). According to Snowling (1980), most children with dyslexia have a phonological processing deficit, which is thought to hinder word recognition and interfere with the mapping of phonemes of spoken words and written letters. The phonological deficit hypothesis posits that dyslexics' difficulty in mapping sounds to their corresponding letters causes them to struggle with reading and recognizing words. Past studies found that interventions aimed at developing phonological awareness improved dyslexics' linguistic abilities. The Dyslexia Association of Singapore (DAS) provides intervention through the MOE-Aided DAS Literacy Programme (MAP) to help students improve their phonemic awareness, phonics, morphology, vocabulary, reading fluency and comprehension, as well as writing abilities. The MAP adopts a holistic approach that caters to the profile and learning challenges of students accessing the programme, and is specifically designed for the local context. The present study evaluates MAP's effectiveness by tracking 83 students' (aged 7-9) literacy abilities over a period of 12 months. To overcome ethical and logistical constraints, an age-control study design was employed. Upon admission into MAP, students were categorized into one of four age-categories (7 - 7.5 years old, 7.5 - 8 years old, 8 - 8.5 years old, 8.5 - 9 years old). Students were assessed upon admission, and at 3, 6, 9 and 12 months after admission. For each assessment session, students completed a speeded reading task, a writing task and a spelling task (further divided into sound-, letter- and written-spelling subtasks). Parallel forms were developed and employed for all the tasks across the sessions. To evaluate whether MAP intervention improved different linguistic abilities, students in the same age range, but with different lengths of interventions, were compared. For example, students in the 7 - 7.5 years old age-group after 12 months of intervention (age range = 8 - 8.5 years old) were compared to students in the 8 - 8.5 years old age group with 0 months intervention. Comparisons were made for intervention periods of 6 and 12 months. Participants' performance for the different tasks were also tracked for each of the age groups. Based on the statistical analysis, three main findings emerged: (a) the MAP intervention improved performance in both reading and spelling tasks, but not the writing task; (b) improvements were more likely to be observed for younger participants; and (c) effects of MAP intervention were only apparent after 6 months. The findings will be discussed in the context of the existing MAP curriculum, and possible suggestions on improving it.

Keywords: Programme Evaluation

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Examining subtypes of dyslexia and their associated cognitive profiles - A pilot study

Deborah Tan Wen Li[1*] and Liu Yimei[1*]

1.   Dyslexia Association of Singapore

Abstract

A pilot study carried out in two parts examined the prevalence of the subtypes of dyslexia and the cognitive profiles of Singaporean primary school students who were diagnosed with Dyslexia. Twenty-nine students with dyslexia and a control group of 29 students with no known learning difficulties participated in the first part of the study. Measures of phonological coding and orthographic coding were administered to determine if students with dyslexia belonged to either one of the six subtypes (pure or relative phonological dyslexia, pure or relative surface dyslexia, mixed dyslexia, or mild dyslexia). In the second part of the study, the deficits in orthographic or phonological coding of the 29 students with dyslexia were then correlated with various cognitive factors – phonological awareness, verbal short-term memory, rapid automatised naming (RAN), visual skills. Results in the first part of the study showed that about half (51.7%) of the dyslexic students displayed a dissociation in their phonological and orthographic processing skills. There were also dyslexic students who did not exhibit a clear dissociation between their phonological and orthographic skills - 31% of the dyslexic students showed relatively intact skills in both areas (mild subtype) whereas 17.2% had similarly impaired skills in both areas (mixed subtype). Results in the second part of the study showed positive correlations between phonological coding tasks and phonological awareness, verbal short-term memory and visual factors. Orthographic coding tasks only correlated positively with specific areas of visual skills. However, RAN did not correlate with both phonological coding and orthographic coding tasks.

Keywords: Dyslexia, subtypes of dyslexia, cognitive factors

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The emphasis on the explicit teaching of Reading Comprehension to learners on the DAS Main Literacy Programme

Serena Tan[1][*]

1.   *Dyslexia Association of Singapore*

Abstract

Reading comprehension is defined as the "process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Snow, 2002). Aside from experiencing difficulty in reading, spelling and writing, learners with dyslexia also struggle with comprehending text that involves higher-order thinking processes which is required of them to extrapolate meaning from the text and make sense of what they have read. Therefore, the explicit teaching of reading skills and textual features such as the employment of annotation is highly emphasised in the delivery of Reading Comprehension to learners at the Dyslexia Association of Singapore (DAS). This presentation will also include a few sample comprehension questions taken from the Reading Comprehension curriculum pack, the corresponding section of text relevant to those questions to highlight the systematic process and structure put in place to guide and scaffold learners to understand the text better.

Keywords: Dyslexia, Reading comprehension,

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Working with Youths with extremely low language and literacy: A case study

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1.   NorthLight School, Singapore

Abstract

This workshop aims to share strategies used to teach youths with extremely low language and literacy level. The sharing isbased on experiences working with students from NorthLight School, a vocational school in Singapore which takes in students who fail their PSLE and who often experience a double whammy in life – they often come from disadvantaged family backgrounds and have learning difficulties such as dyslexia, ADHD, speech and language impairment or intellectual impairment. Very often, these youths have very low self-esteem and come with a huge dollop of emotional baggage towards learning. These teaching strategies are based on an adaptation of the Orton-Gillingham approach typically used to work with individuals with dyslexia.

Strategies shared will include:

- Teaching decoding of single-syllabic and multisyllabic words to youths who experience a great deal of frustration in their learning and who need to see quick success
- Touching the chords of their heart
    - - motivating learning through music
    - - building alliteration and semantic fluency via rhythm
    - - teaching decoding and reading using music
- Working with students with poor working memory
    - - teach students to remember information by:
    a) getting them to use drawings to create meanings for themselves
    b) teaching them to learn via association
    c) helping to develop their access skills using mnemonics and stories
    d) explicitly teaching chunking skills
- Use of assistive technology

Keywords: .Low language, low literacy, youths

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The effectiveness of family literacy programme on the early literacy achievement of Singaporean preschool children identified to be at risk of literacy difficulties

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Abstract

Early literacy lays the foundation for the acquisition of conventional literacy skills. Lack of adequate literacy skills has a profound impact on later school success. Family Literacy Programmes (FLPs) is an intervention that promotes active participation among families to improve their child's literacy. This research explored the effectiveness of FLP on the early literacy achievement on Singaporean preschool children identified to be at risk of literacy difficulties. Two research questions were investigated: (a) Does FLP increases the early literacy attainment for preschool children at risk of developing literacy difficulties and are attending an existing literacy intervention programme?; and (b) What are parents' perceptions of the effectiveness of FLP? Participants included 8 parents and 9 preschool children from 4 to 7 years old enrolled in DAS Preschool Programme. Data sources for analysis included pre- and post-test before and after intervention, post-workshop questionnaire and interview data. The research concluded FLP was not effective in the early literacy achievement on Singaporean preschool children identified to be at risk of literacy difficulties. However, parents had a positive perception of the effectiveness of FLP. Although FLP did not improve early literacy score, it provided skills and knowledge for parents to teach and guide their child in home-based literacy activities. Future research could look into how the content of FLP can be designed to train and provide parents with literacy knowledge, skills and instructional strategies. In-depth and research-based evidence should be implemented to evaluate the long-term effectiveness of FLP.

Keywords: Early intervention, parent and family support, early literacy

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Our Literacy World: The Preschool Class at DAS

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Abstract

DAS preschool programme is designed for the Kindergarten One and Two preschoolers identified to be at risk of developing literacy difficulties. The small group remediation programme equips our students with learning strategies that can be applied to their classroom setting. Differentiated teaching strategies to teach literacy will also be shared. Through hands-on activities, this workshop will also showcase some of these literacy and differentiated teaching strategies that we adopt within our classrooms.

Keywords: Preschool, workshop, intervention

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The effects of font type on reading accuracy and fluency in Japanese children with developmental dyslexia

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2.   *Tsukuba University, Japan*

Abstract

The purpose of this study is to clarify the effects of different types of Japanese font on reading performance in Japanese speaking children with developmental dyslexia. Methods : Participants included 36 children with typical development and 23 children with developmental dyslexia from fourth to sixth grades elementary school student. We conducted rapid reading tasks and hearing of the introspectiveness. In this study, we used four kinds of stimuli: two scripts (paragraph and kana non-words) by two font types (Round-Gothic and Mincho style font). We asked participants to "read the words and paragraph as fast as you can without making mistakes". We analyzed duration time of reading, number of errors and self-corrections. After the reading tasks, participants were required to answer which font type was easy to read. Results : Typical development and developmental dyslexic group did not show significant differences in duration time of reading, number of errors and self-corrections between two types of font. On the other hand, the answer in subjective readability from the group with developmental dyslexia showed significant differences and children with developmental dyslexia had impression that Round-Gothic as the font easily to read. Discussion : In this study, Round-Gothic and Mincho style fonts did not improve reading performance for children with dyslexia. However, Round-Gothic style font tended to be recognized "readable font" subjectively by children with developmental dyslexia. Our results suggest that subjective readability for the Round-Gothic style font contribute to reduce mental burden of reading among children with developmental dyslexia.

Keywords: developmental dyslexia, font type, reading accuracy, reading fluency,
                 readability

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Profile of Children with Expressive Language Delay in Zainab Hospital Pekanbaru, Indonesia

Dhita Natasha Dwiriyanti Hardi[1*] ,Dian Larassati[1] and Yoan Utami Putri[1]

1 *Zainab Hospital Pekanbaru , Indonesia*

Abstract

A language disorder is an impairment that makes it hard for someone to find the right words and form clear sentences when speaking. It can also make it difficult to understand what another person says. There are three kinds of language disorders. Receptive language issues involve difficulty understanding what others are saying. Expressive language issues involve difficulty expressing thoughts and ideas. Mixed receptive-expressive language issues involve difficulty understanding and using spoken language. The objective of the study is to identify characteristically related to children and their parents associated with expressive language delay. The study conducted with all the children in Zainab Hospital Pekanbaru Indonesia diagnosed as expressive language disorder in 2017. Protocol for the Identification of Risk Factor for Language and Speech Disorders (PIFRAL) was used for this study Descriptive statistics and student's t test were used to analyze the frequency and relationship between risk factor. The onset of the complaint occurred after [±SD] 41,76 ± 12,108 months old and mostly are male gender (72.7%). Most of them (54,5%) whose mother had just completed high school and 60.6% of a mother in the category "doesn't work. Out of the 33 participants, 20 were the first child in the family (60.0%). Deleterious oral habits (64%,) and bilingual (51.5%) were significant to incidence of expressive language disorder in that children. Conclusion: Most of children are the first boys. They are mainly raised by a mother with low levels of education and do not work. But many of them have bad oral habits , bilingual and this are significant.

Keywords: risk factor, expressive language

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"I Read and Write!" Evaluation a Multi-sensory Structured Language (MSL) Program for Arabic

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Abstract

"I Read and Write!" is an individualized, structured language training program and materials for teaching persons with moderate to severe difficulties with learning to read and spell in Arabic. The program is designed for use in a one-to-one or small group (two-three students) tutorial setting and focus on Modern Standard Arabic generic to the Gulf Region. Areas of literacy targeted are early reading skills (phonological awareness and letter awareness), decoding/encoding, fluency, vocabulary and comprehension, as well as written expression skills. While the material will be geared for Chall's reading stages 1 -3 (approximate reading and spelling grade levels K/1 through grade 7/8), The program's broad skills goals will be indexed to key curricular benchmarks for Gulf region language curricula for grades 1-9; the purpose of doing this is to demonstrate the curricular relevance of the materials to teachers and school administrators throughout the Gulf, but the skills are relevant for all other Arab countries and learners of Arabic.

Keywords:　Multi-sensory Structured Language (MSL) Program , Dyslexia, Dyslexia in other languages

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How I guide a child with language development delay

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Abstract

A 5 year old focus child who is currently studying in Kindergarten 1. Some learning activities are done one to one which focus on learning through engaging him in the activities and toys that the boy likes. Throughout the activities, I have followed this method:

- Constantly ask questions to assess and to check the child's understanding,
- Then prompt him if he cannot answer.
- After prompting, wait for 5 seconds for his response.
- Then praise him for attempting and answering correctly.

Activity 1:
Asks the child to talk about his cars that he is playing. Then tell him that I am writing down his story so that we could read his story again after I have written them down. He continues to say while I write down. After writing down we go through and read the story told by him. After a few rounds, try to point out a few words that he is not sure and after he has 3 familiarized, ask him if he would like to copy the story in his own handwriting. He complies and through this activity, he learns talking, reading and writing.

Activity 2:
Asks the child to pick up a book from a few pre-selected books that he likes. Then read together with the child. Pointing to the words one by one on each page of the book. Read together with the child. After a few rounds, asks the child to read, while helping him to point each word. Through this activity, he learns new words and reading a book on his own.

Keywords: Reading, Writing, Language Development Delay

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Association Between Screen Time and Expressive Language Delay Children in Zainab Hospital Pekanbaru, Indonesia

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Abstract

The use of interactive screen media such as televisions, smartphone and tablets by young children is increasing rapidly. The American Academy of Pediatric (AAP) recommends that children ≥ 2 years of age should have < 2 hours of screen time per day and that children< 2 years of age be discouraged from television watching. Recommendations for use by toddlers are crucial, because effect of screen time are potentially more pronounced in this group. Therefore, need to identify screen time factors that may have impact on language development. This study investigated the association between children's exposure screen time and expressive language delay. The source of data was collected in Zainab Hospital during 2017. The subjects of this study were children with expressive language delay. In addition, normal children were used as control subject. Linguistic ability were reviewing by language Milestone and Denver II, The data were analyzed by chi-square test. Odds ratios and 95% confidence interval were presented. There were 24 boys and 19 girls; mean $41,8 \pm 12,108$ month of the case group and 17 boys and 14 girls, mean $36,45 \pm 12,129$ month of the control group were enrolled. Children with ≥ 3 hours screen time had around 3.2 times (OR 3,167 95% CI: 1.139-8.806) more risk of expressive language delay. Children with expressive language delay spent more time screen time than normal children ($3,61 \pm 0,0609$ hours/day vs.$2,00 \pm 0,949$ hours/day; p= 0,025). Conclusion: children had screen time more than 3 hours /day were approximately 3,2 times likely to have expressive language delay than normal children.

Keywords: screen time, expressive language delay

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An Autoethnographic Exploration in the search for the Enhancement of Learning for Students with Special Needs

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Abstract

This is a longitudinal autoethnographic inquiry into the quest to explore the support for students with special needs in a mainstream primary school in Singapore. By employing information gleaned from multiple interviews with both students and teachers, the research explores the current issues and problems faced by this particular group of children in their learning in the mainstream classroom. Issues perceived by both students and teachers include problem in completing writing assignments, a lack of interest in the subject matter taught, as well as a short attention span during daily work. Rising from the input of this initial generation of information, this research further explored the autoethnographical journey of the researcher as a teacher who started as a novice in constructivist-oriented teaching, illustrating the researcher's attempts to use the elements of constructivist-oriented teaching to resolve the issues and problems of students with special needs in her classes. The researcher's journey continued four years later, with her being a more experienced constructivist-oriented teacher. Her mode of teaching is grounded on Lev Vygotsky's social constructivist views, especially those articulated in his theory of dysontogenesis, which emphasises the empowerment of individuals rather than a focus on their impairments or deficiencies, suggesting how students with special needs should be offered the opportunity to maximise their potential. Information generated from this research is presented as an autoethnographical novel, which is a detailed appraisal-based description of the educational experience. This part of the research concludes that constructivist-oriented approaches offer a viable platform for the teaching students with special needs, making them more enabled, although all educational stakeholders have to be adequately equipped to sustain such approaches. A framework is then proposed for teachers who can exercise multiple roles to effectively work with students with special needs in the mainstream classroom.

Keywords: special needs, constructivist-oriented teaching and learning

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Risk Factors Identification in Children with Expressive Language Delay in Zainab Hospital Pekanbaru, Indonesia

Yoan Utami Putri[1*], Dian Larassati[1] and Dhita Natasha Dwiriyanti[1]

1.   *Hospital of Zainab Pekanbaru, Indonesia*

Abstract

Speech and language development represent a meaningful indicator of a child's development and cognitive ability. Identification of children at risk for development delay may lead to early intervention services and family assistance at young age. This study investigated the risk factors of children and their parent related to the expressive language delay. The case-control study included 33 children with expressive language delay and 31 normal children. Expressive language delay was diagnosed by reviewing language milestone and Denver II. The following risk factors were identified by using PIFRAL (Protocol to Identify Risk Factors for Language Speech Related Changes). The differences of relationship between risk factors were tested by chi square test. The sample in this study was adjusted in 2 models. Model 1 was adjusted for due date above 37 weeks group. Model 2 was additionally adjusted for birth weight above 2500 grams group. The significant risk factors in model 1 were effects of maternal education's level (p= 0.011), positive family history (p= 0.010), jaundice (p= 0.036), deleterious oral habit (p=0.0001), time spending with mother (p=0.0001), and speaking more than one language (p= 0.005). In model 2, the significant risk factors were effects of maternal education's level (p= 0.037), deleterious oral habit (p=0.0001), time spending with mother (p=0.0001), and speaking more than one language (p= 0.005). Based on this study, the significant risk factors for children with expressive language disorder in a term and normal birth weight were deleterious oral habit, time spending with mother, speaking more than one language and maternal education's level.

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Keywords: expressive language delay, risk factor

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Developing A Dyslexia – Friendly Environment in classroom

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1.   *Madras Dyslexia Association, India*

Abstract

This paper is aimed for teachers who have heard the term dyslexic, know they may have students within their class who possibly could be dyslexic but have no further knowledge of how to adapt their teaching style to assist them. The presentations introduce teacher to dyslexia, and shares ways teachers can adjust their teaching, taking very little additional time, to include dyslexic students and at the same time reach many other students with learning difficulties. The presentation details components of a creating an environment which embraces the use of the word dyslexia; promotes a clear and practical valid understanding of dyslexia for young teachers. A dyslexia-friendly classroom environment encourages dyslexic students to follow their strengths and interests. This paper identifies how the "classroom" and "institution" can be made dyslexia friendly, thus creating an inclusive learning environment. When teachers use the strategies they not only help dyslexic students learn, but engage and improve learning for all students in the class. Additionally, a dyslexia-friendly environment allows educators to be alert to problems and identify children who might be dyslexic. This paper shares guidelines about the changes we can make in the physical environment, adapting new strategies to implement in our classroom. Help the teacher to choose the right tool that fit each student's needs as a learner. Whilst this paper is aimed at supporting dyslexic individuals, many of the strategies suggested here would be equally appropriate for those who are not dyslexic as well as those who are. The aim here is to suggest a range of approaches and strategies that can be adapted to suit the needs of many individuals.

Keywords: Friendly Environment in classroom, Practical understanding of dyslexia, adapting new teaching strategies.

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The effectiveness of memory games in improving reading fluency and reading comprehension of children with dyslexia

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1.   *Dyslexia Association of Singapore*

Abstract

This research study examines the effectiveness of memory games intervention in improving reading fluency and reading comprehension of children with Dyslexia. A total of 22 students diagnosed with Dyslexia participated in the research study. First, it was examined whether there are any transfer effects to reading fluency and reading comprehension on children with Dyslexia after going through the memory games intervention. Next, it was explored whether the lower ability students made more improvements than the higher ability students. Unfortunately, the memory games intervention did not produce any results. The reading fluency and reading comprehension of children with Dyslexia did show significant improvements after going through the memory games intervention. However, the lower ability students did make more improvements as compared to the higher ability students. Even though no significant results were found in this research study, there are room for improvements that can be made to find out the true effectiveness of memory games intervention in improving reading fluency and reading comprehension of children with Dyslexia.

Keywords: Memory Games

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CERTIFICATE IN DYSLEXIA AND LITERACY TEACHING

1

Appreciate the literacy needs of a dyslexic child and acquire knowledge of the phonology and structure of the English Language.

2

Be equipped with skills to support persons with language processing problems associated with dyslexia.

3

A theoretical, practical and experiential learning for personal and professional development.

CERTIFICATE COURSE FEEDBACK

"Some of the english rules that I have never come across were introduced, and this has helped me to support my learner when needed." - Educator, 2015 April

"It helps parents of dyslexic kids to teach them in a more systematic way." - DAS Parent, 2014 August

"Gives me a very clear understanding to improving the language usage." - Educator, 2014 Aug

"It is useful for someone who needs to support her child as it answers the 'why' that surfaced during the learning process." - DAS Parent, 2015 April

DYSLEXIA ASSOCIATION OF SINGAPORE (DAS)

DYSLEXIA ASSOCIATION
DAS
DAS *(inverted)*
OF SINGAPORE

Our Mission: Helping Dyslexic People Achieve

Our Goal: To build a world class organisation dedicated to helping dyslexic people 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 3,000 preschool, primary and secondary school students in 13 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

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.

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.

Submissions are to be emailed to the editor at both email addresses below:

Angela Fawcett
DAS Academic Director
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/journal
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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 (6th ed), which offers sound guidance for writing with clarity, conciseness and simplicity. Authors should follow the APA style in preparation of their manuscripts.

Asia Pacific Journal of Developmental Differences

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