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# Evaluating reading and spelling performance of students with dyslexia using curriculum based assessments and teacher perception.

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## Abstract

*Students attending classes at the Dyslexia Association of Singapore have their cognitive and literacy profiles analysed in order to offer individualised lessons taught in accordance to the Orton-Gillingham Principles. They are placed into three bands, each with three levels of literacy learning, which map out the level of literacy skills taught from emergent to functional to advanced. Students' progress is then monitored using Curriculum Based Assessments (CBAs). This study was designed to better understand whether different profiles of students make a more marked improvement in terms of their reading and spelling ability, and to evaluate possible reasons for this. Results are reported for 60 students showing significant gains in reading over the period of intervention; though there was less impact on spelling. Questionnaires also explored teachers' perceptions in order to determine any effect on students' rate of progress as well as to identify if there is a need to enhance the curriculum and / or our teacher training to increase the impact of this ongoing support.*

**Keywords :** Reading and spelling intervention, Teacher perceptions, Banding and curriculum assessment

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## INTRODUCTION

Dyslexia as defined by the Rose Report 2009 (Rose, 2009, page 9), is as follows :

*"Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling."*

In contrast, the definition used by the Dyslexia Association of Singapore (DAS), where the current research was conducted is broader, guided by the Ministry of Education, Singapore, with elements drawn from the Rose Report:

Dyslexia is a type of specific learning difficulty identifiable as a developmental difficulty of language learning and cognition. It is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling. Characteristic features of dyslexia are difficulties in phonological awareness, verbal memory and processing speed. Co-occurring difficulties may be seen in aspects of language, motor co-ordination, mental calculation, concentration and personal organisation, but these are not, by themselves, markers of dyslexia. An appropriate literacy programme should include the following components: phonemic awareness, phonics, fluency, vocabulary and comprehension. The literacy programme provided by DAS meets these guidelines.

Dyslexia Association of Singapore website, ([www.das.org.sg](http://www.das.org.sg)), 2017.

This is the definition used by the Dyslexia Association of Singapore (DAS) in diagnosing their students with dyslexia, which include children with a range of intellectual abilities in relation to their dyslexia. However, students with dyslexia not only have difficulties with word reading and spelling but they also have other co-occurring difficulties that make their learning and acquisition of reading and spelling arduous. Therefore, if dyslexic students are tested using normed tests they will be at a disadvantage because their performance will not match up to the level of their peers who are non-dyslexics.

A study by Thomson in 1988 charted the progress of both non-dyslexic and dyslexic children by measuring the progress they have made over a 12 month period using normed tests. For the non-dyslexic children their average ratio of improvement was 1.00 over a 12 month period. However, for the dyslexic learners' achievement ratio is about 0.27 for spelling and 0.4 for reading – which means the dyslexic learners made progress of 3 months in terms of spelling age and 4 months in terms of reading age over 1 year. Is this form of testing fair and equitable? Do these tests aid in getting more information about their learning? It is clear that given this rate of progress it is unlikely that a dyslexic student will meet the requirements to progress on standardised tests, which are adjusted in difficulty for age. These tests amplify their weakness and do not provide enough information for educators to work on to improve their performance.

Our approach is therefore to develop and apply curriculum based tests, which will be outlined below. This moves away from administration by a small group of psychologists to administration by the larger group of Educational therapists themselves, in order to avoid a bottle neck in delivery of results and to upskill and empower the teachers further.

### About DAS students and MAP

Dyslexia Association of Singapore (DAS) is a non-profit organisation and it provides assessment, remediation and support services to about 3500 students aged 6 – 17 with dyslexia, i.e. from preschool to secondary levels. Classes at the DAS are conducted in a small classroom environment whereby the teacher student ratio is kept to 1:4 or 1:5. All students attend regular classes at mainstream school and come to the DAS for literacy remediation.

In 2013, the admissions division worked on profiling all our students into different bands based on the standardised scores that they obtained during their full psychological assessment. The students are then grouped into three educational bands A to C. Each band has three levels of language and literacy learning, making it nine levels of learning across bands A to C. In combination, the bands span from A1, A2, A3, B4, B5, B6, C7, C8 and C9, and an increasing level of language and literacy is mapped out and taught, from emergent to functional to advanced skills. Every dyslexic DAS student is expected to make progress in these skills over his period of intervention.

In 2014, the DAS moved away from using normed reference tests for annual testing of our students to a bi-annual Curriculum Based Assessment system to map the progress that they are making in our unique banding system.

**Table 1.** Literacy bands used at DAS

<b>BANDING</b>	<b>LITERACY NEEDS</b>
A1, A2, A3	Language and emergent literacy
B4, B5, B6	Basic literacy
C7, C8, C9	Higher Order literacy

In 2014, a revamped curriculum was introduced. The fundamental principles of the new curriculum were still based on the Orton Gillingham approach to teaching dyslexic students. The following components were included into the Integrated Curriculum - phonemic awareness, phonics, fluency, vocabulary and comprehension (MOE, 2011;

National Reading Panel, 2000; Rose, 2009). The approach was modified to suit the educational environment of Singapore, so for example exercises that include references to winter and snow were revised.

Students in Band A generally have poor receptive and expressive language skills and weak literacy skills; hence the lesson focus for this group of students will be to build up their oracy skills. The Educational Therapist is expected to apportion a significant amount of lesson time on developing listening and speaking skills. Teaching of phonics and basic writing and comprehension skills are also infused in the lesson but these are introduced on “bite-size” basis.

Students in Band B have fairly developed language skill but they have poor letter sound correspondence skills and some weak functional literacy skills. The curriculum focus for this group of students will be towards building their phonics and morphological skills. A portion of the lesson time will also focus on developing writing and reading comprehension skills.

Students in Band C have some foundational literacy skills with emerging reading fluency but difficulties developing inferential reading comprehension skills as well as composition writing. Therefore, the focus on the remediation will be on developing the advance reading and writing skills. Morphology, phonics and spelling are still infused into the lesson albeit a significantly lesser amount of time is apportioned for this.

Alongside the new integrated curriculum, the Curriculum Based Assessments (CBAs) were also introduced. The components that are tested in the CBAs are in accordance to the literacy taught. Prior to 2014, the students were tested annually using Normed Referenced standardised tests by psychologists. CBAs started in 2014 and are administered bi-annually by the Educational Therapists themselves. The reason for transiting to this mode of assessment is to allow Educational Therapists to be more involved in the testing of their students and also be more sensitive to their students’ areas of strengths and weakness. Notwithstanding this, it also serves as a measure to evaluate if the curriculum and teacher instruction is successful.

### **Purpose of the study**

In 2015, a study was conducted at DAS to analyse the reading and spelling standard score gains in children with dyslexia following 1-year of Orton Gillingham remediation (Lim & Oei, 2015). The aforesaid study revealed that reading and spelling achievement at baseline inversely related to reading and spelling gains respectively. The study also revealed that age at beginning of intervention negatively related to reading and spelling gains, which suggested that early intervention is more effective.

DAS embarked on this perception and progress study (PPS) to identify how the students

have progressed under the new curriculum using the Curriculum Based Assessments (CBAs) instead of standard scores. This research also delved deeper to see if teachers' perceptions have affected their progression in the band (see Corkett et al, 2011). In a landmark study conducted by Rosenthal & Jacobson, 1968, when teachers' expectations of students were high, they performed better on achievement tests (known as the Pygmalion effect) and when teacher expectations were low, the students did not perform well in achievement tests (known as the Golem effect). We wanted to see if perception did indeed play a pivotal role in the progress of students from one band to the next (see also Rubie-Davies 2010). Through this study, we are hoping to find out if this holds true.

## Reading and Spelling

There is an extensive literature on reading and spelling problems in dyslexia, with English one of the most difficult languages because of the irregularity of spelling. Teaching in Singapore is undertaken in English, although the students themselves use a form of English known as 'Singlish', a more colloquial language which can add to their problems in literacy. Many theories have tried to explain the underlying cause of the reading difficulty in dyslexia, with the dominant theory the phonological deficit hypothesis (Stanovich, 1986, Snowling, 1987). This proposes that difficulties are due to an inability to break down words into their constituent sounds, leading to problems in segmentation and blending, key skills underlying early reading and spelling.

The double deficit hypothesis (Wolf & Bowers, 1999) identifies speed deficits in addition to the phonological deficits, with the poorest outcomes for those children showing problems in both speed and in phonology. Working memory and processing speed within the phonological framework (Vellutino et al., 2004).

An alternative approach considers learning, with the automatization deficit hypothesis (Nicolson & Fawcett, 1990), applicable to reading, writing and spelling. Automaticity deficits will be identified in slowed performance, or in more complex tasks where dyslexic resources cannot keep pace with task demands.

All of these issues have been identified for children with dyslexia attending the DAS for remediation, and in many cases there is also evidence for problems in attention. Interestingly, in the earlier research, cited above, Lim and Oie (2015) followed a subset of 39 students aged 6-14 attending DAS for support, and established a significant improvement over 1 years teaching on standard scores for reading and spelling. Scores were accelerated from 76.79-82.59 for reading, medium effect size 0.52 and from 75.97 to 83.05 for spelling with medium Cohen's effect size 0.58. The effects of intervention were strongest for the youngest participants. This was the first study to formally evaluate the Orton Gillingham approach in Singapore, but it differs from the current study in selecting a homogeneous group in terms of IQ level, and a more heterogeneous group in terms of age, as well as not using the bands that were introduced later into the system.

## Teacher training info for DAS

In Singapore, mainstream teachers teach using a standardised curriculum that is developed for typically developing children. We train our Educational Therapist on how they should tailor lessons to suit the needs of the individual students.

At the DAS our teachers are called Educational Therapists because they are trained to tailor individualised remediation to suit the needs of students under their care. Each lesson is individually prepared and delivered. Every new Educational Therapist (EdT) starts off with completing the Specialist Diploma, which comprises of 3 modules. The first module is the Dyslexia and The Essential Literacy Approach (DELA) which is a 3 week module, where the 1st week consists of full day lectures and the 2nd & 3rd week consists of half day lectures and 10 hrs of on-the-job training. The second module is the Advance Educational Therapy module for a period of 6 months, where lectures are scheduled once a fortnight for half a day and new Edts are paired up with Educational Advisors who will be guiding and advising them about lesson planning and delivery. The third module is the Enhancing Classroom Instruction which constitutes of 7 half day lectures. The Educational Therapists take about 9 months to complete the Specialist Diploma.

Educational Therapists' training involves observations and periodic meet ups with their Educational Advisors as well as self-reflection after a lesson has been delivered. We have a comprehensive training programme in place so as to give proper support and guidance to the new Educational Therapists. Teaching children with dyslexia can pose some challenges and we want to ensure that all Educational Therapists have adequate support to ensure that the lessons are delivered appropriately.

However, there are also clear indications in the literature that perceptions can influence the outcomes for children in a number of ways (Alkharusi et al, 2014; Begeny et al, 2008). Teachers' perception of their students' ability can influence their teaching which can in turn affect the way they teach. Moreover, children's reading skills and level of interest impacts on teacher's perceptions of their skills in individualised instruction, which may be particularly pertinent for this group of dyslexic children (Kikas et al, 2015).

Efficacy is another component that affects the level of commitment teachers want to invest in teaching students (Ross, 1992, Skinner and Belmont, 1993; Allinder, 1994). The higher the efficacy level, the higher the commitment level towards teaching the students. In this study, the author (Allinder, 1994) also identified that when teachers believe that students benefit from school experiences, their enthusiasm and confidence in teaching is also raised (see also Mojavezi, & Tamiz, (2012).

In a study conducted by Hoy, 2000 the efficacy levels of teachers were tested whilst they were undergoing a one year internship, with efficacy levels found to be high during this internship period. However, after one year of internship, when teachers were given their

own classes to teach, their efficacy levels fell.

These considerations led to the design and research methodology outlined below for this study.

## **METHOD**

### **Participants**

The research participants were randomly selected using the information from the CBA database of students based on the following criteria:

1. Students must have joined the programme in Term 1, 2015. Thus, from Term 1, 2015 to Term 4, 2016, the students would have been exposed to 4 rounds of CBAs only. To ensure validity of the testing, we wanted to restrict the exposure / familiarity with the CBAs to strictly 4 rounds.
2. Only Band A and Band B students were selected for the study. Band C students were omitted from this research because they are considered to be fairly independent in their learning and also, only 1 percent of the cohort of students at DAS are from Band C. Adding them as participants might not give us accurate information.
3. Only primary school students within the age range of 7-12 old were selected. Secondary students are excluded from this study. Secondary school students are considered as fairly independent and including them might again skew the results.

Sixty students were randomly selected from Band A1 – B6 using the data from the DAS Maptrack system (see Table 2 below for details). DAS Maptrack system is software developed exclusively for DAS to administer the Curriculum Based Assessments. Of these 60, 44 of the children were male and 16 of the children were female, with more males than females in each band.

Students are typically taught in groups of 4 at DAS, with groups matched on banding as far as possible so that within each group there is a range of no more than 3 bands, with for example A1-A3. They receive 2 hours support weekly. If there is a mixed banded group then the Educational Therapists are advised to challenge the students in the higher band while trying to bridge the skills of the lower band student. The curriculum / concept taught is the same but the Educational Therapist must differentiate the content either qualitatively or quantitatively to meet the diverse needs of the learners.

**Table 2.** Details of participants

Student number	Band	Age Range	Mean age for group	Standard deviation
1-10	A1	7-12	9.30	1.64
11-20	A2	8-10	8.50	0.71
21-30	A3	7-11	9.10	1.45
31-40	B4	7-12	8.60	1.65
41-50	B5	7-12	9.00	1.70
51-60	B6	9-12	10.60	1.35

### The questionnaire

The Teacher's were given 2 sets of questionnaire. The first questionnaire with 20 questions was developed in house at DAS, following research into similar approaches. This included accessing a site "What kids can do" (2004) expressly designed for schools to craft their own questionnaires, and drawing on examples from 5 different schools, in addition to a recent study (Norman, 2016). The questions were evaluated and amended by a small team and were based on the following categories - Banding Belief System, Own Skill (i.e. teachers' belief in their own skill), teacher's perception of student's ability and organisational structural issues. The questions were tweaked to include terminologies that are unique to the DAS, for example the unique banding of students at DAS. This questionnaire was administered to find out the Educational Therapists' general perception of their students.

The second questionnaire has 18 questions. These questions were specific to selected students that the Edts are teaching. 5 questions were taken directly Fall and McLeod, (2001) with a further 2 adjusted for the DAS context, to specify reading and spelling, and the remainder were added to suit DAS' Educational Therapists, with the concepts for 3 of the questions taken from Bandura, 2006. (See appendix for the full questionnaires.)

### Curriculum Based Assessments (CBAs)

Table 3 shows the range of CBAs used in the work - and the bands with which the components are associated. Examples of the screens used with the reading and spelling components then follow in Figures 1 to 5.



**Table 3.** Types of tests in CBAs

Components	Types of Tests	A1	A2	A3	B4	B5	B6	C7	C8	C9
	Picture naming	✓								
Vocabulary	Picture description		✓	✓						
	Written Vocab (evaluated through Writing)				✓	✓	✓	✓	✓	✓
	PA - Identification	✓								
PA / Phonics	Phonics	✓	✓	✓						
	Word reading accuracy	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Word spelling		✓	✓	✓	✓	✓	✓	✓	✓
Comprehension: Pending completion of RC curriculum										
Fluency	Words correct per minute				✓	✓	✓	✓	✓	✓
	Letter formation	✓								
	Edit & Diagram	✓	✓	✓						
Writing	Narrative / Exposition Writing				✓	✓	✓			
	Exposition Writing							✓	✓	
	Persuasive Writing									✓

Word Reading Accuracy requires the teacher and student to be logged on at the same time and as the student reads the teacher will mark the work.

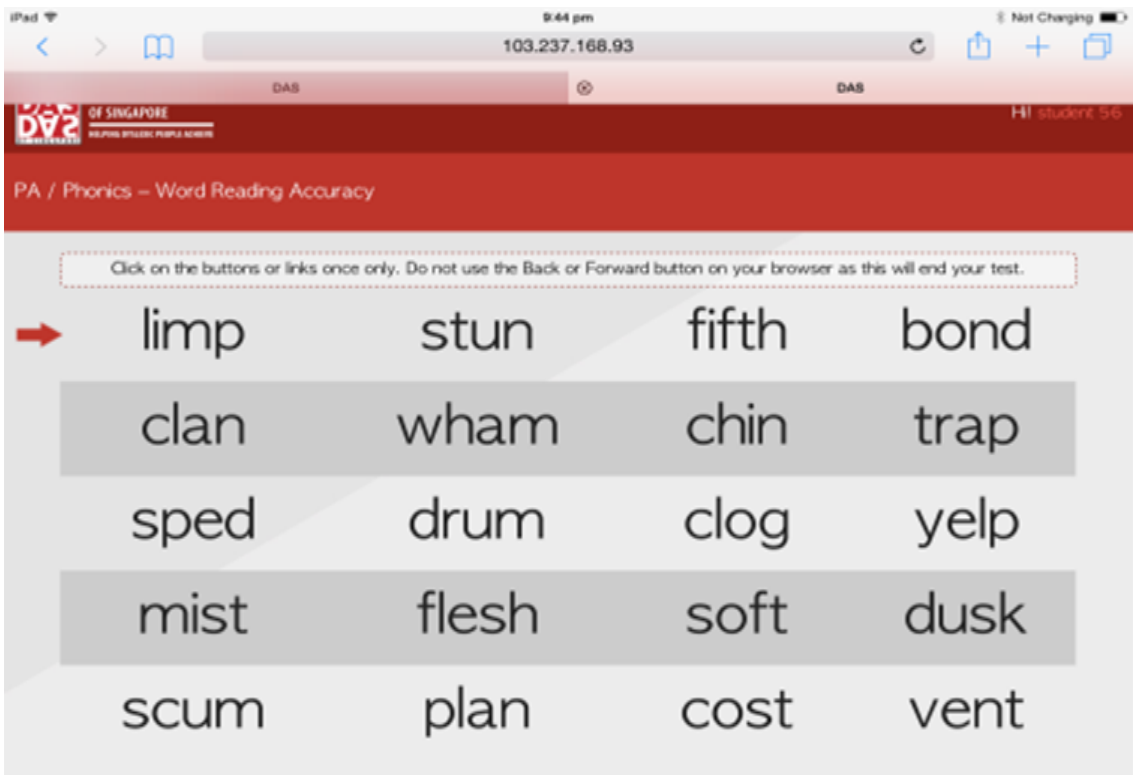


Figure 1. Word Reading Accuracy – student screen - A2 student



Figure 2. Word Reading Accuracy – Educational Therapist (Edt) screen – A2 student

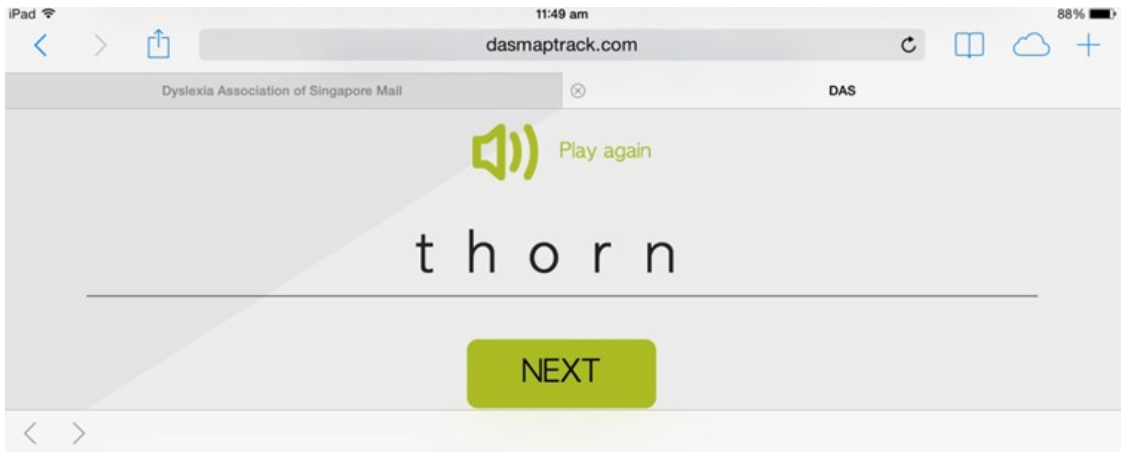
Word Spelling of a B4 student – the word was huff but the student was spelling it wrongly. This is an independently done test whereby the student listens to the instruction and spells on his/her own. The discontinue rule for the spelling test is 3 consecutive errors or the time limit of 10 minutes is reached.



Figure 3. Word Spelling of a B4 student



Figure 4. Word Spelling of a B4 student – the word was shock. Student has spelled it accurately, system will mark it as correct.



*Figure 5. Word spelling of a B5 student.*

## Procedure

A year on year comparison was made on the scores obtained by the students for single word reading and single word spelling using the data from the DAS Maptrack system. The questionnaire on "General Teacher Perception" was administered to the Educational Therapists teaching these 60 students (See Appendix 1). The questionnaire was counterbalanced to ensure that participants were provided an opportunity to respond both positively and negatively, using a 5 point Likert scale.

## Method of Analysis

The data on students' progress was analysed in terms of net gain for reading and spelling.

The questionnaire on "General Teacher Perception" consisted of 20 general questions. These questions were categorised as follows:

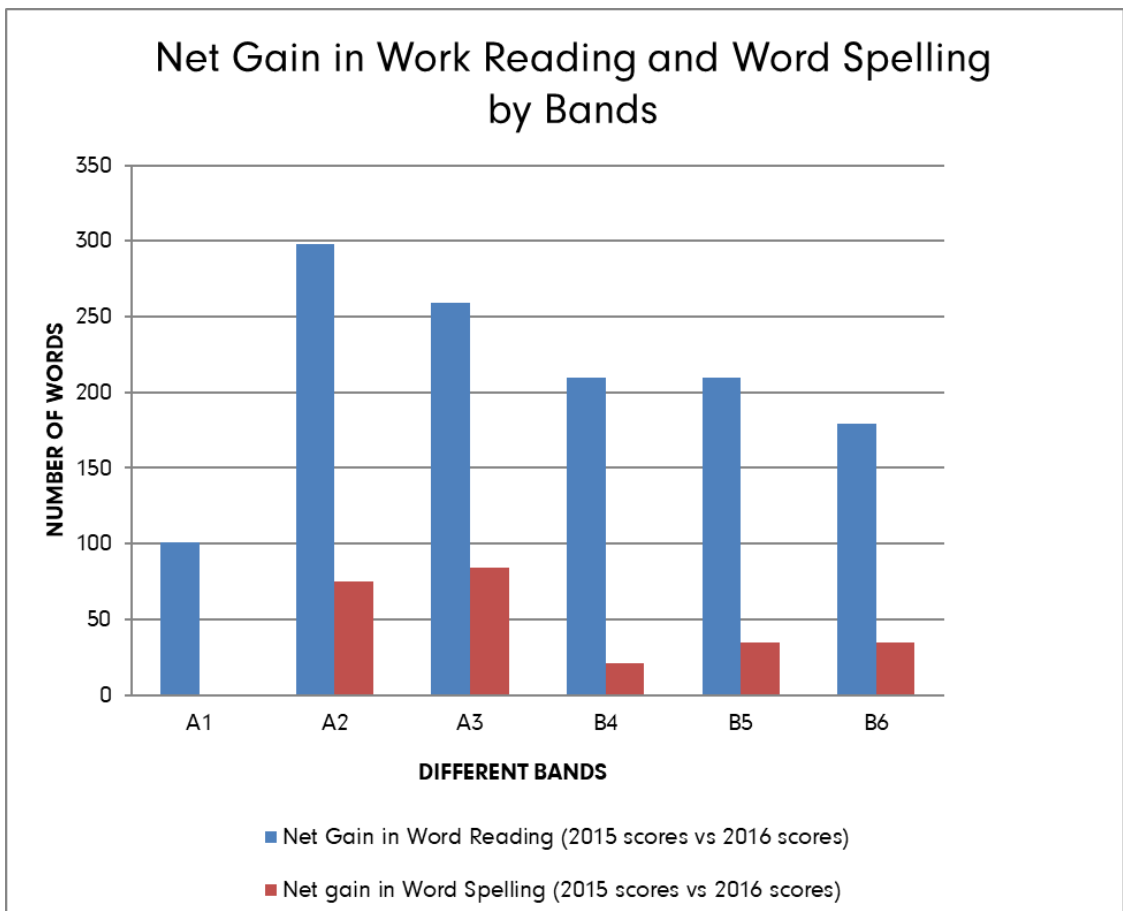
1. Banding Belief of Educational Therapists
2. Perception of own skill
3. Organisational support

The "Educational Therapists' Reflection of student" questionnaire had specific questions about the student that they are supporting.

## RESULTS

### Reading and spelling data

The following results (see Figures 6 and 7) were obtained for the Word Reading and Word Spelling analysis. Students generally performed better in reading than in spelling. Repeated measures t-tests were performed comparing scores at pre-test with those at post-test. For Reading, only A1 was not significant, and this was borderline, whereas for A2 to B6, all t-tests were all significant with a p-value equal to or less than 0.001. In contrast, for spelling, only A3 was significant. A1 did not undertake this test, and scores for A2 were not significant, although there was a trend towards significance. Spelling improvements did not reach significance at any level for the B Band.



*Figure 6. Word reading and spelling gains by band*

A further t-test was undertaken comparing the improvement in reading in Band A and Band B scores (mean 24.97 and 19.97 respectively). There was no significant difference ( $t=0.19$ ), possibly because of the higher variability in 2015 (standard deviation 18.4 versus 8.3 in 2016). It was not possible to undertake the same comparisons with spelling, because the mean scores in A1 were too low.

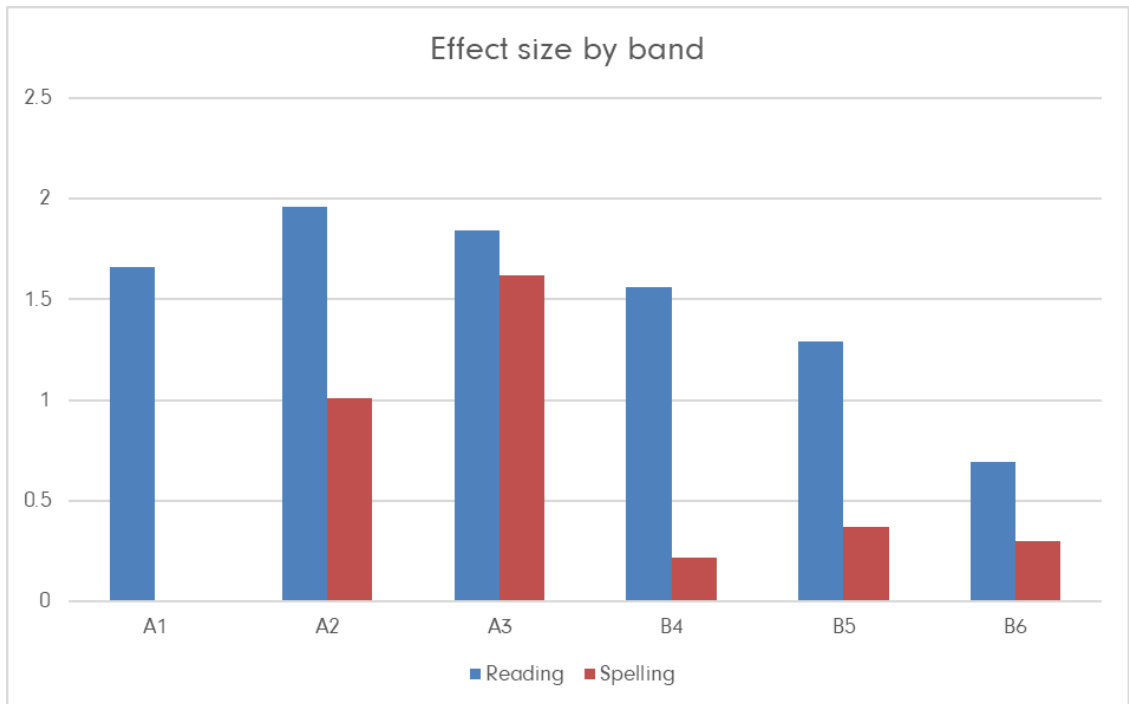


Figure 7. Effect sizes for reading and spelling by band

A series of effect analyses (Cohen 1992) were also conducted to compare the size of the improvement, based on the mean and standard deviation. These results show large effect sizes for reading at all levels apart from B6, where there is a medium effect size. The spelling results show large effect sizes at A2 and A3 and small effect sizes at B4-B6.

### General Perception Questionnaire

One of the key questions for the "General Teacher Perception" questionnaire related to the likelihood of improvement in each band, as follows:

"I believe the following band of students will see the most progress within 6 months of MAP intervention, rank them in order (1 being the most progress and 3 being the least)" Based on the above, the Educational Therapists were supposed to rank which group of students they felt will make the most progress. The results are shown in Figure 8.

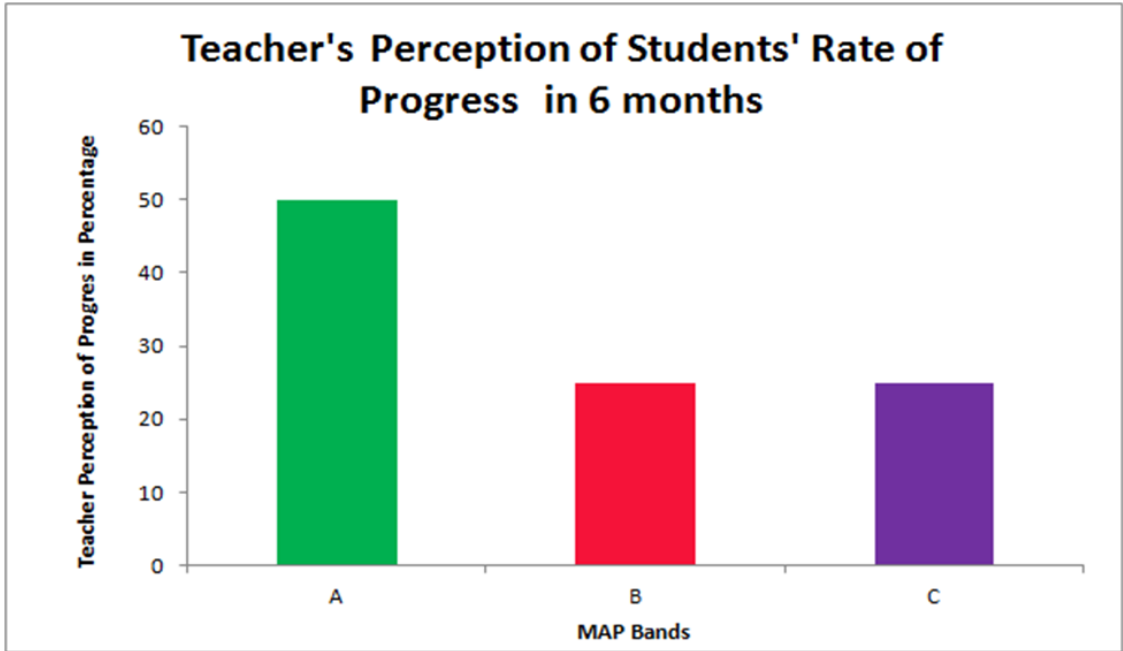


Figure 8. Teachers perceptions of student progress by band

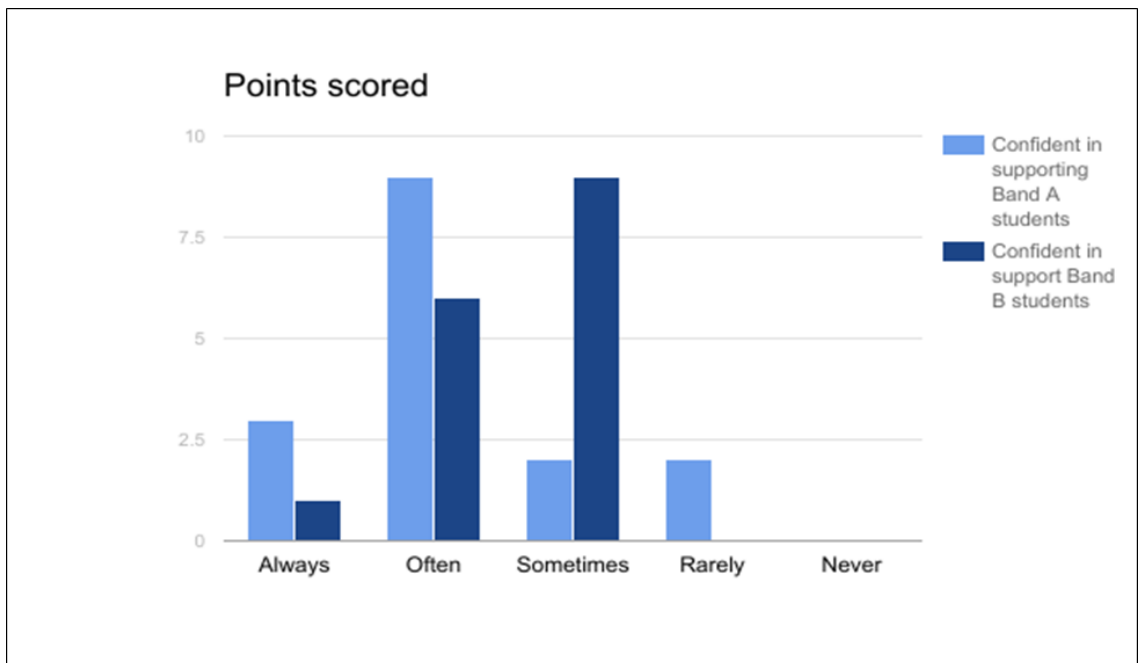


Figure 9. Teacher confidence in ability to support different bands

The Educational Therapists are the most confident that students in Band A will make the most progress in the remediation programme.

Two questions were posed to the Educational Therapists on their ability to support the higher band students as well as the lower band students. These results can be found in Figure 9.

69% of the Educational Therapists felt that they are able to effectively support students in Band A however only 44% of the Educational Therapists felt that they have the ability to effectively support students with high ability in the class.

The two questions that we posed were as follows:

*“I am able to effectively support the weakest students in my class.”*

*“I am able to engage students with high ability in my classes effectively”*

The Educational Therapists felt that they are able to support the Band A students most often in the class however the Educational Therapists are only able to support Band B students sometimes.

We posed a question on how Educational Therapists felt about motivating the students that they teach. The results are reported in Figure 10.

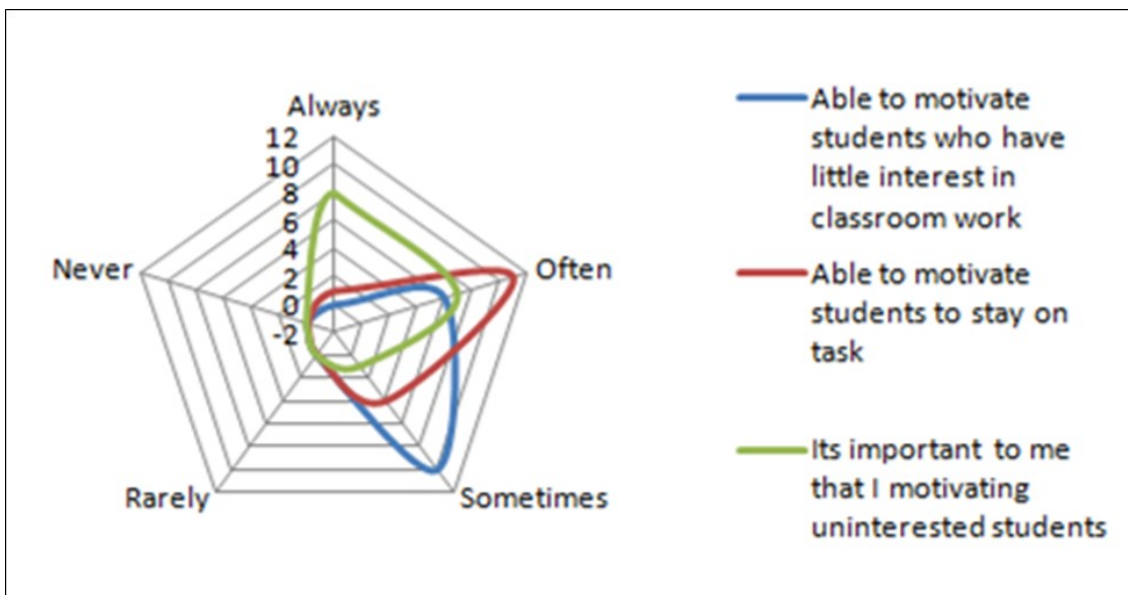


Figure 10. Ability and importance of motivating students.



The following is the result from the survey:

- ◆ Motivating students with little interest in the classroom work – only 38% of the Educational Therapists felt that they have adequate ability to motivate students who show a lack of interest in classroom work.
- ◆ Motivating students to stay on task – 75% of the Educational Therapists felt that they are able to encourage students to stay on task.
- ◆ Giving up trying to motivate students – 94% of the Educational Therapists do not give up easily in trying to motivate their students.

Figure 11 shows the results for the question on Teachers' views on students' potential.

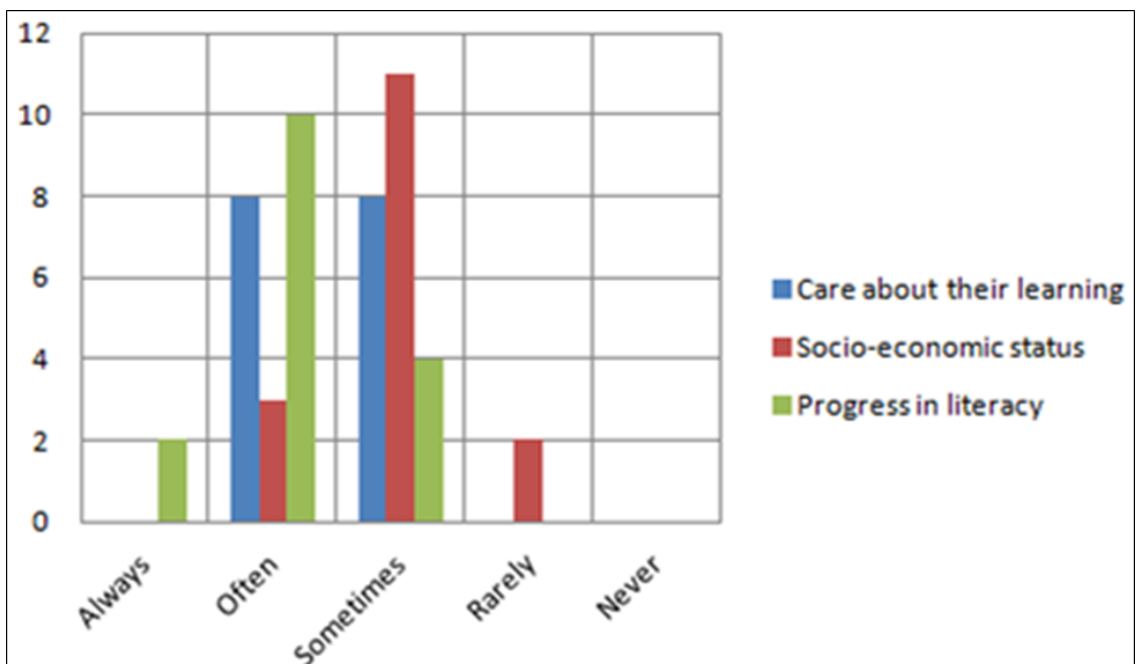


Figure 11. Factors impacting student potential

- a) 50% of the Educational Therapists felt that their students care about their learning
- b) 81% felt that progress of student is not dependent on their socio-economic level
- c) 75% of Educational Therapists felt that their students are making good progress in their literacy

### Educational Therapists specific perception questionnaire

The Educational Therapist's stated that children rarely became frustrated in class, tried to complete tasks even those beyond their ability, attempted to tackle unfamiliar tasks, and rarely gave up in the face of difficulties. They noted that the majority of children approached a task eagerly, and relished a challenge, and were rarely reluctant to take part. Overall, the Educational Therapist's enjoyed teaching these children, recognised their potential, and only 1 child provoked dread in his Educational Therapist because he was not taking the class seriously, despite the challenges that working with these children involve. In terms of attributions, the Educational Therapist's thought that the students did not blame themselves or others for their difficulties.

The Educational Therapists were given the following question:

"The child is not trying hard enough in class."

1. 62.5% of the Educational Therapists felt that their students are not trying hard enough.
2. Persistence. The scores of 37% suggest that only around one third of the children show a level of determination to seek help, and this may be an area which warrants further attention. (Based on teacher perception question - *When the child is unable to read/spell a new word, the child persists in seeking solutions?*)
3. In terms of independent working, 63% of Educational Therapist's thought that their students were independent enough to find their own solutions
4. In the area of confidence in their ability to spell, only 45% of the teachers felt that their students had confidence in his/her own abilities.

### DISCUSSION

One of the keys to literacy for children with dyslexia is their ability to both read and spell. In this study of the net gain in students' single word reading and spelling, there is striking evidence for improvements in reading, with strong but less impressive improvements in spelling. This lack of symmetry in words read and words spelled is not unexpected, in that spelling problems are more persistent in dyslexic learners than reading problems (Frith, 1984, 1985; Nicolson & Fawcett, 1994; Thomson, 1984). However, it is interesting to note that it differs from the previous study from DAS (Lim and Oie, 2015), where equal gains were found for both reading and spelling. This may reflect the different composition of the current group.

A key aspect here seems to be an increase in the fluency of reading, and possibly the automatization (Nicolson and Fawcett, 1990) given that the CBA approach is time limited. Note also that the words presented in reading here are not based on frequency of

occurrence, so one might speculate that this approach to intervention has been effective in improving word attack skills for unknown words, another key to improvement. However, there is no specific data to support these speculations, so these issues would need to be investigated more systematically in future research.

Focusing again here on reading, because this seems to be the strongest impact of the intervention received, it is interesting to note that the greatest gains are made at the lower levels of banding with a particularly striking net gain for Band A2 (nearly 300 words) and Band A3 (over 250 words). This means that the students were able to read more fluently from the list of words presented as part of the timed curriculum based assessment, and with greater accuracy ensuring they did meet the error criteria to discontinue before the allotted time. This finding is in line with earlier findings from Lim and Oie (2015) that intervention improves most for the lower achievers, and seems to be most effective for the younger age groups, but here the groups are comprised of participants ranging in age from 8-10 and 7-11 respectively (see Table 1 for details). Considering the approaches adopted for Band A and Band B respectively, A is a more oral language based instruction, whereas in Band B the focus is more intensely on written language. The key to success for Band A2 may be that their age range is clustered within a smaller range than the other bands. On the other hand, it may not be just the age range which is critical in learning but the stage the learner has reached.

It is interesting to note here that the teachers clearly indicate that they expect Band A to make the most progress in the 1st 6 months of teaching at MAP, and this indeed seems to be the pattern from the data. Comparing this belief with the reading and spelling performance of the students (Figure 1), there are suggestions that this could be a realistic analysis of the progress the students are making, and this is reflected in the scores obtained. These results show that the changes in method of assessment to involve the Educational Therapists themselves in curriculum based assessment have been successful in creating a greater awareness of their students' outcomes. Conversely, it could be that this belief on the part of their teachers has allowed students in Band A to make greater gains in reading as well as spelling compared to the Band B students. There is a possibility that the Educational Therapists strong sense of belief in Band A students' potential in turn made them dedicate significant time and effort to teaching Band A students (Tschannen-Moran & Hoy, 2001), but it is not clear whether this would also lead to less effective support for Band B. Is the Pygmalion phenomenon coming into play here? (Rosenthal & Jacobson, 1968; Rubie-Davies, 2010), or does this simply reflect the greater room for improvement in Band A?

There is also a possibility that Teachers' belief in their ability to integrate language and vocabulary (Oracy) to support Band A students could also be one of the factors that account for Band A students to make the most progress amongst the 3 bands. This is in line with the Rose Report which emphasises phonics as part of a wider curriculum which includes language comprehension (Rose, 2006).

There is a further possibility emerging from the data that Educational Therapists find it easier to support students in Band A and/or they might be lacking in confidence to support Band B students. This seems to emerge in figure 3, where there is clear evidence of greater confidence in supporting at the lower level. Although it may well be that teachers put in greater effort in order to support their more challenging students in Band B, the results here clearly indicate that Band A students are receiving more effective support.

This could be interpreted as Educational Therapists either needing more training or support to engage these students. This phenomenon needs further investigation to identify gaps – and to establish whether this reflects gaps in training, or lack of resources or the curriculum not meeting the needs of these students fully. It may well be that the greater awareness that the Educational Therapist's have developed of the needs of their students based on the Banding system has led them to question their own efficacy further, and that this increasing knowledge has not yet transferred to increased confidence in their own teaching. Further research is currently underway to address the more complex needs of Band B and above, and this will be reported in future papers.

The results indicate that sufficient training, resources and support is in place for Educational Therapists to deliver lessons for Band A students. However, our organisation needs to further investigate as to why the Educational Therapists felt that they are not able to engage the higher ability students as effectively.

Motivated learners have a positive mindset and they are more likely to persist with learning and understanding (Simmons, 2014). 62% of the Educational Therapists felt that they do not have adequate ability to motivate students who show a lack of interest in the classroom. However, even if they do not believe in their ability to motivate, Educational Therapists still do their utmost to try motivating and engaging these students, and were clearly committed in their approach, with 94% determined to continue striving to improve outcomes. Further training may be needed for Educational Therapists on how to effectively motivate these more challenging students. Notwithstanding this, there might be a need to probe further to understand the reason for the lack of interest shown by the students - Is it a trait within the students themselves, or situational forces that make them have little interest in classroom work? (D'Elisa, 2015).

Learned helplessness linked to lack of esteem may well be a factor with students who are experiencing difficulties in learning, but this might well be more of an issue for Band A where achievement is lower. Conversely, the students in Band B may be more aware and frustrated by their lack of progress. Issues such as intelligence levels in these students and any co-morbid issues also need to be investigated. One might speculate that more intelligent and mature children would show greater issues with motivation, given that despite their best efforts and the extra support provided they are still not achieving at the level of their peers.

It is reassuring to know from figure 5 that Educational Therapists do not hold stereotypical views of their students and their abilities to succeed and there is no evidence that banding has impacted this. Additionally, the majority of Educational Therapists were also optimistic about the progress that their students were making.

Interestingly, it is often assumed that higher scores than those demonstrated in the Educational Therapist's surveyed suggest that they are likely to be more effective. Conversely, these scores may be seen to demonstrate that Educational Therapist's at DAS are developing their self-critical faculties, and this combined with their enthusiasm and optimism for their student's progress, could augur well for outcomes here.

The Educational Therapists also feel that the students have not attained confidence as yet in their spelling, and this is well matched by the data on improvement, which show less improvement than might be hoped for in this area. Nevertheless, this pattern of results is in tune with research internationally, which demonstrates that spelling typically improves less consistently than reading (Nicolson and Fawcett, 1994). This may be largely because it is possible to use a combination of phonics and vocabulary to successfully guess a word in reading, whereas it is never possible to accurately guess the correct spelling.

Overall, the Educational Therapist's perceptions of individual students show a strong and positive approach, whereby the Educational Therapists have a realistic understanding of the students and their strengths and weaknesses, and the children are largely co-operative and confident. These students do not blame themselves or others if they are not successful, and these positive attributions augur well for their future success.

## LIMITATIONS

Although the research has reached its aims, there were still some limitations that could be addressed in future research. First and foremost, the selection of students was strictly based on their start date on the programme and no independent checks were made to see if these students had any initial diagnoses of co-morbidities, or any differences in IQ. Another issue that we did not take into consideration is to check if these students are receiving any additional support outside of the DAS, such as private tuition. Given that Singapore is highly focused on education, many students receive more than one input in terms of support. Thirdly, student demographics and primary language of communication was not taken into consideration. If students' primary language of communication is not English then their exposure to the English language might be limited thus hampering the development of their oracy. Two other factors that might need to be included in this study are the age and experience of the Educational Therapists and also parents' perception of their children as learners.

In all good research, a number of outstanding questions will emerge once the researchers have focused on a specific area of interest. In further research, a small focus

group of the Educational Therapists who had participated in this study could address some of these unresolved issues and consider whether the therapists felt the need for further training, greater access to resources or mentoring in enhancing their support for students in Band B.

## CONCLUSIONS

The study that we embarked on revealed particularly interesting data on the gains in reading and spelling made by this group of DAS students. The most impressive reading gains were seen in A2 students and most gains in spelling was seen in Band A3 students. These results are in line with Teachers' perceptions that Band A students will make the most progress. This accurate prediction of students' performance is in line with the previous study where it was found that reading and spelling achievements at baseline inversely related to reading and spelling gains respectively. It could also be suggested that Educational Therapists own feelings of adequacy influenced their behaviour in feeling more confident to better support Band A students. Conversely, it could simply be an accurate estimate of the gains their students have made, based on their own abilities in teaching.

Offsetting the needs of lower band students, versus the needs of students in higher bands – are Educational Therapists' perceptions that lower band students' needs are more 'urgent' or 'severe' affecting the support given to higher functioning dyslexics. The study needs further exploration in the following areas –

- ◆ A more targeted needs analysis to find out about training gaps in Educational Therapist training that are currently in place.
- ◆ To form a new sample and conduct a second round of data collection and analysis, with the following in mind:
  - ◇ Split students into groups based on diagnosed co-occurring issues
  - ◇ Undertake further analyses with IQ as a variable
  - ◇ Educational Therapists' years of experience – does it affect teaching, i.e. does longer service inversely affect perception and performance
  - ◇ Questionnaire to include open ended questions.
  - ◇ To conduct focus group sessions to clear any ambiguities.
  - ◇ To conduct a parent perception of their child as a learner

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**APPENDIX 1** General teacher questionnaire (ref)

<b>S/NO.</b>	<b>QUESTIONS</b>	<b>CLASSIFICATION</b>
1	I believe the following band of students will see the most progress within 6 months of MAP intervention, rank them in order (1 being the most progress and 3 being the least)	Banding Belief System
2	I am able to effectively support the weakest students in my class.	Own skill
3	I am able to get my students to follow classroom rules.	Own skill
4	I am able to control disruptive behavior in the classroom.	Own skill
5	The training and support I receive is sufficient for me to teach in class.	Organisational support
6	There are opportunities for me improve my teaching (i.e. observations, collaboration with other colleagues).	Organisational support
7	I am able to motivate students who show low interest in classwork.	Own skill
8	I feel my students are making good progress in their literacy	Perception of students
9	I am capable of motivating my students to stay on task.	Own skill
10	My students are not working hard enough to progress to the next band.	Perception of students
11	My teaching methodology does not change to suit students at different bandings .	Own skill
12	If my student is uninterested in the lesson, I will do my best to motivate them.	Own skill
13	The curriculum challenges my students.	Banding Belief System
14	My students care about their learning.	Perception of students
15	My students in Band A progress slower compared to Band B.	Banding Belief System
16	Focusing on Language and Vocabulary (Oracy) component helps Band A students make progress.	Banding Belief System
17	The organisational restrictions hinders my students' progress i.e. curriculum, administrative work and etc .	Organisational support
18	I am able to engage students with high ability in my classes effectively	Own skill
19	My students' progress depends on their socio-economic level.	Perception of students
20	OTHER COMMENTS	

**APPENDIX 2****EDUCATIONAL THERAPISTS' REFLECTION OF STUDENT QUESTIONNAIRE**

1. How long have you taught this student for?
2. When the child is unable to read/spell a new word, the child persists in seeking solutions
3. The child becomes frustrated when unable to read/spell a new word.
4. The child is not confident of completing the task, although he/she has the skills to accomplish the task.
5. The child tries hard to complete a task, even though he/she does not have the skills to complete the task.
6. The child tends to blame others for personal failure.
7. The child tends to blame himself/herself when unable to read/spell words.
8. The child has confidence in his/her own abilities.
9. When presented with an unfamiliar task, the child believes that he/she can complete the task.
10. The child gives up easily when he/she feels that the word is too difficult to read/spell.
11. The child appears to like challenges.
12. When you give a child a task, he/she eagerly approaches it.
13. The child is reluctant to participate when given a task.
14. I believe that the child has the potential to do well.
15. The child is not trying hard enough in classes.
16. The child is not taking classes seriously.
17. I enjoy teaching this child.
18. Sometimes, I dread teaching this child.

*Questions 6,8,9,11 and 12 taken from the Self-Efficacy Scale - Teacher Version (Fall & McLeod, 2001) with questions 2 and 10 adapted for literacy, and with added questions devised based on Bandura (2006) on creating self-efficacy scales.*