



Expanding the Provision for People with Dyslexia in Singapore

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Abstract

Studies show that dyslexia affects about 10% of the population. While the Ministry of Education (MOE) and the Dyslexia Association of Singapore (DAS) have provided more support for students with dyslexia in recent years, this remains inadequate. Based on literature review and comparison with other developed countries, as well as discussions with local stakeholders, including the MOE, DAS, teachers, parents, and subject matter experts, this paper investigates the gaps in dyslexia provision in Singapore and finds that the roots causes are in three main areas: service volume (under-identification of students with dyslexia), service nature (limited scope of dyslexia intervention), and service support (insufficient resources to support the provision of dyslexia services). We recommend a broad expansion of the current provision to improve the identification, intervention, and support for people with dyslexia, through the following key measures: harmonising intervention efforts between the MOE and DAS, expanding professional learning pathways for mainstream teachers and Allied Educators (Learning and Behavioural Support), investigating the feasibility of a specialist school for students with severe dyslexia, investing in assistive technology, and increasing the reach of public awareness and anti-bullying campaigns.

Keywords: dyslexia, Singapore, early intervention, identification, pre-school, post-secondary school, teacher training, specialist school, technology, coordination.

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1. Problem Definition: Background and Context

1.1 What is Dyslexia?

Dyslexia is a specific learning disability that is neurological in origin. It is characterised by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction.

Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge (International Dyslexia Association [IDA], 2002).

The difficulty children with dyslexia have with reading and writing is not determined by their intelligence, but by the severity of their dyslexia. Children with average intelligence and mild dyslexia are likely to be more skilled at reading and writing than children with high intelligence and more severe dyslexia.

There are several theories about the causes of dyslexia, but it is generally accepted to be genetic and neurobiological. Anatomical and brain imagery studies show differences in the way the brain of a person with dyslexia develops and functions, as compared to a person without dyslexia (IDA, 2012).

1.2 Dyslexia in the World

IDA, British Dyslexia Association (BDA), and DAS have reported that dyslexia affects about 10% of the population. More specifically, a study by Nathalie Badian reported by the BDA found that about 4% of any population have severe dyslexia (DAS & ISEAS, 2008). Rose (2009) has similarly cited that dyslexia may significantly affect the literacy attainment of between 4% and 8% of children in the UK, while Whiting (2005) estimates that the proportion of children potentially requiring additional assistance for dyslexia is approximately 7% in Australia.

Dyslexia affects people of all ethnicity as well as languages based on symbols such as Chinese. The effect of dyslexia varies across languages, for instance, dyslexia is less problematic in languages with pronunciation rules such as Spanish, Portuguese, and Italian. Languages such as English, where there is often no clear connection between the written form and sound, can be more challenging for a person with dyslexia.

While it was previously reported that dyslexia is four times more common in males than females, recent studies suggest that the gender ratio is more balanced. The previous gender difference may be due to more males being identified with the learning difficulty than females (DAS & ISEAS, 2008).

1.3 Social Impact

According to a survey conducted in the UK in 2012, the social and emotional impact of dyslexia can be the hardest to

deal with (Dyslexia Action, 2012). Children with dyslexia tend to have a hard time at school and sometimes feel isolated or bullied. The results showed that:

- More than 50% of parents in the UK said that there were times when their child with dyslexia did not want to go to school.
- 57% of parents felt that their child had a negative experience at school.
- 53% of parents reported that their child felt different compared to their peers.
- 47% of parents said that their child had been bullied or picked on at some point.
- 37% of parents reported that teachers made unhelpful comments like "try harder", which had a negative impact on their child's self-esteem.

From our discussions, parents of students at DAS learning centres shared that their children had similarly received negative comments and labels from their school teachers. These included comments that their children were "stupid", "the naughty one", "lazy", "uncooperative", and "sotong" (colloquialism for "failing to understand"). Some parents said that their children's self-esteems were affected to the extent that they would say these of themselves when they failed to meet their teachers' expectations.

1.4 Dyslexia in Singapore

The Early Intervention Programme for Infants and Children (EIPIC) in Singapore provides therapy and educational

support services to pre-school children with special needs and learning difficulties. As of April 2015, there were 16 EIPIC centres run by ten voluntary welfare organisations, of which seven organisations offered programmes to address global developmental delay, including literacy difficulties.

In 2012, the MOE launched an S\$3.6 million School-based Dyslexia Remediation programme in 20 primary schools, of which the breakdown of the programme expenses was not publicly available. This two-year intervention programme is designed for Primary 3 and 4 students, who are identified for support through a screening process for dyslexia conducted at the end of Primary 2. The programme is conducted by allied educators and English language teachers who have received specialised training, and among other things, teaches students letters and name sounds, as well as how to read and spell words. These students typically meet in small groups of three to four people, four times a week at their schools for 45 minutes per session.

The MOE had piloted this programme given feedback that these younger students found it difficult to travel to DAS learning centres outside school hours for the specialised remediation (MOE, 2012). In 2013, the pilot project was expanded to another 22 schools, bringing the total to 460 assisted children. The findings from the 2012 pilot showed that students who participated in the remediation programme had improved in their reading and spelling skills. The majority of them made more than two and a half years gain in their reading age. The MOE will expand its remediation

programme to 60 more primary schools in 2015, covering 121 or two-thirds of the schools, and make available the programme to all primary schools in 2016 (MOE, 2015a).

The MOE has reported that there are about 13,000 students with learning difficulties or mild special educational needs across primary schools, secondary schools, and junior colleges in 2014 (Fang, 2015). Of which, the number of identified students with dyslexia has increased significantly by 83% from 3,320 in 2009 to 6,063 in 2013 (see figure 1), notwithstanding the general decline in total student enrolment from more than 500,000 students in 2009 to 473,000 students in 2013 (MOE, 2014a). The increase in number of dyslexia diagnoses in mainstream schools possibly reflects the MOE's efforts in identifying students

with dyslexia and parents' growing awareness of dyslexia as a learning difficulty.

Besides its dyslexia programme, the MOE offers Learning Support Programmes for all students who have any learning difficulties and literacy delay, not limited to dyslexia. Students who participate in this programme are from the Primary 1 and 2 levels only.

The overarching strategic plan for people with disabilities in Singapore, including special education needs, is the Enabling Masterplan (2012-2016). The Masterplan aims to create an inclusive Singapore where persons with disabilities can maximise their potential and are embraced as part of the society. The development of the Masterplan involves representatives from voluntary welfare

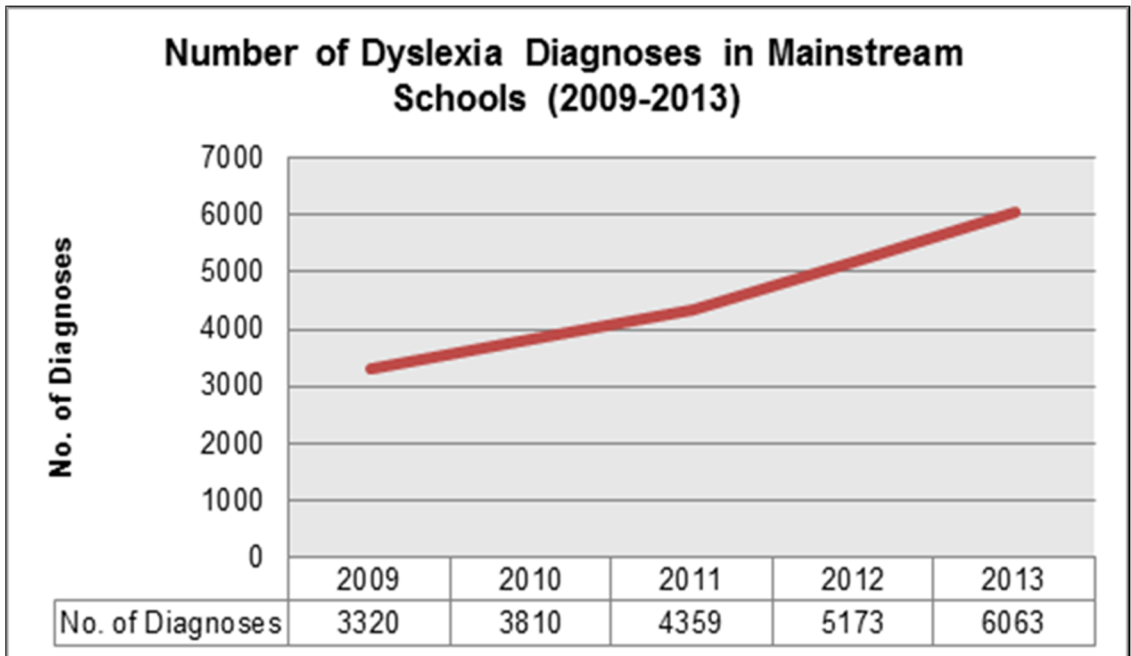


Figure 1: Number of students diagnosed with dyslexia (MOE database, 2014)

organisations, as well as the private and public sectors. Launched in 2007, the first Enabling Masterplan (2007–2011) charted the development of programmes and services to enable persons with disabilities to better integrate into society. The second Enabling Masterplan (2012–2016) builds on the earlier initiatives and adopts a life-course approach for persons with disabilities. It starts with the early pre-school years, followed by the education and employment phases, then the adult and ageing years. The literature review section will highlight the relevant points in the second Masterplan relating to our research focus.

1.5 The Role of DAS

DAS offers two main programmes for students with dyslexia. The MOE-aided DAS Literacy Programme focusses on five key areas – phonemic awareness and phonics, reading fluency, reading comprehension, vocabulary, and writing. The MOE-subsidised programme fee is about S\$500 for 10 weeks of lessons (2 hours per week). Specialised Educational Services (a division of DAS) which provides additional programmes for students such as; preschool early

intervention, Chinese, English exam skills, mathematics, specialist tutoring, speech and drama arts, and speech and language therapy. The fees for these programmes range from about S\$300 (for 10 lessons) to S\$700 (for 20 lessons).

DAS provides a range of assessment services for diagnosing dyslexia among students. The applications and actual assessments for diagnosing dyslexia have generally increased from 2004 to 2014 (see table 1), suggesting an increased parental awareness of dyslexia as a learning difficulty. Full psychological assessments are conducted only for primary and secondary school children. Between 2004 and 2008, the difference between the number of applications and assessments conducted is mainly due to the applications for pre-school children to be assessed for dyslexia. DAS generally does not conduct an assessment for these pre-school children, given the difficulty in making an accurate diagnosis of dyslexia at a young age. Between 2010 and 2014, the number of assessments conducted is higher than the number of new applications, as the former includes both new and review cases.

Table 1: Dyslexia assessments conducted by DAS (DAS statistics, 2015)

DAS Assessments	2004	2006	2008	2010	2012	2014
Applications for dyslexia assessment	434	550	730	559	629	837
Actual number of assessments conducted	389	479	613	656	684	1,110

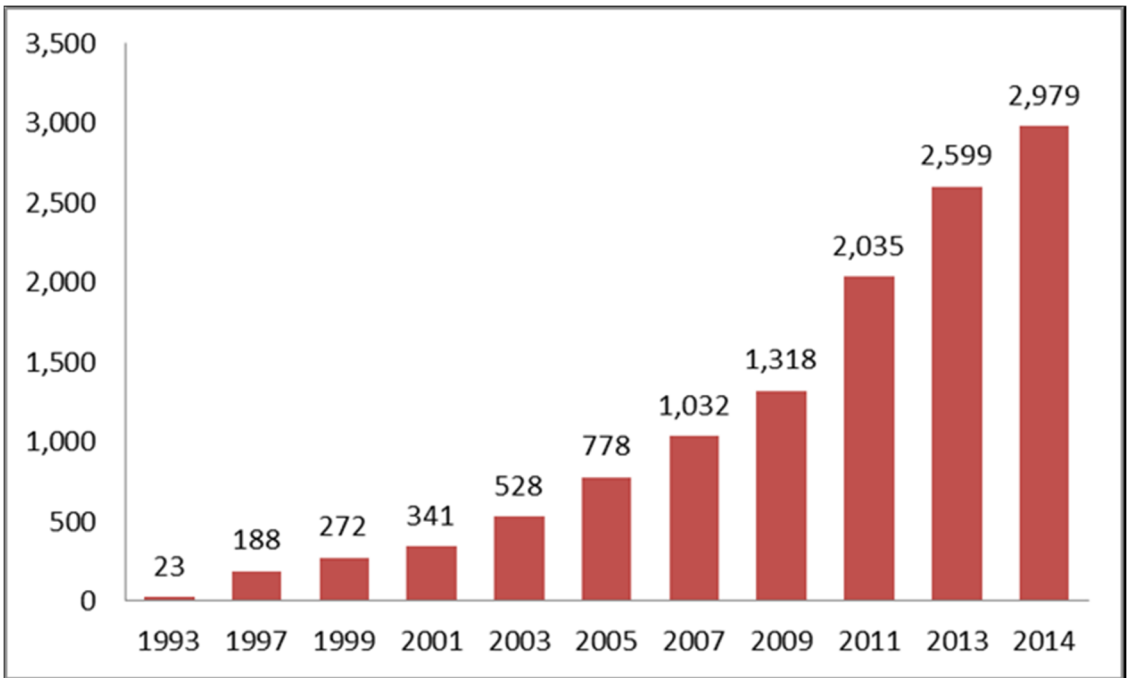


Figure 2: Student enrolment at DAS learning centres (DAS statistics, 2015)

Parents and teachers appear to be increasingly aware of dyslexia as a learning difficulty and its impact on children's learning process, which may have resulted in the increase in numbers of children being diagnosed with dyslexia. Further, there has been a steady increase in DAS total enrolments over time, with the highest percentage increase of 54% from 2009 to 2011 (see figure 2). To meet the increase in demand, DAS has expanded its facilities, with four learning centres being opened over the stated period.

1.6 Research Question

This study examines the current provision for people with dyslexia in Singapore, the limited services provided, and policy options to expand the provision. While the MOE and DAS have provided more

support for students with dyslexia in recent years, we find that there remain significant gaps in dyslexia provision. This warrants a research study on what can be done to expand the services for people with dyslexia in Singapore.

DAS suggested six areas that we could cover in our research studies:

- a. coverage in terms of the number of people with dyslexia who are receiving support;
- b. dyslexia services offered across age groups;
- c. scope of dyslexia intervention;
- d. regional cooperation and exchange of knowledge;
- e. adequacy of special needs professionals and tools; and
- f. research on the local population.

Beyond these areas, we have examined other possible strategies for addressing the existing problems with dyslexia provision. In summary, our key research objectives are to:

- Investigate relevant policies and initiatives in other countries and their applicability to Singapore;
- Identify and evaluate the gaps in provision for people with dyslexia in Singapore; and
- Propose recommendations to expand the provision to improve the identification, intervention, and support for people with dyslexia.

2. Problem Analysis

Our analysis of the current gaps in provision is based on our literature review and comparison with other developed countries, as well as discussions with local stakeholders, including the MOE, DAS, teachers, parents, academia, and subject matter experts. The key stakeholders such as the MOE and DAS are aware of the gaps and have taken actions to address some of these issues. For instance, the MOE has taken a phased approach in the expansion of its School-based Dyslexia Remediation programme, which may in part be due to the need for time and training to increase its pool of teachers and allied educators to run this programme. DAS similarly has to manage its priorities within its resource constraints and is currently focussed on expanding its preschool programme and use of technological tools, developing a new programme to support post-secondary

school students, and refining its programme evaluation reports.

To build capacity for future needs and ensure coherent strategic priorities, it is important for the key stakeholders to understand holistically the existing gaps in dyslexia provision. This will ensure that attention and resources are directed to expanding service provision in the areas of priority. We find that the root causes for the gaps in provision are in three main areas:

2.1 Service Volume

First, service volume refers to the quantity or depth of dyslexia services that are provided vis-à-vis the number of people with dyslexia that has been identified. We find that there is a significant under-identification of students with dyslexia in Singapore. This is mainly due to: a reliance on teachers' observations when they are not adequately trained to make the identification; poor public awareness and the social stigma attached to dyslexia; and a lack of standardised psychological assessment for dyslexia.

Based on the MOE's database, there are about 6,000 or 1.3% of students identified with dyslexia across primary schools, secondary schools, and junior colleges. However, using a conservative prevalence rate of 4% based on academic studies, we expect that there should be least 20,000 students with dyslexia across primary schools, secondary schools, and junior colleges. This suggests a potential gap of 14,000 students who are not identified or reported as having dyslexia.

Besides the gap in the identification of people with dyslexia, there is an existing shortfall in the provision of support for the existing 6,000 students with dyslexia. The MOE has reported that about 1,500 students have benefited from its School-based Dyslexia Remediation programme since 2012 (MOE, 2015a). DAS current enrolment across its 13 centres is about 3,000 students. This leaves a potential gap of at least 1,500 students with dyslexia who are not receiving any form of intervention. The MOE will partially mitigate this gap with the expansion of its remediation programme to all primary schools by 2016. However, students with dyslexia in secondary schools and junior colleges remain unsupported within the education system.

Our study will assess the means of improving the identification of students with dyslexia and expanding the service volume to meet the consequential increase in demand for dyslexia support. Our evaluation criteria include the monetary costs, political viability, infrastructure needs, and organisational capacity.

2.2 Service Nature

Second, service nature is the breadth of dyslexia services that are provided across various age groups, academic and non-academic subjects, and severity of dyslexia. We find that the existing service nature is significantly limited in terms of age group and scope of intervention. In particular, pre-school and post-secondary school students are not offered sufficient support, although dyslexia can affect a person throughout one's life. The existing focus on English

remediation is also inadequate, as students with dyslexia are likely to struggle with other academic and non-academic areas, including art, memory, and organisational skills.

The MOE schools that run the School-based Dyslexia Remediation programme are mainly focussed on helping students with basic literacy skills in English such as reading, spelling, and comprehension, at Primary 3 and 4 levels only. DAS has a broader range of programmes for primary school students, but its programmes are similarly limited to English intervention at the secondary school level. Given that there is currently limited dyslexia support for post-secondary school students, DAS plans to develop a programme for these students by 2017. DAS also has plans to extend its programmes beyond basic literacy to other academic and non-academic subjects such as social and life skills. Overall, DAS is of the view that the existing intervention remains inadequate, especially for students with dyslexia and other special needs such as attention deficit hyperactivity disorder.

Our study focusses on how the service nature should be expanded to support people with dyslexia across age groups and across academic and non-academic subjects. Our evaluation criteria include the scope of intervention, the capacity of the MOE and DAS, as well as monetary costs.

2.3 Service Support

Third, service support is the system-level resources that support the provision of dyslexia services, which include the

availability of special needs professionals and technological tools, coordination between key stakeholders such as the MOE and DAS, and research support. We find that there are insufficient resources dedicated to supporting the provision of services for people with dyslexia. There is a shortage of professionals with the expertise and skills to work with people with dyslexia and other special needs in Singapore. The Government's Enabling Masterplan (2012-2016) has recognised the shortage of Allied Educators (Learning and Behavioural Support) to support students with special needs in mainstream schools. As allied educators are often thought of as a liaison between classroom teachers and parents of students who struggle with dyslexia and other special needs, this is a critical gap in support services. We also find that the existing mainstream teachers and allied educators have not been able to provide satisfactory intervention due to inadequate training, time constraints, and a lack of empathy. Further, assistive technology and examination access arrangements such as extended time are not adequately provided, although these could reduce students' struggles with writing and spelling when completing classwork and taking examinations.

A prominent area that requires attention is the coordination of service support between partners. While the MOE has chosen DAS as a service provider in supporting students with dyslexia, there remains a lack of coordination, particularly in the area of curriculum planning and training programmes for their teachers. A closer coordination will minimise the duplication or inconsistency

in the curriculum and encourage the exchange of useful resources and teaching practices. Another area that is lacking is the limited academic research on dyslexia in Singapore and the effectiveness of various dyslexia interventions locally. The reasons for the weak research support may be attributed to Singapore's relatively small population size and a lack of publicly available data on people with dyslexia. Such research is useful for the development of pedagogy and technology to help people with dyslexia learn and work effectively.

Given these challenges, our study considers measures to expand the service support that contribute to meeting the needs of people with dyslexia in Singapore. Our evaluation criteria include the value-add of service support initiatives, monetary costs, political viability, and organisational capacity.

Throughout this study, we will reference these three categories of service volume, service nature, and service support as our analytical framework. This framework helps us to categorise the challenges of dyslexia provision, what other countries have done, and how we can solve the problems in Singapore. This categorisation is important. Instead of dealing with individual weaknesses in the system, we can group them together, and design policy tools to tackle each category of challenges.

3. Research Methodology

Literature review: we reviewed comparative studies and literature on provision for dyslexia in Singapore and

other developed countries such as the UK, US, and Australia, which are relatively more advanced in their support for people with dyslexia. Through this review, we obtained a general overview of how Singapore and other countries had studied and tackled the challenges of dyslexia, what approaches worked well, and what issues would need to be explored through other research channels.

Observation at DAS learning centres: we observed the classes conducted at one of DAS learning centres and spoke with the centre manager to understand the DAS programmes, pedagogy, and operational matters. Our observation of DAS classes provided background information on how the curriculum was organised, how teachers and students interacted, and helped us in our preparation for subsequent discussions.

Interviews with subject matter experts and the MOE: we interviewed Professor Angela Fawcett, Research Consultant to DAS, and Dr Thomas Sim, former Executive Director of DAS Academy. They provided useful insights into our research study, including provision for dyslexia globally, gaps in Singapore's provision, and means of expanding intervention locally. We also met with Mr Terence Tan, Assistant Director, MOE Psychological Services Branch and his team. They provided further insights into the MOE's initiatives in identifying and supporting students with special needs in mainstream schools, as well as some relevant statistics. The DAS Embrace Dyslexia Seminar held on 20 November 2014 was another good source of information on dyslexia from subject matter experts,

including Mr Thomas West and Dr Thomas Sim.

Interviews with DAS teachers: we conducted face-to-face individual interviews with four DAS teachers, who had at least nine years of experience teaching primary and secondary school students in the DAS. Based on their teaching experiences, they shared useful insights into the DAS curriculum, performance of students, and use of technological tools as teaching aids.

Focus groups with parents: we conducted two focus groups with a total of 12 parents of students attending classes across different DAS learning centres. The first group focussed on the adequacy of dyslexia intervention for primary school students, and comprised parents of primary school students who had attended DAS classes for at least 2 years. The second group focussed on the type of support that that could be offered to post-secondary school students, and comprised parents of secondary school students who had attended DAS classes for at least 4 years. Consents were obtained from these parents for the anonymous disclosure of their quotes from the focus group discussions.

4. Literature Review

Our literature review has examined the international research and provision for dyslexia, with particular attention to the three key areas of service volume, service nature, and service support.

The objective was to gather evidence on the effectiveness of interventions and

support for people with dyslexia, so as to formulate evidence-based policy recommendations for Singapore.

4.1 Service Volume

Academic research all over the world has recognised the importance of early identification in providing timely support for students with dyslexia. However, similar to Singapore, the UK, US, and Australia have reported challenges in identifying people with dyslexia (Rose, 2009; Fletcher et al., 2006, & Whiting, 2005). The main reason for this is that dyslexia is not a clear-cut diagnostic category (Snowling, 2013). Further, dyslexia may not present itself to parents or teachers until the child begins to read.

The lack of international agreement on the definition and causes of dyslexia imply that a differential diagnosis is not possible, and the formal evaluation focusses on a number of indicators that may suggest an individual has dyslexia (New Zealand MOE, 2007). Similarly, in the US, the definition of dyslexia and eligibility criteria differ across states, which may result in a child not being recognised as having a learning disability just by crossing a state border. This situation undermines the credibility and integrity of any identification process (Klassen, 2002).

The academia is divided on how early identification of dyslexia should be achieved. One view is that children should be systematically screened for dyslexia, while the other view disagrees on the grounds that blanket screening tests are unreliable and that there are better ways to identify children with

dyslexia. Taking the first view, Australia has created the Australian Early Development Index, to measure how children have developed in school and improve the early identification of children with dyslexia. Teachers complete a checklist of their students' language and communication skills in their first year of full-time school. The Progressive Achievement Tests in Reading and Mathematics is the most widely used of such performance measures, which help identify students with learning difficulties (Pyne, 2014).

Instead of a systematic screening test, some countries have advocated the role of teachers and parents in identifying children with dyslexia. The US has pioneered the "response to intervention" method (Fletcher & Vaughn, 2009), which involves monitoring the progress of a group of children through a programme of intervention, rather than undertaking a static assessment of their current skills. Children at risk of dyslexia are those who fail to respond to effective teaching. Such a strategy was similarly advocated by the UK's Rose Review (2009). Since the publication of the Code of Practice (1994), the UK has required that teachers identify children who are struggling in the early years of school and provide support for children at risk of dyslexia, with legal provision for a statement of special needs for those diagnosed as having dyslexia.

In 2003, the assessment of children's progress at the end of the foundation stage (from three to five years of age) was formally introduced into UK schools through the Early Years Foundation Profile Stage (EYFS). A study was conducted to investigate whether an assessment

undertaken by teachers at the end of the EYFS could provide a screening tool for the identification of children at risk of dyslexia (Snowling, 2013). It was found that the teachers' assessment provided a good measure of the children's development and was a reasonable predictor of literacy attainments two years later.

The MOE currently takes an in-between approach in its identification of students with dyslexia. An assessment is conducted at the beginning of Primary 1 to identify students who are generally weak in English and/or Mathematics (this assessment is not a screening test for dyslexia). These students will then be placed in the Learning Support Programme for additional support at the Primary 1 and 2 levels. At the end of Primary 2, students on the Learning Support Programme who may need to be enrolled in the School-based Dyslexia Remediation programme are identified for an assessment of whether they have dyslexia.

On an ad-hoc basis, teachers may also identify and refer students for the dyslexia assessment. The limited screening and reliance on teachers' observations when they are not adequately trained to make the identification may have contributed to the significant number of students with dyslexia who are not identified or reported as having dyslexia.

4.2 Service Nature

Following identification, the next challenge is to provide adequate intervention to people with dyslexia. The nature of provision in the researched

countries appears to be more comprehensive in terms of age group and subject coverage than that in Singapore.

Empirical evidence shows that early intervention for dyslexia (Ehri et al., 2001; Fawcett et al., 2014) and the continuity of effective intervention for adults with dyslexia (Eden et al., 2004) result in better outcomes. However, in Singapore, the provision for pre-school and post-secondary school students with dyslexia is currently limited. For instance, the MOE-aided DAS Literacy Programme is extended to only primary and secondary schools students between 7 and 17 years of age. The Enabling Masterplan (2012–2016) has also acknowledged that students with special needs in institutes of higher learning have difficulties accessing integration support services such as career support. Singapore can take a leaf from the UK, US, and Australia, particularly in terms of post-secondary support.

Under the UK's Education, Health and Care (EHC) Plan, support will be made available to students from preschool to 25 years of age (UK Department for Education, 2014). The change in the UK policy is supported by academic research, which shows that older students with dyslexia continue to face difficulties in learning even if they have received appropriate intervention and improved their literacy skills. Goulandris & Snowling (2001) followed up a group of children with dyslexia who had received intervention and found that none of them had been able to catch up with their peers, despite their positive motivation and self-image.

Hunter-Carsch (2001) has reviewed ways in which students with dyslexia can be effectively supported in secondary schools. She outlines several areas of activity that will need careful attention if students' learning are to be maximised, including differentiation in writing activities with emphasis on systematic drafting, peer tutoring in which students with dyslexia are paired with peers who have good literacy skills, use of computer technology, as well as parental support and home-school liaison.

In the US, academic institutions have provided strong support for people with dyslexia. Besides help with literacy, college students are supported in note-taking, time management, health, and study skills. There are also colleges dedicated specifically to learning-disabled students, including those with dyslexia, such as the Landmark College and Strategic Alternative Learning Techniques Centre at the University of Arizona. The faculty at these institutions dedicate significant time to research in the field and provide access to new technology. In addition, each student works with a learning specialist to create an individualised learning plan and is offered career development assistance.

In terms of the type of intervention, the UK, US, and Australia offer a wider range of services, both from the government and other organisations, compared to the current provision available in Singapore. The MOE's mainstream schools that run the School-based Dyslexia Remediation programme are mainly focussed on helping students with dyslexia with basic literacy skills at Primary 3 and 4 levels only. There is scope for the MOE to

consider expanding its intervention to other academic subjects such as Chinese, given the effectiveness of such intervention (Goswami, 2011).

In the UK, with the launch of the EHC plan, the number of hours and the scope of intervention vary according to each student's severity of dyslexia. When it comes to non-government provision, the interventions provided by Dyslexia Action include traditional academic subjects such as mathematics, as well as study skills, advice for parents on adaptations and use of technology, and individual tutoring. The tuition offered by Dyslexia Action is normally conducted in two one-hour sessions per week in groups of up to three children working at similar levels, with daily practice activities to be carried out at home.

Under the EHC legislation, which came into force from 1 September 2014, British local authorities have to publish information about what support is available for people with special educational needs in their respective geographical areas. Further, the new system places more emphasis on healthcare and the family will be more involved in the planning stage. However, there have been criticisms of the new approach, particularly on the lack of regulations and guidelines.

Each local authority can have its own system, which may lead to huge variations in how an EHC plan is developed. Charities are also concerned that this will make it difficult for them to advise parents and young people on the processes involved in the EHC plans (Driver Youth Trust, 2013).

In the US, a holistic view of dyslexia is established through the Individualised Education Programs (IEP), which is part of the Individual with Disabilities Education Act (IDEA) from 2006. The IEP holds that parents, mainstream teachers, special education teachers, and the student should work together to develop a customised education programme (US Department of Education, 2010). As mentioned earlier, specificities of the scope of intervention in the US differ across states and even districts, making a cross-country comparison challenging. Nevertheless, schools across the US have been trying to incorporate more non-academic subjects into their curriculums for integration purposes, such as language arts, as well as organisation and study skills.

In Australia, support for people with dyslexia is similarly extended to both academic and non-academic subjects, but to a lesser extent than the US. The state and territory governments take responsibility for the day-to-day delivery of school education in Australia. The local education authorities are seen to be best placed to determine the provision of specialist dyslexia teachers for students who require more intense, explicit, and individualised instruction (Pyne, 2014).

When it comes to extra support for test-takers with special needs, all four countries (US, UK, Australia, and Singapore) offer some form of special arrangements. Under the American IDEA, testing agencies have a duty to provide accommodations to students with disabilities such as offering them more time, use of a private room, or access to a scribe. A University of California-

Berkeley study showed that students with dyslexia taking a standardised reading test could score on par with their peers when granted extra time (Runyan, 1991). However, the quantity of extra time that should be granted for such tests remains a point of debate (Ofiesh & Hughes, 2002).

In the UK, students with dyslexia are generally given an additional 25% of the allocated time for their examinations. In addition, the British Equality Act (2010) requires organisations to ensure that people with disabilities are not treated unfavourably and are offered reasonable adjustments, which can include a reader, oral language modifier, scribe, using a computer instead of handwriting, using assistive software (screen reader/voice recognition), exam papers in dyslexia friendly font, hard copy instead of on-screen, and supervised rest breaks.

Similarly, the Australian Disability Standards for Education (2005) emphasise that reasonable adjustments must be made to help ensure students with disability are able to access the tests wherever possible. Teachers and schools are best placed to determine how many minutes of extra time a student should have to take the test. Generally, it is recommended that no more than 5 minutes of extra time per half hour of test time be granted. In some cases, an additional 50% of the allocated time could be granted (National Assessment Program, 2015).

In Singapore, access arrangements for students with learning difficulties and/or sensory and physical disabilities include exemption from a component in a subject

such as oral examination, extended time, exemption from answering certain types of questions such as questions with graphic stimulus or questions related to measurements, constructions and drawings, tessellations and symmetry, and special assistance through the use of readers or scribes (MOE, 2013). However, unlike countries such as the UK, Singapore has not published a full and detailed list of access arrangements that are being offered for students with dyslexia.

Another issue of debate is whether students with dyslexia should attend a specialised school that caters to their learning needs or whether they should be in mainstream schools, so that they can interact with other students and integrate better into society following their education. In Singapore and Australia, the education policies are inclined towards integrating students with dyslexia in mainstream schools, regardless of their severity of dyslexia.

In the US, whether a student is educated in a mainstream school or a more specialised special needs program depends on the severity of the student's learning disability. In the UK, both options are available. Besides specialist schools, there are about 77 independent mainstream schools that have a Learning Support Unit providing specialist tuition on a small group or individual basis. The general approach is to keep all the children together most of the time and to withdraw those needing extra support for tailored sessions when necessary.

Findings from academic research have been divided on whether students with

special education needs (SEN) should be included in mainstream schools. Studies supporting inclusion in mainstream schools have found that students with SEN can benefit from mainstream education if they receive adequate support. Some students with SEN in mainstream schools have achieved improved academic performance and developed social skills. Students without SEN have also benefitted socially with an increased understanding and acceptance of differences with students with SEN (Weng, Walker & Rosenblatt, 2015).

Academic studies that do not support inclusion in mainstream schools have argued that students with SEN should be educated in specialised schools that specifically cater to their needs. Such studies have found that students with SEN in mainstream schools have not received adequate support from teachers who are not trained to do so. Further, when teachers and students without SEN have negative impressions of disability, it can lead to a marginalisation of students with SEN in mainstream schools and they may experience humiliation, bullying, and a loss of self-esteem. Having students with SEN in mainstream schools may also add stress to both teachers and parents (Weng, Walker & Rosenblatt, 2015).

Overall, the success or failure of the inclusion efforts appears to be highly dependent on the academic environment and teachers. In the case of Singapore, studies have found that the MOE's focus on inclusion remains largely limited to the physical integration of students. It has been argued that inclusive education should extend beyond the physical presence of all kinds of students to

adjustments to cultures, polices, and school practices so that communities respond to student diversity and encourage all students to participate and achieve within the communities (Lim, Wong & Tan, 2014).

DAS had conducted study trips to specialist schools for students in the US and Canada to identify the best practices for its conception of such a school in Singapore. Among other schools, it visited Shelton School in Dallas, one of the largest private schools in the world for students with learning difficulties, and Fraser Academy in British Columbia. DAS found that these schools share a number of common characteristics that contribute to their success - low student-teacher ratio, curriculum that is designed after the mainstream education system, and affordable fees. In terms of outcome, Shelton School cited that 25% of its student population had re-joined mainstream or other private schools, while Fraser Academy reported that the majority of its students go on to post-secondary education (DAS & ISEAS, 2008).

4.3 Service Support

Adequate volume and scope of dyslexia provision depends on the quality of service support available, especially in terms of special needs professionals, technological tools, and research and regional collaboration. As compared to Singapore, the other researched countries are generally more advanced in their investments in each of these areas to support the provision for people with dyslexia.

Special Needs Professionals

The special needs educators in other developed countries tend to hold higher academic qualifications than those in Singapore. For instance, in the US, 70% of the early intervention teachers and professionals have a Master's degree, following the obtaining of their general education degree (Enabling Masterplan, 2012). In addition to the Master's degree, US special education teachers are required to complete continuous education requirements, including the completion of 150 hours every five years in a planned academic program pertaining to the types of students they teach. Similarly, the UK Department of Education has set as a target that every teacher should expect to teach children with special educational needs, and therefore needs to be equipped with the relevant skills (Rose, 2009).

In Singapore, all teachers in mainstream schools are currently provided with a basic awareness of special educational needs. Over the past decade, there have been steps taken to raise the level of teacher competency pertaining to special needs education. In 2005, the National Institute of Education (NIE) introduced a compulsory 12-hour module on special needs in the training of new teachers. From 2011, the NIE re-designed the module to situate this area within a compulsory 24- to 36-hour module on "Teaching and Managing Diverse Learners" for all beginning teachers during their pre-service training. Further, the MOE has offered certificate-level training (108 hours) to develop a core group of Teachers trained in Special Needs (TSNs) in every school to support

students with mild special education needs. As of end-2013, about 10% of primary school teachers and 20% of secondary school teachers (total of about 3,800 teachers) have been trained as TSNs (MOE, 2014b).

At a more specialised level, the MOE has trained and deployed about 400 Allied Educators (Learning and Behavioural Support) to support students with special needs. These allied educators are required to undertake a one-year Diploma in Special Education programme at NIE, before they are posted to the schools (Sim, 2012). In terms of entry requirements, the MOE has set out that allied educator applicants should possess a university degree or polytechnic diploma; those without a degree/diploma and with relevant experience and expertise may also apply. As of February 2015, all 190 primary schools and 69 secondary schools (about 40% of the total number of secondary schools) have at least one allied educator who is trained to identify and support students with learning difficulties and mild special education needs (Fang, 2015).

In addition, there is currently a wide range of degree and diploma programmes in Singapore pertaining to special needs education, which is comparable with other developed countries. The NIE offers the following programmes for teachers who intend to specialise in special need education: Diploma in Special Education, Advanced Diploma in Special Learning and Behavioural Needs, Master of Education (Special Education Specialisation), and Master of Education (Early Childhood Specialisation).

In terms of psychology courses, the NIE offers a Master of Education (Developmental Psychology), while the National University of Singapore offers a Clinical Psychology Masters Degree. James Cook University Singapore offers both undergraduate and postgraduate degrees in Psychology, including a Master of Psychology (Clinical).

As to diploma courses, the National Council of Social Service has partnered with Ngee Ann Polytechnic to introduce the Advanced Diploma in Early Childhood Intervention (ADECI) and Certificate in Early Childhood Intervention for teachers and teacher assistants respectively. The ADECI study awards and training scholarships were also introduced in 2007 to encourage more professionals to be trained in early intervention (Enabling Masterplan, 2012).

Use of Technological Tools

The Enabling Masterplan (2012–2016) recognises that the use of assistive technology (AT) and information and communications technology (ICT) enhances the quality of life of persons with disabilities and their potential to lead productive lives. In 2011, the Society of the Physically Disabled (SPD) conducted a study that surveyed more than 700 SPED school staff, caregivers, and students on the use of AT aids, and found that AT was significantly underutilised. The findings showed that:

- 34% of teachers and 37% of therapists in SPED schools said that they used AT devices as part of their work.

- 6% of the parents reported the use of AT by their child in SPED schools.
- 46% of parent respondents in the SPED school survey reported that one of the reasons they were not using AT was its high cost.
- 68% of the parent respondents in the SPED school survey had never heard of AT.
- 48% of the parent respondents in the SPED school survey were unaware of the type of AT that might benefit their child.

The SPD study concluded that the low utilisation of AT was mainly due to low awareness of the devices and the lack of coordination of resources at the national level. There was also a shortage of trained AT specialists to support teachers and therapists, and to address parents' queries. For mainstream schools, the MOE has shared that it provides a Support for Special Needs Grant to every school resourced with an Allied Educator (Learning and Behavioural Support) to purchase resources for the support of students with special educational needs. However, the MOE currently does not maintain a recommended list of special education needs resources, which have proven to be effective in the following developed countries.

The UK is currently using computer assisted learning as part of its instructional process, which is beneficial for students with dyslexia as it enhances motivation, provides individualised instruction and immediate feedback, creates an active learning environment, and can monitor the student's

performance. Singleton and Simmons (2001) reported a study of the use of the program "Wordshark" in 403 primary and secondary schools in the UK. Wordshark provides training in word recognition and developing phonic skills for reading and spelling, using a wide range of entertaining and challenging games. More than 90% of children using Wordshark made improvement in their reading skills and spelling. Other common programmes used in the UK to support reading and writing are Lexia, Catch up, Rapid Reading Assistant, e-books that can be read to or by children independently, Write Out Loud (word processing), and touch typing.

The US makes use of classroom tools such as the Wilson Reading System to help students with dyslexia. This reading system uses manipulatives such as cards with letters and a finger-tapping procedure, to teach phonics and word analysis skills systematically. In terms of assistive technology, common tools used in the US include the Livescribe Smartpen (for note-taking), Dragon Naturally Speaking/Dragon Dictate (a voice recognition program), and various smartphone applications such as Phonics Genius, Audio Note, and Read to Kids.

Research and Regional Collaboration

The literature review on other developed countries shows that many of the best practices currently in place were developed based on academic research. The UK is one of the leaders in studies on dyslexia globally with many research centres throughout the country. For instance, the University of Buckingham manages the Research in Adult Dyslexia

website, which provides a forum for researchers to submit their qualitative and quantitative research, as well as case studies, on the experiences of adults with dyslexia. Another example is the Miles Dyslexia Centre of Bangor University, which provides assessment, teaching, and support services for dyslexia that are informed by research findings.

The US similarly has a number of established research institutes that are dedicated to dyslexia research. The Dyslexia Research Institute operates Woodland Hall Academy and Dyslexia Research Institute Literacy and Life Skills, an adult program, which provides parenting information, teacher training, and research and development resources. The Yale Centre for Dyslexia and Creativity serves as a nexus for dyslexia research, and is a leading source of advocacy and information to improve the lives of people with dyslexia. The advances in dyslexia studies in US and UK can in part be attributed to the countries' open data policy, which facilitates the conduct of research.

In response to recommendations made by dyslexia interest groups, the Australian Government has agreed in principle to provide funding for research to determine effective dyslexia support in schools. This includes funding for large randomised controlled trials of school-based dyslexia intervention studies, evaluation of the efficacy of dyslexia treatment programs, and trial of models of teacher training and AT for students with dyslexia (Australia Government, 2012).

Comparatively, the research on dyslexia in Singapore remains limited. One source

of research is the Early Childhood and Special Needs Education Academic Group at NIE, which has conducted a number of research studies on child development, early childhood and special education, and teacher education. The other source is from the DAS, which has published its Asia Pacific Journal of Developmental Differences to address the range of special educational needs in the regional context.

An efficient way to expand research would be through regional cooperation. The UK is very active in international organisations pertaining to dyslexia, particularly in Europe. One example is the Welsh Dyslexia Project, which aims to assess the provision and use of ICT for students with dyslexia in European universities. The project has involved people with dyslexia, practitioners, policy makers, and developers across Europe, to put together the best practices.

Another important UK initiative is the Dyslang project, which aims to develop a course that equips special education needs professionals with skills to help students with dyslexia learn an additional curriculum language. Partners of the Dyslang project from the UK and other European countries have reported the importance of transnational cooperation and the value of exchanging experience and broadening their knowledge about dyslexia in different European contexts.

In the US, a number of associations actively participate in dyslexia campaigns and conferences both at the national and international levels. The country also hosts important events pertaining to dyslexia such as "Unlocking Dyslexia",

which is sponsored by the International Dyslexia Association and takes place every October to raise awareness of dyslexia and offer resources to parents, teachers, and individuals with special needs.

In Australia, there is a growing number of parent-initiated associations (SPELD organisations) that are motivated by a strong desire to improve the quality of instruction and increase the level of support that are currently offered to students with dyslexia. In many states, the SPELD organisations collaborate with universities on research projects designed to improve understanding of dyslexia and successful interventions (Australia Department of Education, 2014).

5. Research Findings and Analysis

In light of our literature review, we have engaged various stakeholders in the provision for people with dyslexia in Singapore, including the MOE, DAS teachers, parents of students with dyslexia, and subject matter experts. From our comparison with other developed countries and local fieldwork, we have identified and analysed the existing gaps in the service volume, nature, and support for people with dyslexia in Singapore.

5.1 Service Volume

Failing to identify dyslexia and intervene at an early stage is often cited as a huge impediment for students to better cope with the learning pace at the mainstream schools. During the DAS Embrace Dyslexia 2014 seminar, a recurring theme across the personal stories of successful people

with dyslexia in Singapore was that many were diagnosed only when they were in their teenage years. As a result, they worked very hard, but were unable to excel academically, bringing frustration both to themselves and their parents, as the following comment from a person with dyslexia shows:

“Everyone around me was trying their best to help me, and I was trying hard, really hard. No results. I felt like the tortoise in ‘The Tortoise and the Hare’, except that this tortoise could never win the race.”

Parents in our focus groups strongly agreed on the importance of early identification and intervention:

“The best time to help special needs students is from Primary 1 to 4, when they start developing their skills. We cannot neglect them during this phase.”

The identification of people with dyslexia remains a significant challenge in Singapore, probably more so compared to other developed countries such as the UK, US, and Australia. Dyslexia in Singapore is likely to carry a higher level of social stigma, to the extent that some parents will rather hide the fact that their child has dyslexia, than to acknowledge the fact and request that their child obtain certain examination access arrangements such as extended time. These parents are concerned that their child will carry the label of having dyslexia, which may affect their tertiary education and career prospects. Students may also want to hide their struggles to protect themselves from being singled out or bullied. During

the focus group, one parent disclosed:

“[my son] is very unhappy; he wants to hide he is dyslexic because he is not failing ... but he isn’t doing great either.”

Besides the negative label of dyslexia, the MOE has shared during our meeting that another reason for the low level of students identified is the poor awareness of dyslexia as a learning difficulty among parents and teachers. The existing means of identifying students at risk of dyslexia is largely dependent on the limited screening for dyslexia, progress monitoring under the Learning Support Programme, and the teachers’ ability to recognise that their students are displaying symptoms. The assessment that is conducted when students enter Primary 1 is intended to identify students who are generally weak in English and/or Mathematics, and is not a screening test for dyslexia. These students will then participate in the schools’ Learning Support Programme. At the end of Primary 2, students who demonstrate persistent literacy difficulties based on progress monitoring scores in the Learning Support Programme will be identified by MOE for further assessments to confirm if these students have dyslexia. These assessments are conducted by the MOE. On an ad-hoc basis, teachers who are able to identify students at risk of dyslexia may engage their parents to conduct further investigation.

Besides the limited screening for dyslexia and the progress monitoring under the Learning Support Programme, the existing process of identifying students with dyslexia is dependent on the teachers’

ability to identify the symptoms. However, this reliance on teachers has not been an effective means of identifying students with dyslexia, given that most teachers are not adequately trained to make this identification. Parents in the focus groups believed that many teachers were simply “mislabelling students with dyslexia as lazy.” Even if they find that a student is at risk, they do not appear equipped to recommend to the student’s parents the necessary follow-up measures, including the formal psychological assessment and dyslexia intervention.

A third challenge in the identification of students with dyslexia is the lack of a defined process of doing so. Parents in the focus groups gave feedback that when they suspected that their child was at risk of dyslexia, there was no clear process of how their child could be formally assessed as having dyslexia. “Sometimes, you do not know where to get help from”, a parent said. From media reports, the ‘DAS Parent Support’ Facebook group, and experiences of parents in the focus groups, there have been a number of cases where parents have brought their children for psychological tests, and obtained different results from different psychologists. There appears to be a lack of a standardised methodology and guidelines for psychologists to assess if a child has dyslexia. For one of the parents in the focus group, it took three years and multiple visits to different psychologists, before she obtained a formal psychological assessment that her child has dyslexia. Further, even if a psychologist has assessed that a child has dyslexia, there have been instances where the MOE schools have not

recognised the assessment nor granted any examination access arrangements to the student, partly on the basis that these students are continuing to achieve "acceptable" academic grades. The MOE has clarified that access arrangements are made based on the needs of individual students.

Put together, this has led to a low number of students identified with dyslexia at only 1.3% of the student cohort, when it should be at least 4% based on academic studies. There remains further scope to enhance the process of identification, so that students with dyslexia may receive earlier intervention, which is more effective. The currently low proportion of students who has been identified as having dyslexia shows that the existing process is not effective. There are also reports of parents trying to obtain a psychological assessment to exempt their child from Chinese, as Chinese characters can be confusing for a child with dyslexia.

A parent from the focus group shared that, "Especially when it comes to exemption from mother tongue, [the MOE] are sceptical of psychology reports because even 'normal' kids will try to get these reports." While a number of parents may try to game the system and claim that their children have dyslexia, so that they can be exempted from their mother tongue language, particularly Chinese, this in itself should not be a reason for not improving the process of identification. Rather, the process should be enhanced such that such parents will not be successful with their false claims.

5.2 Service Nature

Limited Service Provision

The MOE's School-based Dyslexia Remediation (SDR) programme has an overly ambitious objective of helping students with dyslexia to read at the same level as their peers by the end of the two-year programme in Primary 3 and 4 (Sim, 2012). Studies cited in our literature review have shown that dyslexia intervention should be offered from the pre-school level and continued through to tertiary education to achieve sustained outcomes. The current two-year SDR programme is therefore too short, as compared to that provided by other developed countries. Even if the MOE's internal studies show an improvement of the students' results after the SDR programme, it should track the students' subsequent results to assess if they were able to maintain their academic performance without any intervention. While the MOE-aided DAS Literacy Programme extends the support to other primary and secondary school students, the subsidised programme fee of about S\$500 for 10 weeks of lessons implies that some households, especially the low-income ones, may not have access to the programme, notwithstanding the bursaries offered.

The MOE's SDR programme and DAS programmes are currently limited in terms of its scope. The SDR programme is limited to English remediation, while students with dyslexia are likely to be also struggling with their mother tongue language, mathematics and science. DAS programmes are more broad-based at the primary school level, covering the

academic subjects and non-academic ones such as speech and drama. Most parents in the focus group concurred that DAS programmes were helpful, with one parent attributing her son's successful admission to the Express stream in Secondary 1 to the DAS programme. At the secondary school level, the DAS programme is similarly limited to English remediation.

Parents in the focus groups gave feedback that their children would greatly benefit if DAS could expand its secondary school programme, and cover other academic subjects such as mathematics, humanities, and sciences. One parent voiced a "need for someone to break equations down for their kids. Not many DAS teachers can do this. A queue for a mathematics teacher will be very long and one or two teachers will not be enough. It will probably take DAS a year to find a good teacher." The parents also indicated the usefulness of non-academic programmes to enhance their children's memory, as well as processing, organisation, and application skills that "they will take along for the rest of their lives rather than for just a period of time." While such programmes are useful, these are additional classes outside of school hours and incur additional costs. There is therefore a limit to the number of such DAS classes that students can afford and are able to attend. Additionally, requests were made for courses organised to enable parents to teach their children with dyslexia at home – "something that empowers us."

The mainstream schools generally do not appear to provide a supportive environment for students with dyslexia to

thrive. One of the teachers interviewed shared that she received feedback from her students that they found the MOE's Learning Support Programme to be too fast-paced for them. Given their difficulty in keeping up with the classes, most students with dyslexia are perceived as "lazy", "slow", and "uncooperative", and end up performing poorly in the mainstream schools. This then affects their self-esteem and confidence, resulting in a downward spiral in academic performance. Several parents corroborated stories of their child being bullied by other students and even by teachers, which further impacted their child's self-esteem. These "comments stay with them" and, as a result, they "always refer to themselves that way." Earlier intervention, then, is critical to help them cope with the learning disability. For instance, the children we observed participating in DAS classes exhibited much more confidence, wanting to impress us with their knowledge and progress, which was very different from the nervous, uncertain children described by parents in the focus groups. Most of their children had received dyslexia intervention only at the upper primary or secondary school level.

Similarly, the wellbeing of students with dyslexia is significantly affected by teachers and fellow students who do not show an understanding of their learning difficulty, and may have even laughed at their linguistic difficulties. Some of these students with dyslexia also have difficulty with their mother tongue language, particularly Chinese. One mother described her son's efforts to learn Chinese: "He tries so hard but he keeps failing. This is demoralising." Other

parents in the focus group shared that while they requested that their child be exempted from the mother tongue subject, the school would typically grant the exemption only when the student performed poorly in the subject. As a result, the parents had taken actions such as carefully dissuading their child from studying the mother tongue language or withdrawing them from tuition classes, with the intent of having their children do poorly in the subject, so that the school would accept their exemption request.

Students with dyslexia are currently subject to the schools' discretion in the granting of examination access arrangements. From the focus group discussions, we found a lack of consistency across the schools' practices. For instance, some schools have not granted an additional time of 10 minutes for every 1 hour of examination to students with dyslexia, except for the second Semestral Assessment. To the surprise of other parents, one parent shared that her daughter's school had granted her request for her daughter to take her examination in a classroom on her own "so that she could read to herself out loud." The MOE has clarified that access arrangements are granted based on the level of needs of each individual student.

Overall, given their dissatisfaction with the mainstream schools, 92% of the 856 parents who responded to a DAS parent survey in July 2011, as well as parents in the focus groups have supported the establishment of a specialist school for dyslexia, as an alternative path of education.

Lack of Focussed Attention on Students with Severe Dyslexia

Since 2008, DAS has proposed the establishment of a specialist school for students with dyslexia. This is intended to provide a conducive and safe environment for students to learn, without the stigma attached to having dyslexia. The school will follow a modified MOE curriculum to the extent that it pays particular emphasis on literacy and numerical skills. All the classes will be taught by special needs teachers, who are trained in pedagogy that caters to and helps students with dyslexia to learn academically. Other non-academic life skills that are useful for people with dyslexia will also be taught.

The MOE's objection to such a specialist school is primarily on the basis that it is keen to promote integration between students with dyslexia and normal students, which benefits both groups. Such experiences are also intended to help these students cope when they transit to their working lives, where they are expected to work together. As cited in the literature review, students with dyslexia can benefit academically and in terms of social skills from mainstream schools if they receive adequate support. Normal students may also benefit socially from their interactions with students with dyslexia.

Parents in the focus groups felt that it was unfair for the MOE to push for integration when the mainstream schools were not providing sufficient support for their children. In their opinion, the teachers had shown a lack of empathy and understanding of dyslexia as a learning

difficulty, and had not provided the necessary support and teaching to their children. Other students might also bully the students with dyslexia, as they were granted “privileges”, including extra time for their examinations. The parents attributed the negative behaviour of teachers and students in general to a lack of awareness of dyslexia as a learning difficulty. The difference between mainstream teachers and DAS teachers “is really just training.” During our classroom visit, we observed that DAS teachers continuously made encouraging comments such as “good job” or “you can do it” to nurture confident responses. Even when the student stumbled, the teacher had the flexibility in the small group setting to prompt the correct answer through a line of questioning, rather than by simply giving the right answer. Parents greatly appreciated this method and could see obvious improvements.

The benefits of integration should be evaluated against the costs and harms of keeping students with dyslexia in the mainstream schools. Students who feel ostracised generally have difficulty interacting with others, which puts into question the ability for students with dyslexia to truly integrate with their peers. Further, the MOE’s decision to keep students with severe dyslexia in mainstream schools has affected some students’ self-esteem and confidence, as they continue to fail regardless of how much effort they put into their studies. Finally, dyslexia as a learning difficulty does not imply that students with dyslexia are not able to learn to communicate effectively in a specialist school. In fact, they can probably learn to communicate

better in an environment where they do not have to fear being laughed at. The benefits of integration therefore appear limited in this context.

The establishment of a specialist school essentially provides students with severe dyslexia and parents with the choice of an alternative path of education. Students with dyslexia and their parents should be given the freedom to choose, especially when the students have attempted to, but have not been able to integrate and excel in the mainstream schools. The MOE should not assume that it has made the right choice for these families simply based on the objective of integration, without recognising that the education system has not been able to fully benefit and accommodate students with severe dyslexia.

5.3 Service Support

Scarcity of Adequately-Trained Teachers and Allied Educators

There are currently insufficient resources dedicated to supporting the provision of services for people with dyslexia. The mainstream teachers and Allied Educators (Learning and Behavioural Support) have not been able to provide adequate support to students with dyslexia. Parents in the focus groups were dissatisfied with the teachers’ competency, availability of time and resources, and attitude in supporting their children with dyslexia. While 10% of primary school teachers and 20% of secondary school teachers are Teachers trained in Special Needs and the younger teachers will have attended the 24- to 36-hour NIE module on “Teaching and

Managing Diverse Learners”, the majority of teachers remain untrained to support students with special needs. This is significantly below the level of teacher training in other developed countries.

Parents in the focus groups all cited negative experiences in their interactions with the teachers and schools regarding their child with dyslexia. While there were a few teachers who tried to help their child, the parents found that most teachers had a poor understanding of dyslexia as a learning difficulty, and lacked the empathy and training to help their child. Below are the comments from parents in our focus groups:

“Teachers usually do not address the real problem. Instead, they punish our child for not completing the assignment. Dyslexia is not only about learning difficulties, but it also involves emotional problems, and mainstream’s professionals do not seem prepared to cope with it.”

“As long as children with dyslexia are passing their exams, teachers ignore their problems.”

As their child progress to the next academic level, parents in the focus groups often had to repeat the process of informing the new teachers of their child’s dyslexia and the associated learning difficulties. While there is the School Cockpit System – an existing academic record for each student, the parents felt that such records might not have been updated, and even if they were, the new teachers did not seem to have referred to the records. The lack of a proper handover of the students had led to

significant frustration among the parents in having to explain their child’s learning difficulties with every change in teachers.

Parents in the focus groups are generally aware that each school has at least one Allied Educator (Learning and Behavioural Support). However, they questioned the adequacy of the training that these allied educators received such that they were able to effectively provide differentiated learning and remediation support to their child. The parents also found that the allied educators were generally “overwhelmed” by the number of students that they were managing. They felt that the allied educators tended to be dealing more with behavioural issues of students, than focussed on providing learning support to students with dyslexia. As a result, the parents were of the consensus that the mainstream teachers and allied educators did not provide sufficient support to their child.

Low Utilisation of Technological Tools

There is a lack of provision of ICT and assistive technology to help students with dyslexia with their learning and taking of examinations, relative to other developed countries. Our literature review shows that the use of technological tools can provide important learning support for students with dyslexia. Parents in the focus groups were supportive of the use of computers, tablets, calculators, electronic dictionaries, and other technological tools in the classrooms. The parents concurred that “dyslexic kids are better in terms of technology ... they can play around and fix things in a different way.” They believed that these tools would speed up their children’s

understanding and work by helping them overcome their difficulties with spelling and reading comprehension.

Unlike other developed countries, students with dyslexia are generally not able to use technological tools during their examinations, except for a digital dictionary for Chinese. Parents in the focus groups felt strongly that the MOE should review its policy and be more accommodative towards students with special needs. The use of dictionaries during English exams was mentioned as a useful aid, as a way for a "child to become "unstuck" when he or she gets stuck." The parents questioned the emphasis on spelling and grammatical accuracies for students with dyslexia, given the availability of technological tools the children could eventually use to support their writing at work. One parent commented that:

"Classroom needs to facilitate more IT [information technology] usage. The real world is computers now, not pen and paper. Why are schools focussed on spelling when the real world is moving away from that?"

DAS has been exploring the increased use of technology as a complementary teaching tool. For instance, it conducted a trial on the use of iPads as a teaching aid at a few of its learning centres in 2014. Given the positive feedback from the teachers and students, DAS intends to invest in and expand the use of iPads across its learning centres. DAS is also considering the investment in other assistive technology to support its students' learning.

Redundancies and Missed Opportunities in Service Offerings

Based on our fieldwork and discussions with stakeholders, we observed that there is scope for improved coordination between the MOE and DAS in their curriculum planning, to ensure consistency and continuity in the intervention offered to students with dyslexia. There are currently students who are attending the MOE's Learning Support Programme in Primary 1 and 2, and are concurrently attending DAS classes.

Following the School-based Dyslexia Remediation programme in Primary 3 and 4, some students in Primary 5 and 6 may attend DAS classes to continue with the remediation. There is therefore a need for the MOE and DAS to regularly exchange information on their programmes to minimise any duplication or inconsistency in the curriculum and encourage the sharing of useful curriculum resources and good practices.

We found that the MOE has not regularly communicated its academic expectations and curriculum changes to DAS and its teachers. While the MOE's syllabus is publicly available, it will be useful for the MOE to highlight and explain the changes to DAS, so that the latter can refine its programmes accordingly.

An experienced teacher from DAS recalled that the frequency of such communication was about once in three years. She commented that she would find out about such curriculum changes as a parent at her daughter's school, instead of through the MOE's communication with DAS.

Limited Investment in Research and Regional Collaboration

There has been limited research on the effects of dyslexia and the effectiveness of various interventions on the local population, as compared to other developed countries covered in the literature review. Besides the small population size, the other key impediment is the lack of publicly available data on people with dyslexia in Singapore. Such research is useful in the design and development of new pedagogy and technology to help people with dyslexia learn and work effectively.

From our discussions with the academia, there are currently limited collaborations within the region to study topics of common interest such as the teaching of the Malay language to students with dyslexia.

DAS has made some progress in this regard with the organising of conferences with its regional counterparts in Kuala Lumpur, Malaysia and Bandung, Indonesia, to facilitate the exchange of knowledge and teaching experiences. Such collaboration will serve to augment local research and improve the pedagogy to benefit students with dyslexia.

6. Policy Viability Evaluation Criteria

We have developed an analytical framework to assess the viability of our policy recommendations that are developed based on our field work and literature review.

Our policy evaluation criteria covers four key elements:

- a. benefits of policy option;
- b. costs of policy option;
- c. political feasibility; and
- d. capacity to implement policy option.

Each element of the criteria is elaborated as follows:

- a. Benefits of policy option
 - Reach of policy measure (number of people with dyslexia that will benefit from the policy)
 - Quality of intervention (curriculum, pedagogy, timeliness, and coordination between MOE and DAS)
 - Quantity of intervention (number of hours of classes)
 - Quantity of intervention (scope of academic and non-academic subjects)
 - Capacity-building for future
- b. Costs of policy option
 - Operational costs (manpower)
 - Training costs
 - Technological costs (for the adoption of assistive technology and ICT)
 - Infrastructure costs (physical facilities)
 - Research costs
- c. Political feasibility – support from the Government/MOE in terms of:
 - Financial support
 - Data availability for research
 - Partnering with DAS
 - Partnering with other voluntary welfare organisations, the

- private sector, and the public
 - Partnering with regional counterparts
- d. Capacity to implement policy option
- Financial capacity
 - Adequacy of special needs professionals (availability of specialised degree and diploma programmes)
 - Availability of physical facilities
 - Availability of technological resources
 - Parental support

Depending on the policy option, some of the detailed criteria may not be relevant and are therefore not applied in our assessment of the policy recommendations.

7. Policy Recommendations

Based on our research findings and analysis, we recommend a broad expansion of the current provision to improve the identification, intervention, and support for people with dyslexia. We have ranked the following five policy recommendations based on their importance and priority, taking into account potential socio-economic and political constraints. Under recommendation 1, the priority is to establish a systematic and cost-effective screening process to identify students with dyslexia. With an expected increase in the number of students identified with dyslexia, the MOE and DAS will have to expand their service volume, nature, and support offered to these students, including expanding teacher training (recommendation 2), investigating the feasibility of a specialist school for students with severe dyslexia

(recommendation 3), investing in assistive technology (recommendation 4), and increasing the reach of public awareness and anti-bullying campaigns to support integration into mainstream schools (recommendation 5). We believe that these recommendations will contribute to the Government's efforts to build an inclusive society, where all citizens have the opportunity to achieve their aspirations.

Recommendation 1:

DAS and MOE should harmonise their intervention strategies across multiple stakeholders and streamline existing interventions in order to supply and expand dyslexia provision in a coordinated manner.

One of our main findings is the need to increase the effectiveness of current provision for students with dyslexia, which could be achieved by creating a unified approach across all current service offerings, including screening for dyslexia, curriculum planning, and access arrangements. In the longer term, the key stakeholders (DAS, MOE, parents of students with dyslexia, and teachers) should work towards a harmonised approach in supplying and expanding the service provision in a coordinated manner.

The expansion of dyslexia provision, supported by an increase in cooperation among key stakeholders, will increase the reach, as well as quantity and quality of intervention. The enhancement of dyslexia support begins with a systematic process of identifying students with dyslexia, so that they may receive early

intervention, which is proven to be more effective. This lays a stronger foundation for them to advance their studies to the best of their potential and contribute to society in future. Further, as the MOE and DAS both have plans to expand their existing dyslexia provision, it is important for the expansion to be done in a coordinated manner, instead of doing so on separate tracks, which increases the risk of duplication and inconsistencies in approach.

Cooperation among key stakeholders will provide economies of scale, while reducing duplicative efforts and clarifying the approach can achieve cost savings. The partnership between the MOE and DAS has worked well, particularly in the MOE-aided DAS Literacy Programme. There is further potential for collaboration. DAS has offered screening tests, parental support, and awareness campaigns at the school level. Such activities could be scaled up with the MOE's support and coordination. Feedback from parents of students with dyslexia, DAS teachers, and mainstream teachers will be useful in considering the expansion of such activities. In this regard, we recommend that DAS and MOE streamline their existing intervention strategies, to achieve the benefits and cost effectiveness from implementing a unified intervention method in the following areas.

Short-term measures (within 2 years)

Determine the most cost-effective screening process: the MOE should establish a broader and more systematic screening process to identify students at risk of dyslexia. The screening process could be conducted at the end of Primary

1 after students have undergone their foundational year of education. This would be similar in principle to the model for the UK and Australia in identifying children with dyslexia and the MOE's existing screening test for the Gifted Education Programme, which is offered to academically gifted students in the top 1% of the national cohort. To identify these students, the MOE conducts a screening test for all Primary 3 students to assess their intellectual ability and potential. In addition, the MOE, with stakeholder feedback, should seek to standardise the psychological assessment, given that there appears to be varying practices across psychologists. While the MOE generally accepts the psychological assessment of DAS, the MOE should consider maintaining an accepted list of other psychologists whom it recognises.

Streamline curriculum: the MOE and DAS should work towards streamlining the curriculum for students with dyslexia who go through MOE's Learning Support Programme in Primary 1 and 2, and are concurrently attending DAS classes. Further, the MOE and DAS should ensure consistency and continuity in the intervention offered through the School-based Dyslexia Remediation programme in Primary 3 and 4, and the continued remediation through the DAS programme in Primary 5 and 6. There also remains scope for the MOE and DAS to regularly exchange information on useful curriculum resources and good practices.

Publish access arrangements: the MOE should publish the list of examination access arrangements that may be granted to students with dyslexia, so that parents know the available options they

can apply for their children. This will also ensure that the access arrangements are consistently granted across the schools for students with similar severity of dyslexia. In addition, parents have requested spelling leniency for students with dyslexia, so that they will not be penalised during exams for their spelling and grammatical errors.

Long-term measures (more than 2 years)

In the long term, this unified approach will serve as a good foundation for the MOE and DAS to expand their current provision. The existing MOE-aided DAS Literacy Programme should be expanded to offer subsidised intervention to preschool and post-secondary school students. Empirical studies have shown that early intervention for dyslexia among preschool children results in better outcomes, and that students with dyslexia in tertiary education continue to require effective intervention. Further, DAS should expand its programme for secondary school students, to cover other academic subjects (besides English), including mother tongue languages, mathematics, humanities, and sciences. The parents in the focus groups have also indicated interest in non-academic programmes to enhance their children's memory, as well as processing, organisation, and application skills. Additionally, DAS should consider the further expansion of its learning centres to meet the expected increase in demand for dyslexia services with a more robust screening process. For students with mild or moderate dyslexia, we agree with the MOE's ongoing efforts to expand its School-based Dyslexia Remediation programme to all primary schools by 2016 to support

these students. The MOE should consider the feasibility of expanding the programme to other academic levels, as well as to other academic subjects such as mother tongue languages, mathematics, and science, given that students with dyslexia are likely to also struggle with these subjects besides English. These subjects should be taught in specialised classes by specialised teachers within the mainstream schools to students with mild or moderate dyslexia. The experience from other developed countries has shown that such continuous and broad-based interventions have been effective in improving students' performance.

Recommendation 2:

The MOE should expand professional learning pathways for mainstream teachers and Allied Educators (Learning and Behavioural Support) to better meet the needs of students with dyslexia.

The improvement of mainstream teachers' and allied educators' capabilities to better meet the needs of students with dyslexia was one of the pressing issues raised by parents during the focus groups. We have identified that the majority of teachers are not adequately trained to identify and support students with dyslexia. This contributes to the relatively low proportion of students identified with dyslexia in Singapore at 1.3%, compared to the international norm of at least 4%. By improving the level of training, these teachers and allied educators will be better equipped to identify students at risk of dyslexia.

The expansion of professional learning

pathways for teachers and allied educators will also enhance the quality and quantity of intervention. Teachers will be more prepared to meet the needs of students with dyslexia within the classroom, which should improve their learning process, self-esteem, and performance, and thereby develop their potential to excel in future.

Our recommendation will involve moderate operational and research costs, as we suggest an expansion and intensification of the programmes for pre-school, primary, and secondary teachers, as well as allied educators. We expect low infrastructure and technological costs since it is possible to utilise the existing physical facilities and resources.

Our proposed expansion of the current training programmes is consistent with the general policy objectives of the Government and MOE. We also expect parents to support such initiatives in raising teachers' competency to work with students with dyslexia.

There continues to be limited data that is publicly available for research on special needs in Singapore. Part of the reason could be due to the low engagement of universities in the special needs research field. Researchers locally and within the region should therefore be encouraged to conduct more academic studies on dyslexia and special needs, and contribute to the availability of public data.

Short-term measures (within 2 years)

Expansion of training in special needs for teachers: the MOE should expand its

training and certification of Teachers trained in Special Needs (TSN) beyond the existing 10% of primary school teachers and 20% of secondary school teachers. These TSNs should be trained to plan and adapt the curriculum for students with special education needs. The MOE should also ensure that tertiary institutions have tutors, who can support students with dyslexia. These tutors should be trained in special needs education, and be able to help the students understand academic concepts and develop study skills at the tertiary level.

Raise awareness: general awareness needs to be raised among teachers and principals pertaining to students with special education needs, so that they are better able to support these students, including those with dyslexia. The National Institute of Education's special needs training programmes should be followed up with annual workshops covering: (a) daily classroom and exam skills; (b) identification/screening process; (c) technology-based curriculum; (d) public awareness; (e) how to communicate with parents; (f) how to manage the transition process when students change teachers or academic levels; and (g) emotional consequences of mishandling a student with dyslexia. The MOE could also engage DAS to conduct dyslexia awareness talks to mainstream teachers.

Training in identification: preschool and mainstream teachers, as well as Allied Educators (Learning and Behavioural Support) (AEDs) should be adequately trained to identify students with literacy difficulties and dyslexia. This should entail a careful observation and

assessment of these students' response to reading activities in comparison with their peers. This is similar to the approach taken by the UK and US. The teachers and AEDs should also be equipped to advise parents on the appropriate follow-up measures, including a formal psychological assessment and dyslexia intervention.

Career progression: the MOE should set out the potential career progression for AEDs and ensure that they are adequately remunerated, to mitigate their high attrition rate. In addition, given the existing concern that some AEDs are preoccupied with students' behavioural issues, the MOE should consider separating the responsibilities of AEDs such that there are dedicated AEDs who provide learning support to students with special needs, while other AEDs provide behavioural support.

With enhanced career progression options and clearer delineation of responsibilities, more people should be attracted and incentivised to become AEDs, and thereby increase the number of AEDs per school. Ideally, there should be at least one AED for each academic level, given the need for a low student-teacher ratio to effectively conduct intervention programmes (DAS maintains a ratio of 4:1 for its classes).

Long-term measures (more than 2 years)

Our literature review shows how important research studies on local population are in designing teacher's training modules. In other countries, researchers within their own disciplines have begun asking questions about what it is like being

dyslexic, how people with this learning difficulty navigate through school and other life situations, and how the cumulative psychological impact that persistent academic trauma and stress has on people with dyslexia (Sykes, 2008). These answers are critical in preparing teachers to better support students with dyslexia in the classrooms.

The MOE should increase the availability and transparency of data pertaining to special needs students and education, in order to promote research on the local population. The MOE should also consider funding external research to investigate the effectiveness of dyslexia support offered in the mainstream schools through the School-based Dyslexia Remediation programme and AEDs, and make the necessary enhancements to its intervention. In addition, the MOE and DAS should partner with their regional counterparts to conduct research studies and teacher cross-training to benefit students with dyslexia. One area of potential collaboration is with DAS counterparts in Malaysia and Indonesia in the teaching of the Malay language.

Recommendation 3:

The MOE should investigate the feasibility of a specialist school for students with severe dyslexia.

With an enhanced process for identifying students with dyslexia, we have considered how best to support students who are identified to have severe dyslexia. The options are to maintain the status quo, create special classes for students with dyslexia within the mainstream schools, or establish a

separate specialist school as proposed by DAS. In partnership with the Institute of Southeast Asian Studies and based on the best practices of specialist schools in the US and Canada, DAS has submitted a proposal to the MOE in October 2008 for a specialist school for students with dyslexia, and followed up with a refined proposal in January 2012. However, the MOE has indicated its preference for the status quo, where students with dyslexia remain in the mainstream schools to promote integration with other students.

We have assessed that the status quo is untenable given that the mainstream school environment is unable to cater for and support students with severe dyslexia, and has harmed their self-esteem, confidence, and ability to achieve their aspirations. Creating special classes for students with severe dyslexia within the mainstream schools lacks the economies of scale and the capacity to adopt a different pedagogical approach to facilitate the students' learning process. Further, students in these special classes may develop a stigma since they appear to be unable to cope in the mainstream classes, unlike the rest of the students. It may also be difficult to find mainstream schools that are willing to house such special classes within their premises given the potential stigma attached to students with learning difficulties.

We recommend the establishment of a specialist school for students with severe dyslexia to achieve the following benefits. First, the specialist school will provide a conducive and safe learning environment with intensive individual support for students with dyslexia to achieve academic success and acquire life skills.

Second, given that DAS proposed a specialist school will follow a modified MOE curriculum, students who are equipped with the necessary learning strategies may return to the mainstream schools, while still receiving intervention support from DAS. Third, the specialist school will have economies of scale in the design of pedagogy, training of special needs teachers, and use of assistive technology, which contribute to capacity-building for the future.

While the establishment of a specialist school may incur higher operational and infrastructure costs than the other two options, its benefits in raising the quality and level of intervention, as well as its efficiency and reach may outweigh the costs. The school fees are expected to be substantial given the expected quality of the programme and intensive individual support for each student. DAS has not provided an estimate of the quantum, but has indicated that it will be lower than similar specialist schools abroad. To ensure access to the specialist school, DAS has proposed a fee-subsidy scheme, with appropriate means-testing and funded by donations and the MOE, to enable deserving students to attend the school (DAS, 2012).

DAS has expressed that without the MOE's support, it would not be able to finance the specialist school on its own. The DAS proposal is for its specialist school to be funded in the same way the MOE funds the Pathlight School, a special school for students with autism that offers mainstream academic curriculum with life skills. It is proposed that the MOE covers the land costs and 90% of the budget for standard facilities, furniture, and

equipment, while the balance will be raised in donations by DAS. DAS has requested that the specialist school be operated on a per student MOE annual grant, which is four times the recurrent expenditure for primary school students. On this basis, the specialist school is estimated to breakeven and be self-sustaining after the first four years of operations. DAS has also committed to raise funds to offset any annual deficit of the school budget (DAS, 2012).

The MOE's support for the proposed specialist school would demonstrate its commitment to create "a variegated education landscape with diverse pathways" (MOE, 2015b). The MOE teachers in mainstream schools would also be less strained in terms of time and resources if students with severe dyslexia were supported by the specialist school.

As for parental support, the establishment of a specialist school will be greeted by parents with children who are struggling to learn and integrate into the mainstream schools. From the DAS parent survey conducted in July 2011, 92% of the 856 parents surveyed supported the establishment of a specialist school. Parents who are not supportive of the specialist school were mainly concerned about the potential stigma attached to the school and its students' ability to assimilate into the mainstream schools in future.

There is also concern on the foregone benefits of inclusion in mainstream schools, where students with dyslexia and normal students have the opportunity to gain social and developmental skills through their interactions. While these

are valid concerns, they should not detract from the majority of parents' support for the specialist school and the offering of a choice of an alternative path of education.

Given our analysis of the benefits, costs, political feasibility, and implementation capacity, we believe that there is merit for the DAS proposed specialist school. However, this has to be balanced against the concerns of the potential stigma attached to the school, future assimilation, and the opportunity costs of segregation. We therefore recommend that the MOE investigate the feasibility of a specialist school for students with severe dyslexia.

Recommendation 4:

DAS and MOE should identify and invest in assistive technology that help students with learning and enhance communications across various school channels.

The use of assistive technology and ICT, including mind-mapping, mind-to-speech, and spelling applications, to help students with dyslexia in their learning, have demonstrated effectiveness in other countries surveyed in our literature review. However, assistive technology remained "underutilised at the systemic level" in Singapore, as set out in the Enabling Masterplan (2012-2016). Interestingly, the low utilisation was not attributed to a lack of resources, but low awareness of such devices and the lack of coordination of resources at the national level.

In terms of benefits, it should be recognised that based on research studies, the academic performances of

students with dyslexia have significantly improved with the appropriate use of technological tools. Besides the improvement in performance, students have shown a greater interest in learning. The challenge lies in the selection of effective technological tools and coordination in the use of these resources.

As the Enabling Masterplan has set out, the low utilisation of assistive technology in Singapore is not primarily due to high, prohibitive costs. Instead with the influx of a wide range of applications, the costs of such technological tools have generally decreased. However, there remain significant costs in determining the appropriate tools in the local context and in training teachers and allied educators to use these tools effectively.

The MOE and DAS can play an important coordinating role in the selection of technological tools and training of their teachers. Both institutions have the capacity to initiate pilot trials to assess the effectiveness of technological tools that have worked in other countries. The institutions can then contribute to a recommended list of special needs resources, which the mainstream schools can consider investing in based on the needs of their students.

In relation to funding, the MOE's Support for Special Needs Grant provides schools with the financial capacity to invest in and utilise technological tools. Parents are also expected to support the use of such tools to support their children's learning.

Short to long-term measures (continuous investment required)

The MOE and DAS should incorporate the use of technological tools and assistive technology in its programmes to support students with dyslexia. To encourage schools to do so, the MOE should ensure that its Support for Special Needs Grant is adequate and that a certain portion of the fund is dedicated to investment in such tools. Further, the MOE and DAS could work together to provide the schools a recommended list of such resources. The MOE and DAS should also coordinate the necessary training to ensure that the teachers and allied educators are able to effectively employ these tools. The MOE should also consider expanding the current examination access arrangements to grant students with dyslexia an allowance for the use of technological tools such as digital dictionaries for English.

The MOE teachers should ensure that the School Cockpit System is adequately updated, particularly for students with special needs, to ensure a proper handover of the students at the beginning of each academic year. An understanding of the students' learning difficulties will help the new teachers to better accommodate and teach these students, as well as to better interact with their parents.

Additionally, the MOE and DAS should improve their communication with parents of students with dyslexia regarding their academic and non-academic progress. An online communication portal will be useful for teachers to update parents on what their children are learning and

provide feedback on their performance. Parents can then help reinforce what the teachers have taught their children and request additional information or set up meetings, as necessary. The MOE and DAS should ensure that the online portal is secure and that the information exchanged remains confidential.

Recommendation 5:

DAS and MOE should increase the reach of public awareness campaigns to identify children who may require dyslexia intervention and initiate an anti-bullying campaign to aid integration efforts.

The identification of students with dyslexia tends to occur only after poor performance is observed in the classroom. In addition, teachers and students receive minimal information about the consequences of bullying, especially to children struggling with a learning disability. Schools with a school counselor or social worker may provide some information and support, but the level of effort currently varies across schools.

Increasing the public's awareness of dyslexia is expected to provide a number of benefits. Other developed countries have been able to effectively launch informational campaigns and point to success stories in the corporate world. This has led to increases in the number of children identified and led to more children being identified earlier.

A positive spillover effect may also be a change in social stigma. By promoting success stories, such as Charles Schwab

(founder of the Charles Schwab Corporation), the general public may be more accepting of those struggling with dyslexia and more willing to identify whether their own children struggle with it. This may also create an environment where students with dyslexia can integrate better into the mainstream schools.

The costs can be very high to develop a successful nation-wide campaign, such as television or newspaper advertisements. However, there are ways to implement these types of programmes in a cost-effective way. Until there is financial capacity, a team could disseminate information about dyslexia through public spaces. This can, at a minimum, start the conversation in new forums than the ones currently being tapped. In addition, campaigns can be led through social media, such as Twitter or Facebook.

Given the social stigma that accompanies any learning disability, the MOE and DAS may encounter resistance from parents, students and even some teachers of mainstream schools for two key reasons. First, anti-bullying campaigns may be dismissed by some of these stakeholders because bullying, for years, has been considered normal as part of the learning process or as harmless child's play. However, these campaigns intend to promote the opposite.

Today, victims of bullying tend to experience higher rates of depression and other mental instability as a result of harassment. Second, teachers may resist any criticisms of their teaching style and pedagogy. However, it is important to develop a school climate that is

conducive to learning, regardless of the students' abilities.

Anti-bullying is increasingly becoming a priority in many schools in the US and UK because bullying is no longer confined to the classroom, but continues at home through social media channels. A significant worry of most of the parents in our focus groups pertained to the emotional well-being of their children due to constant misunderstandings that arose between their children and teachers and/or other students. One of the MOE's main priorities is the integration between students with dyslexia and mainstream students. This means that bullying must be addressed early and consistently. Tapping current resources, school counselors or social workers, to help broaden the current piecemeal initiatives will keep costs of pursuing such a programme low.

When financial capacity increases, it will be imperative to measure the success of these campaigns to understand how these campaigns are directly linked to increases in identification of students with dyslexia or decreases in parental complaints regarding bullying. Such studies will provide more tangible data on which to base further recommendations. Partnering with local universities or local voluntary welfare organisations could also provide a spillover benefit of increased research interest in the area of dyslexia in Singapore.

Short to long-term measures (continuous investment required)

Raise parental awareness: parents of a

child with dyslexia should be equipped with a deeper understanding of "positive dyslexia", which emphasises the strengths of people with dyslexia. In particular, people with dyslexia tend to be strong in big-picture and 3D thinking, integration of complex information, and strong pattern awareness. Such capabilities have helped a number of people with dyslexia to achieve success in a variety of careers (West, 2014). This emphasis on positive dyslexia is important in encouraging parents to continue to invest and believe in their child's prospects, and not simply lower their expectations given their child's learning difficulty.

Establish anti-bullying campaigns for all students and teachers: the MOE and DAS should leverage regional studies to develop an anti-bullying campaign targeted at reducing the bullying of students with dyslexia in mainstream schools. The campaigns could include educational videos, classroom activities, and other programmes customised to age-levels, which are aimed at enhancing student integration.

8. Limitations of Study and Future Research

In the course of our study, we faced limitations in conducting a more precise cost-benefit analysis of the policy options due to the lack of data availability regarding costs of dyslexia provision both in Singapore and in the other developed countries covered in the literature review. For this reason, our assessment relies on qualitative criteria rather than quantitative data. Given the scarce data on the prevalence of dyslexia in Singapore, our

field work was conducted primarily through qualitative research, which required an understanding of processes, events, and relationships in the context of the social and cultural situation of the learning disability in the country. There is also a limitation to the generalisability of the comments made by parents in the focus groups, given the small sample size. This was mainly due to limited interest among parents to participate in such focus groups, although our sessions were conducted over the weekend and limited to two hours per session. Nevertheless, the qualitative research was extremely useful for obtaining insights into situations and problems concerning the current provision for students with dyslexia in Singapore, which were critical for shaping our policy recommendations.

Aligned with the recommendations of this report, we understand that DAS intends to:

- a. expand its preschool programme and use of technology, including the use of iPads and other assistive technology, as complementary teaching tools;
- b. expand the range of subjects under its Specialised Educational Services, including the support for post-secondary school students and adults with dyslexia; and
- c. continue its efforts to increase public awareness of dyslexia, including “positive dyslexia”, which emphasises the strengths of people with dyslexia and thereby increases their self-esteem. Future research should therefore explore these areas of expansion and their effectiveness, especially in terms of

the benefits of early intervention, pre-school and post-secondary support, as well as provision for adults with dyslexia, weighed against the costs of non- or delayed intervention such as the loss of labour productivity.

9. Summary and Conclusions

Despite efforts from the MOE, DAS, and other relevant stakeholders, there remain significant gaps in the provision for people with dyslexia in Singapore. In quantitative terms, there is a potential gap of 14,000 students who are not identified as having dyslexia, and therefore are not receiving any type of intervention. From a qualitative perspective, the services that are currently in place are limited in scope and there are insufficient resources to support dyslexia provision.

Based on our literature review and comparison with other developed countries, as well as discussions with local stakeholders, including the MOE, DAS, teachers, parents, and subject matter experts, we find that the root causes for the gaps in provision are in three main areas:

1. **Service Volume:** there is a significant under-identification of students with dyslexia in Singapore. This is mainly due to: a reliance on teachers’ observations when they are not adequately trained to make the identification; poor public awareness and the social stigma attached to dyslexia; and a lack of standardised psychological assessment for dyslexia.

2. **Service Nature:** the current interventions are limited in terms of age group and scope of intervention. In particular, pre-school and post-secondary school students are not offered sufficient support. The existing focus on English remediation is also inadequate, as students with dyslexia are likely to struggle with other subjects.
3. **Service Support:** there are insufficient resources dedicated to supporting the provision of services for people with dyslexia. First, mainstream teachers and Allied Educators (Learning and Behavioural Support) have not been able to provide satisfactory intervention due to inadequate training, time constraints, and a lack of empathy. Second, there is low utilisation of technological tools to help students with dyslexia with their learning and taking of examinations. Third, there is scope for improved coordination between the MOE and DAS in their curriculum planning, as well as collaboration between Singapore and other regional countries to enhance local research and improve the pedagogy to benefit students with dyslexia.

Based on our research findings, we propose five policy recommendations to expand the current dyslexia provision. The recommendations are assessed based on an evaluation criteria, comprising benefits, costs, political feasibility, and capacity of implementation.

1. **DAS and MOE should harmonise their strategies across multiple stakeholders and streamline existing interventions in order to expand dyslexia provision in a coordinated manner.** The priority is to establish a systematic and cost-effective screening process to identify students with dyslexia. Further cooperation between DAS and MOE will facilitate the expansion of current provision, increasing the reach, quantity, and quality of intervention.
2. **The MOE should expand professional learning pathways for mainstream teachers and Allied Educators (Learning and Behavioural Support) to better meet the needs of students with dyslexia.** In particular, we propose an expansion of training in special needs for teachers and dyslexia awareness workshops; training in identification of students with dyslexia; and the development of enhanced career progression options and clearer delineation of responsibilities for allied educators.
3. **The MOE should investigate the feasibility of a specialist school for students with severe dyslexia.** We have considered that its benefits in providing a conducive learning environment, effective intervention, and economies of scale have to be balanced against the concerns of the potential stigma attached to the school, future assimilation, and the opportunity costs of segregation.

4. **DAS and MOE should invest in assistive technology and ICT to help students with dyslexia in their learning and examination access arrangements.** Additionally, the MOE teachers should ensure that the School Cockpit System is adequately updated to ensure a proper handover of the students at the beginning of each academic year. The MOE and DAS should also improve their communication with parents regarding students' progress by using an online communication portal.
5. **DAS and MOE should increase the reach of public awareness campaigns** to identify children who may require dyslexia intervention and initiate an anti-bullying campaign for all students and teachers to aid integration efforts.

We expect our report to support an ongoing discourse about the policies and means to ensure that Singapore embraces dyslexia and provides the conditions for all students, including those with dyslexia and other special needs, to excel and succeed in life.

10. Acknowledgements

This research was conducted as a Policy Analysis Exercise under the Lee Kuan Yew School of Public Policy for our client organisation, DAS. We thank our faculty advisor, Ng Kok Hoe, for his guidance on our research. We also thank the MOE, Angela Fawcett, Thomas Sim, DAS teachers, and parents for their insights and participation.

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