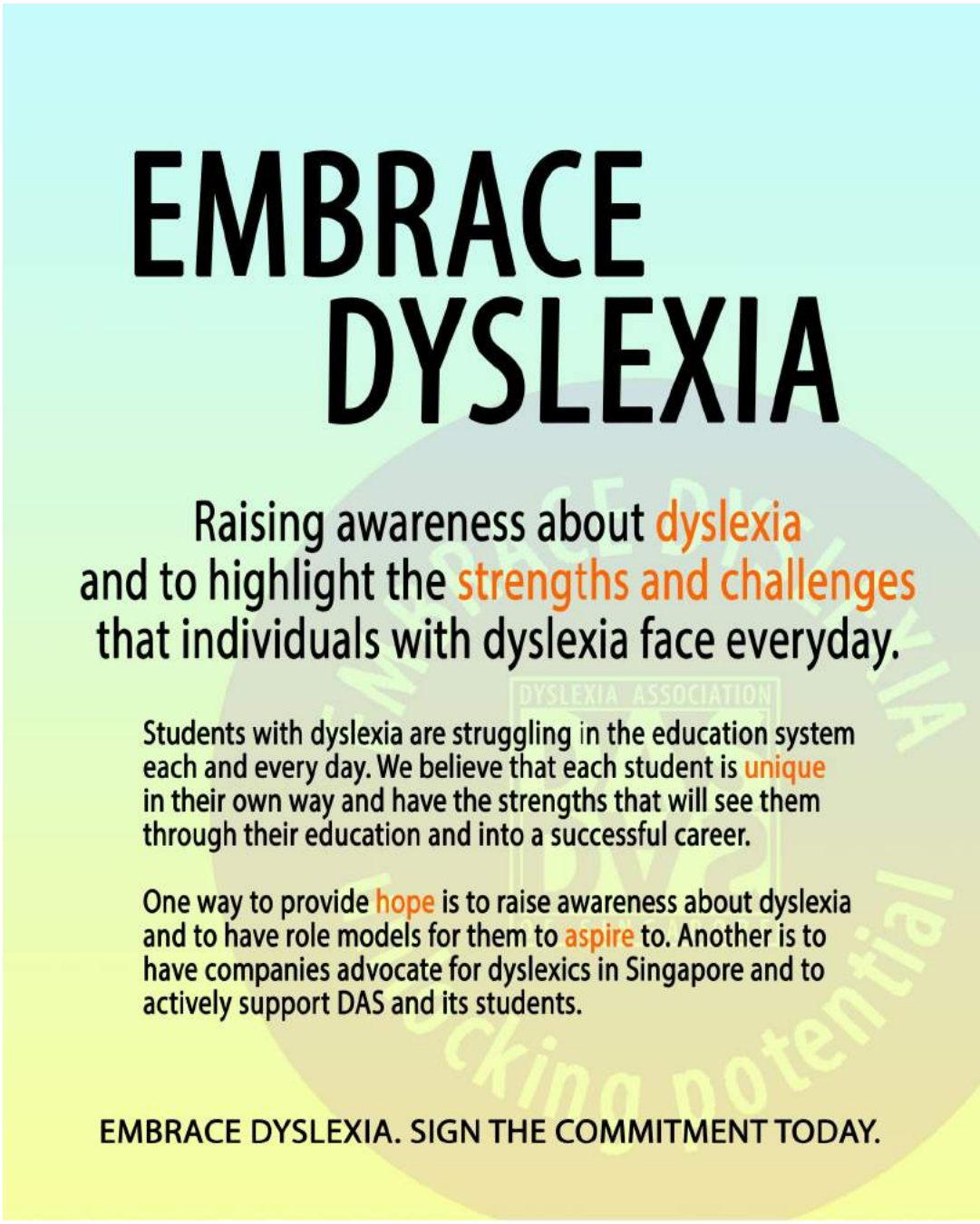

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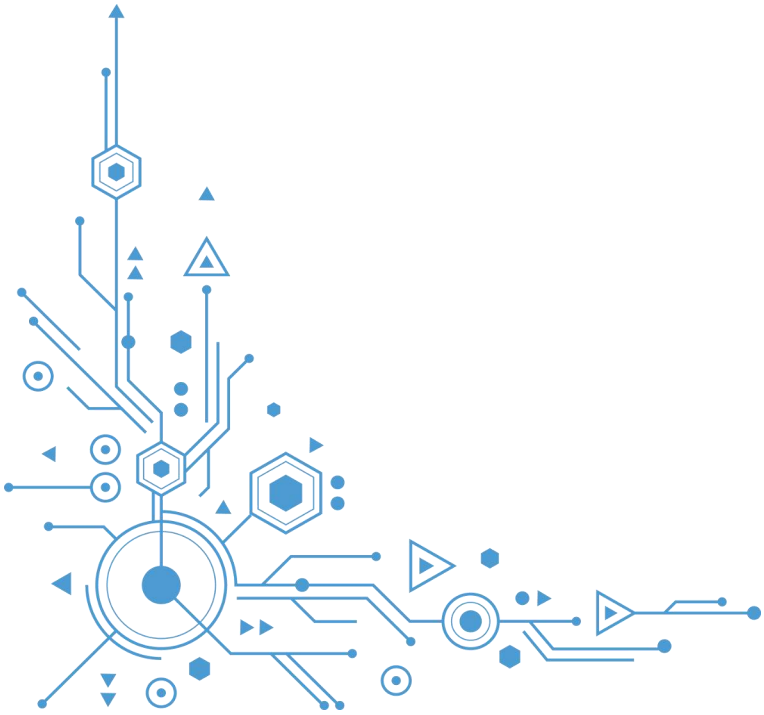

Stress, Anxiety, Mental Health and the Need for Positive Psychology in Dyslexia

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Are you anxious before you take a test? Many competitive people are very stressed before taking exams -the adrenaline can be useful, but it can lead to panic and errors.

Undiagnosed hyperglycemia in my second year Psychology degree exams led to complete disaster for me! If you have dyslexia, you are likely to be more anxious and this will affect your processing, not just during exams but when trying to process at speed.

Signs of test anxiety include visible signs of nervousness such as sweaty palms, shaky hands. "butterflies" in the stomach and nausea immediately before a test. You may read through the test and feel that you do not know any of the answers, and so panic before and during a test. Your mind goes blank during a test, and you only remember the correct answer once you get out of the testing situation. You make mistakes on easy questions or put answers in the wrong places, may have difficulty choosing answers, or even forget to turn the page.

All these happened to me in my second year Psychology BA exams at Sheffield University. I thought this was a panic attack, but it turned out to be hyperglycemia. We had been encouraged to drink coca cola and eat mints to help maintain our attention, and this had caused my undiagnosed diabetic blood sugar to soar sky high, so that I felt drunk and confused.

"Many competitive people are very stressed before taking exams -the adrenaline can be useful, but it can lead to panic and errors."

If you are dyslexic you are likely to have higher scores not just in exam conditions, but throughout life! A review of anxiety in dyslexia by Kannagura (2015) notes the following comments from dyslexic adults.

> "*... nearing the end of fourth decade in my life. Still my childhood experiences can bring me to tears."*
>
> *"I seemed to stand out as a sore thumb, the misfit, an ugly (read 'dumb') duckling among elegant (read 'intelligent') swans."*
>
> *".. ..now Head of the Department (in a well known university, Economics department) no one would ever doubt my scholastic abilities.. .."*
>
> *"I suffered silently hiding my secret, nursing my wound all alone."*
>
> *"I am known today to be a perfectionist, keen on documentation, stickler to the rules of language, be it grammar or spellings."*
>
> *" .. .and yet I was the same child benumbed by fear, standing up in class, trying to maintain any shred of dignity through the humiliating experience of being laughed at my attempt to read aloud. I had mispronounced the word 'native' and my well-kept secret was out in Grade 3."*
>
> Kannagura, 2015

But Malcom Gladwell, the eminent philosopher claims that dyslexia is a desirable disorder...So how can this be? In this chapter I shall try to explain how this happens and how positive dyslexia can help to overcome this.

In my research with Rod Nicolson, (for further information see Nicolson and Fawcett, 2007, 2008) we looked at Dyslexia as a Learning Disability. The 'correct' description of dyslexia is 'Specific Learning Difficulties' or 'Specific Learning Disability'. So, we argued that Dyslexia is some general deficit in learning, and for some reason it is difficult for dyslexic children to become 'expert' in a task, whether it is a cognitive task or a motor task.

This led to our Automatisation Deficit Hypothesis, that Dyslexic children have problems making skills automatic, and need therefore to 'consciously compensate' even for simple skills. This has an impact not just at school but throughout life!

There are 3 Stages in Learning skills.

- The Cognitive (declarative) stage, in which a description of the procedure is learned. This is domain independent.
- The Associative (procedural) stage, where a method for performing the skill is worked out. This is domain dependent and relates only to the specific skill learned.
- Finally, the Autonomous (automated) stage, where the skill becomes more and more rapid and automatic, speed and accuracy improve and verbal mediation is often lost.

In earlier research, we set out to examine Learning and the Ogive, with a study of Procedural learning. When you start learning a new task your performance is initially very slow and effortful. It's a bit like trying to climb a mountain, but as your performance improves then the learning curve flattens out and you have achieved automaticity. In the study, we examined the blending of primitive skills, in this case a simple reaction time to either a flash or a tone. This was the only task in which we had found our dyslexic children were not impaired. To make it more fun we asked the children to blend together the two skills using both their hands and their feet. Of course, once this task becomes a choice reaction task everyone's performance deteriorates. In this case, our control children became faster at the dual task than they had originally been with just a single task, over the course of 2500 trials. By contrast the dyslexic children struggled and their performance remained slow. They had problems with the initial blending, made more errors, had slower final performance, and slower learning

So where do their difficulties lie? If we look at the Stages and Timescales of Learning, the Immediate stage takes seconds, Practice minutes to hours, Consolidation happens overnight and Automaticity takes days. In a study of Motor Sequence learning we showed that the dyslexic adults learned slower initially, remained slower at end of session 1, and were slower at start of next day. This showed that they lacked some of the basic processes involved in learning, in particular here the ability to benefit from consolidating their memory overnight. This applied even to high achieving dyslexic students, who have largely compensated for their difficulties. For further information on our research see Nicolson and Fawcett, 2007, 2008.

These difficulties in learning are exacerbated for children with co-morbidity with another condition. There is a high overlap ('comorbidity') between symptoms of different developmental disorders, so that when Kaplan and colleagues (2001) studied a population-based sample of 179 children receiving special support in Calgary, they found the following overlaps:

- If they met dyslexia criteria -> 51.6% chance of having another disorder
- If they met ADHD criteria -> 80.4% chance of having another disorder

"in developmental disorders comorbidity is the rule not the exception".

So why do these overlaps occur? If we consider the impact of comorbidities on development in childhood, we see that problems at birth in the procedural learning system for motor skills leads directly into the motor skill issues that manifest by the age of five as dyspraxia. Similarly, problems in the language based procedural learning system will manifest as specific language impairment and will include problems in phonology. However, articulation which is key in language apartment development involves many thousands of muscles and therefore it can be said to be both a language and motor skill.

Typically, dyslexia will not be diagnosed until the age of eight, by which stage several years of failure will impact on the self-esteem and achievement of these children. By contrast children with problems in the declarative learning system will manifest as a more generalised learning difficulty, although a spiky profile in these children may also indicate elements of dyslexia.

We need to embrace dyslexia - identify and support all dyslexic schoolchildren so that they have every chance of flying rather than sinking! A key aspect here is executive function, which includes a range of functions: Attentional control, Cognitive flexibility, Goal setting, Information processing, Utilizing feedback and Dealing with novelty. These skills are typically demonstrated in tasks such as sequencing (known to be impaired in dyslexia...). This is now seen as key in developing resilience and dealing with stress and lowered self-esteem, particularly for dyslexics.

Adele Diamond has written at length about the importance of improving Executive Functions and how malleable these can be.

> "*Executive functions (EFs; e. g., reasoning, working memory, self-control) can be improved. Good news indeed, since EFs are critical for school and job success and for mental and physical health.*
>
> *EFs need to be progressively challenged as children improve and that repeated practice is key.*
>
> *Children devote time and effort to activities they love; therefore, EF interventions might use children's motivation to advantage.*
>
> *addressing children's emotional, social, and character development works (as do martial arts, yoga, and curricula shown to improve EFs).*

> *Children with poorer EFs benefit more from training; hence, training might provide them an opportunity to "catch up" with their peers and not be left behind."*
>
> Diamond (2012) p335

Self-esteem indicates the degree to which one sees oneself as worthy and capable. Low self-esteem leads to feeling unworthy and inadequate. Self-concepts are our own understanding about ourselves, and can be positive or negative. Attributions is how we deal with success or failure – do we see this is down to our own efforts or luck? Is this within our own control? Locus of control is our understanding that we can influence our own destiny. It is contrasted with learned helplessness, linked with depression, where it seems that nothing you can do has any impact on outcomes. Attribution theory is also linked with this, so if you do well, do you think this is down to your own efforts or to luck? If you do badly, do you think this is your own fault, or bad luck? Are you stable or variable in how you attribute success or failure? Dyslexic children and adults can be passive victims, who have difficulty in recognising their own role in success, and so our task is to help them reframe themselves to see positive aspects in their dyslexia by working to their strengths.

The impact of stress on learning is profound, given that our brains work by a combination of the two major systems, sometimes working together, sometimes in competition. The Declarative system – facts, language-based, available to consciousness, thinking - mind-based learning and the Procedural system – doing, habits, 'automatic' processes - brain-based learning. The response to stress includes the release of Noradrenaline, leading to Adrenaline rush effects and preparation for fight or flight. This manifests as an increase in blood pressure, increased blood sugar, increased fatty acids and cholesterol in the blood for energy production and increased metabolism. Stress shifts processing to the brain-based action-based procedural system – fight or flight – and indeed reduces blood supply to the declarative circuitry. So even relatively mild stress causes all of us to 'batten down the hatches' and blights any ongoing declarative learning processes. This could lead to particularly adverse consequences for dyslexic people because it shifts them from their stronger to their weaker learning system. But actually, it's a major issue for everyone – stress is the assassin of cognitive function!

In a study of situation-specific stress and dyslexia in University Students in 2015, my colleague Rod Nicolson asked Sheffield students to undertake 5 tests of reading, speed, procedural and declarative memory, first under physiological stress (with a hand in icy water) and then unstressed. The tests comprised Reading, Rapid Automatised Naming, Jigsaw, Motor Sequence Learning and Declarative Memory. As expected, under the no stress conditions the dyslexic students showed clear weakness in the reading, speed, and the two procedural conditions. As predicted

[only] under the procedural / declarative framework, the dyslexic students performed significantly better than the controls on declarative memory. However, under stress conditions, the declarative advantage was lost, and the dyslexic students had no advantages. This has clear implications for impaired performance under exam stress in dyslexia.

The effects of chronic stress can be even more deleterious, leading to General Adaptation Syndrome. The alarm reaction leads to a stress response, then the resistance phase, where the body adapts to stressors it is exposed to, and tries to reduce cortisol-induced changes. This is quickly followed by the exhaustion stage, where the immune system suffers, mental and physical resources are used up, leading to collapse or burnout.

Seligman has described the condition of Learned Helplessness based on the shuttle box avoidance task, where dogs were subjected to an electric shock following a warning tone. It was possible to escape the shock by jumping to the next compartment, and most dogs learnt to jump after the tone starts but before the shock, changing from escape to avoidance. But some dogs just lay down and didn't try to escape. It turned out they'd been inescapably shocked and had just 'learned to be helpless', which is probably associated with a 'freezing' response to threat.

Recent research indicates that these effects are mediated by gene methylation effects with long-term consequences, which maybe even inherited, so that whole families may produce a maladaptive response to stress.

In terms of dyslexia, traumatic stress and learned toxicity follow aversive experiences (which are common for dyslexics), including shame and guilt, which can lead to Post-Traumatic Stress Disorder and Phobias. For many dyslexic children, this will create an aversion to learning, leading to Learned Helplessness, Toxicity, and even the creation of a mental abscess. This occurs when repeated failure sensitises the child to their difficulties and the impossibility of dealing with them successfully. The trigger stimulus here is mental freezing creating a 'Mental Abscess' where the very thoughts of exposure, for example being asked to read aloud in class, can lead to avoidance and despair.

There is a terrible danger that this learned helplessness will not only persist as a 'mental abscess', inhibiting learning, but will also 'fester', generalising to other aspects of the school environment, so that the very thought of school will trigger feelings of learned helplessness and/or helpless rage, for which the only solution is either 'freezing' or actions such as disruption or truancy. The danger is that a dyslexic child is 'brain-washed' such that the printed word triggers a feeling of learned helplessness or rage, from which there is no escape.

SUMMARY: STRESS AND DYSLEXIA

The Stress Response is an ancient evolutionary adaptation to optimise response to threat, resulting in initiation of a 'fight, flight or freeze' response that provides a short (unsustainable) burst of rapid physical activity, together with increased safety-salient environmental monitoring. For most animals, the stress response only occurs for physically present threats or physically present predictors of threat. For humans, our declarative system allows us to imagine threats, thereby priming the stress system – and of course not having any stress release mechanism. Even mild situational stress impairs learning, causing a 'procedural shift' that biases processing away from the declarative system to the procedural, habit-based system. This might have particularly adverse consequences for dyslexic people because it eliminates their preferred processing mode – declarative - and forces them onto their weaker mode. Chronic stress has very serious consequences, leading to the 'general adaptation syndrome' and impairing learning and affect. In the case of dyslexia, We suggest that the school-specific chronic stress can lead to 'mental abscesses' that result in maladaptive 'fight, flight or freeze' responses which even excellent teaching cannot overcome.

DYSLEXIA, ANXIETY AND PSYCHIATRIC SYMPTOMS

It is hardly surprising given the stress associated with dyslexia, that a variety of psychiatric symptoms have been identified in association with dyslexia. A recent article recognising psychiatric symptoms in dyslexia (Hendren et al, 2018), identified overlaps with a range of different conditions but queried whether these conditions might themselves be a consequence rather than the cause of the reading difficulties. This study also highlighted the shared genetic etiology of these conditions, in particular ADHD, Autism and SLI, with associated anxiety and depression linked to negative experiences and family risk.

Young dyslexics are particularly vulnerable at stages of transition between schools and into adulthood. The factors involved may include the following: Loss of the concessions they had at school, access to immediate parental support no longer available, trying to hide their difficulties in a new environment, setting up new personal relationships, dealing with new timetables and subjects – don't forget that subject related vocabulary is simply a nonsense word when first encountered. Moreover, simply knowing where they should be, organising living accommodation, food and life skills can in itself be overwhelming. It would be hardly surprising if this all became too much!

Given all these difficulties stacked against them, how is it possible for children with dyslexia to succeed? Have you heard parents say 'my other children are bright' Is this fair? Research suggests that resilience and success in dyslexia are critically

dependent on having someone who believes in you. This is usually parents but could be a teacher or tutor. Greater understanding of the profile of skills, strengths and weaknesses in dyslexia can transform the dyslexic child and adult.

> *'Adults with dyslexia report that being stereotyped as stupid, mentally incapacitated, cheating, and lazy places a greater emotional burden on their lives than their language-based difficulties'*
>
> Nalavany and Carawan 2012, p70

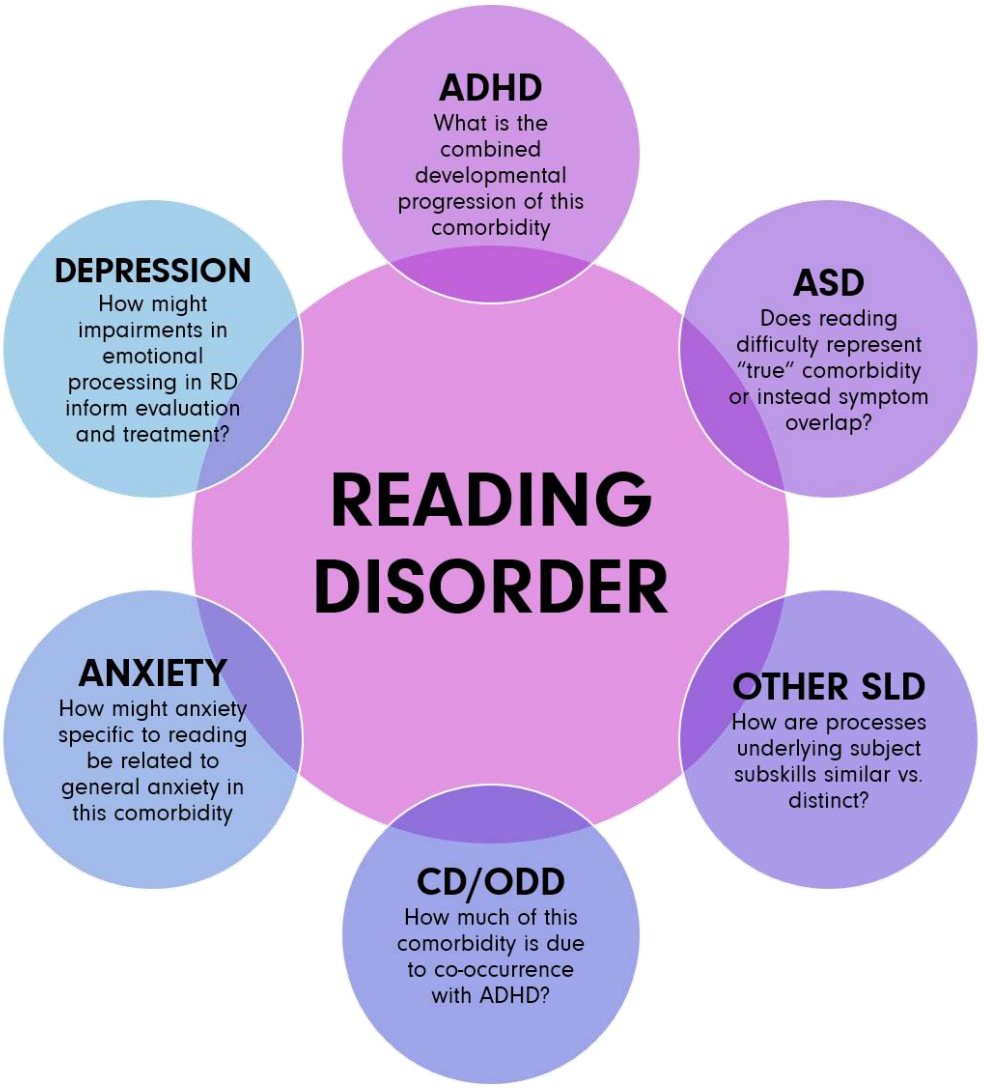

Figure 1. Overlaps between reading difficulties and psychiatric disorders.

Our responsibilities to help dyslexic children and adults are to understand the strengths and opportunities of dyslexia, to deal effectively with the weaknesses and threats, to understand that it is not a weakness to seek help, to help them recognise that they may need help throughout their lives to achieve. The secret of success is to find their 'niche', to capitalise on their strengths and to overcome or avoid their weaknesses. But we need to try to do more than this – our ultimate aim is to help dyslexic children and adults to feel better about themselves. This is the secret of success!

In 1988, Seligman identified the need for Authentic Happiness and initiated the positive psychology movement. He notes the following:

> *"[Progress in relieving disorders] has come at a high cost. … people want to do more with their lives than just to correct their weaknesses. They want lives imbued with meaning … to know how to go from plus 2 to plus 7 in your life, not just how to go from minus 5 to minus 3. If you are such a person, you have probably found the field of Psychology to be a puzzling disappointment. The time has finally arrived for a science that seeks to understand positive emotion, build strength and virtue, and provide guideposts for what Aristotle called the "good life".*
>
> Martin Seligman, Authentic Happiness, Preface

The focus for psychology has been on human pathology, or what is wrong with or lacking in people based on the inherent idea that humans are fragile and flawed. This created a "deficit bias" and a set of theories and practices that describes and explains remedies for human problems. Positive psychology is designed not to replace the existing field but to supplement it, and focuses on strengths and building the best in life! Positive experiences, individual traits and institutions. We therefore propose that rather than simply hoping that dyslexic people can overcome their difficulties, they are encouraged to engage with tasks to enhance positive experiences. Four suggestions were investigated:

1. Write gratitude letters to people who have been especially kind to you, BUT have never heard you express your gratitude. The habitually grateful among us are happier than those who are not.
2. Think of 3 good things that have happened today, and ask yourself why. This is effective long term for reducing depression but doesn't induce happiness...
3. Concentrate on thinking about yourself at your best.
4. Identify your character strengths; for dyslexia creativity, visual skills, social skills, (West, 2008), resilience determination and seeing the Big Picture (Nicolson, 2015) This has proved to be effective long term for both lower depression and greater happiness...

We need to adopt a balanced approach to strengths and weakness, to identify and empower dyslexics to work to their Signature Character Strengths, working for one's own development rather than to someone else's tune, and identify and guide toward careers involving Signature Work Strengths, building up better career advice, better diagnostic information, to acknowledge and accommodate Signature Weaknesses, and adjust the environment, and provide support for literacy in order to succeed with dyslexia (Nicolson, 2015).

Our ultimate aim, to move our dyslexic adults from languishing to thriving in the words of Kannangara (2015) a dyslexic PhD student working towards a new model of dyslexia.

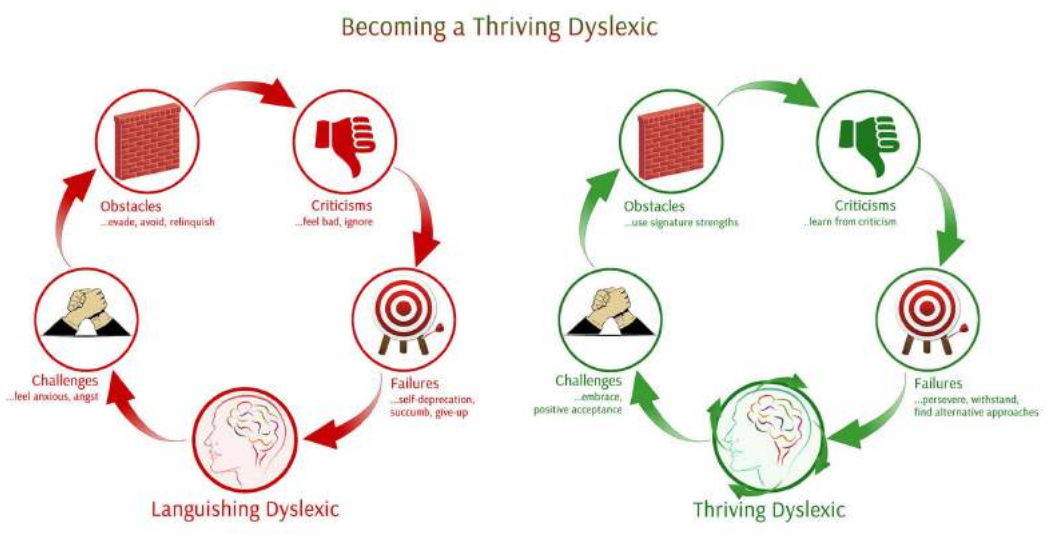

Figure 2 From languishing to thriving as a dyslexic (Kannangara, 2015)

SUCCEEDING WITH DYSLEXIA

The overarching goal for success in dyslexia is to develop significantly improved support for dyslexic infants, children and adults in an effective but cost-effective fashion. The strategic plan focuses on learning abilities as well as disabilities, working to strengths, using positive psychology as a yardstick for evaluating the cost-effectiveness of interventions. We need to blend the best of positive psychology with the best of traditional support to help people succeed with dyslexia. In the process, we can effectively break into the cycle of failure and anxiety that for too many years has characterised dyslexia, and allow dyslexics of all ages to focus on their strengths.

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Professor Angela Fawcett is a leading international researcher into dyslexia and other development disabilities, encompassing a range of theoretical and applied contributions to this field. Her approach is broad and interdisciplinary ranging from child and cognitive development to educational screening and intervention, as well as development cognitive neuroscience. She is the Vice President of the British Dyslexia Association and also the Former Chair and Director of the Centre for Child Research at the Swansea University, UK.

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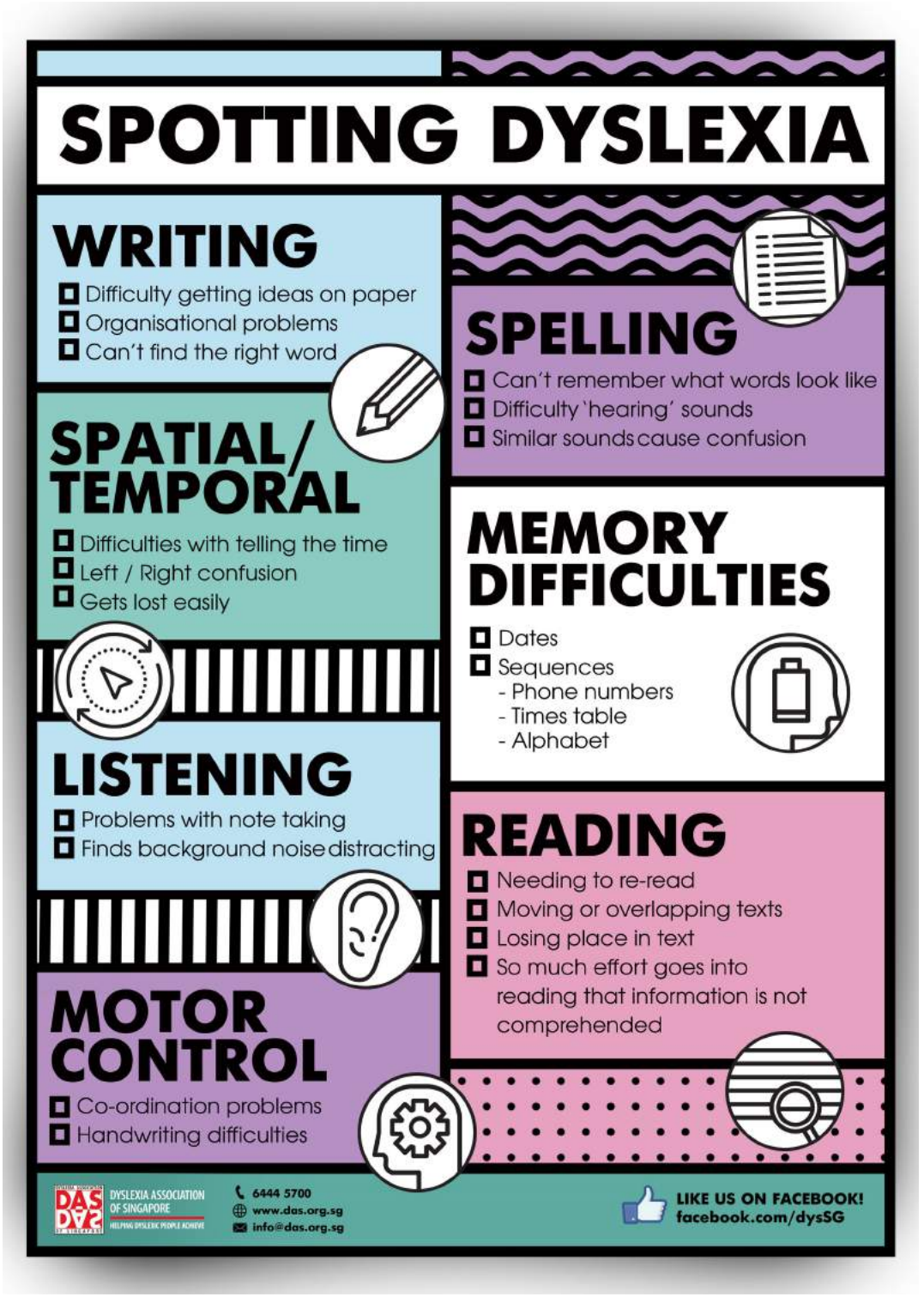
SPOTTING DYSLEXIA
WRITING
Difficulty getting ideas on paper
Organisational problems
Can't find the right word
SPELLING
Can't remember what words look like
Difficulty 'hearing' sounds
Similar sounds cause confusion
SPATIAL/ TEMPORAL
Difficulties with telling the time
Left / Right confusion
Gets lost easily
MEMORY DIFFICULTIES
Dates
Sequences
- Phone numbers
- Times table
- Alphabet
LISTENING
Problems with note taking
Finds background noise distracting
READING
Needing to re-read
Moving or overlapping texts
Losing place in text
So much effort goes into reading that information is not comprehended
MOTOR CONTROL
Co-ordination problems
Handwriting difficulties
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Indonesian Computer-based Dyslexia Early Identification System

Kristiantini Dewi[1], Helena Nurramdhani Irmanda[2], and Purboyo Solek[1]

1. *Dyslexia Association of Indonesia*
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This study evaluates a computer-based dyslexia early identification system for Indonesia that can be applied to a child as early as 5 to 7 years old, generating a report that is in line with Indonesian language. The screening method is based on completing a questionnaire – which consists of 21 questions for a 6-7 -year old child and 17 questions for children under 6 – by the parents or caregiver of the child, working with a trained counsellor, rather than an expert in the field. The expert system has been designed to bridge the bottleneck in screening and identification created by the geography of the region and restrictions on local expertise. It can be downloaded online from certain websites using a personal computer or smart phone. The result would be "Risk" or "No Risk" of dyslexia. The skills examined in the tool are as follows: children and parents' backgrounds, academic ability (oral and written language), and non-academic abilities (sequence and direction, working memory, and organization ability). The following processes are reported here; designing the instruments and the scoring methods, determining the objective of the instrument, arranging parameters, writing the questionnaires, identifying the scoring technique, determining scoring guidelines, piloting the instrument, and evaluating the final product. 105 children were evaluated following a pilot study with 52 children to check on the usefulness of the approach. The system identified dyslexia with good accuracy and specificity, comparing children with known dyslexia in special school with those identified by the expert system. The Dyslexia early identification system (DEIS) is a good and reliable tool which is valid, and can easily be accessed anywhere, as long as there is an internet connection, which is able to identify whether children have a risk of dyslexia or not in accordance with expert opinion

Keywords: dyslexia, early screening tool, Indonesia, computer based.

1. INTRODUCTION

Dyslexia is a specific learning difficulty mainly evident in language areas such as the language used for oral, written and social communication. Dyslexia causes difficulties in reading, writing, spelling, and executive function. Consequently, failure in these key skills will affect not only academic success, but also self-esteem and social-emotional development. Dyslexia cannot be cured, but the impact can be significantly reduced if identified and well intervened as early as possible (International dyslexia association, 2013). Research evidence from the USA has shown that children who do not receive the support they need in the early years may need 67.5 hours of one-to-one support in order to catch up with their year group in junior school (Torgesen, 2001). Ideally dyslexia would be diagnosed by experts, who could provide a programme of support that will allow young children to begin to reach their potential.

This has been the goal in Western countries such as the UK and the USA where a system has developed to identify and support these children, including early screening, support and response to intervention prior to formal diagnosis. However, this type of system is not yet in place in many countries in South East Asia, where considerable further work is needed to ensure that dyslexic children are not condemned to failure. Indonesia is an archipelago that consists of a scattered thousand islands, with a ratio between experts and dyslexic children that is extremely small, and consequently the provision of an expert system, based on an easily accessible computer based tool should prove both cost effective and efficient to cover the areas that the expert cannot easily reach.

Children in Indonesia start school at age 6, and undertake 6 years of compulsory schooling, before moving on to junior school. Indonesian is a transparent language, with an emphasis on the syllable, (Winskel and Widjaja, 2007), written in the same format as the English alphabet, but with a high degree of orthographic transparency. For many young children, their difficulties with literacy are compounded by the overlay of over 700 other languages or dialects. In the 1st 3 years in school, children will be taught in these native dialects, but after that, teaching will be in Bahasa Indonesian. This means that children must switch to more formal language after the age of 9 and this is particularly problematic for children with dyslexia. This in itself may contribute to the poor educational outcomes identified in Indonesia. This also means that constructing standardized tests for younger children becomes more difficult, because of the wealth of dialects spoken that would need to be accommodated. These issues are compounded by the geographical layout of Indonesia itself, which is comprised of many thousands of islands, 6000 of which are inhabited.

Expertise is largely confined to the larger cities, such as Bandung, where the Dyslexia association of Indonesia is located, and Jakarta. The authors of this paper, Dewi and Solek, pediatricians, founded the Dyslexia association of Indonesia 8 years ago, and have been instrumental in spreading awareness throughout the region, based on their extensive case histories and the founding of the Indigrow school for children with special needs. Their approach is based on observation of the child in a clinical setting, coupled with completion of a series of questionnaires and checklists, which typically take a whole day to administer.

Education in Indonesia continues to struggle with the needs of children with learning disabilities of all kinds. Recent Pisa reports (2016) showed that Indonesia fell into 62nd place, although some countries, such as Vietnam which has a similar economic profile, managed to achieve 8th position. In 2014, only 31% of children with special needs were accommodated in mainstream school, in data reported from Innovasi (2014) an ongoing project to generate local solutions in education. Research into dyslexia in Indonesia has been sparse, there are few publications in English and these were largely conducted by international researchers. In order to effect lasting change, it is important for future progress to involve local experts in the field. A study in 2012, (Wiguna et al, 2012) indicated that 24.6% of 423 elementary students in Jakarta had learning disabilities, with problems in working memory, a figure higher than that identified in most Western countries A major factor in diagnosis is that most of the standardized tests used elsewhere have not been translated into Bahasa Indonesian, although the 3rd author of this article with colleagues has been instrumental in validating the SYSTEMS-R cognitive assessment of neurological and communication impairments in children aged 4-15 in Indonesia (Harsano et al, 2016).

At the time this research was undertaken, no screening tests of this type were available for dyslexia for Indonesia, although the authors had considered how their Lexipal intervention program could be used in this context (Dewi and Solek, 2015). The need for a test of this type has been further highlighted by the recent publication of a screening battery for dyslexia in Indonesia (Jap et al, July 2017) that focuses on reading and reading related skills in line with the definition of the International dyslexia association. This test comprises 9 subtests for ages 6 and 7, including fluency of word reading and nonsense word reading, arithmetic, rapid naming, phoneme deletion, forward and backward digit span, verbal fluency, orthographic choice (spelling) and writing, in conjunction with teachers' reports. Unlike the present study, this study used a mixed sample of children, including 22 children at risk for dyslexia, a ratio of around 17% incidence, with the testing undertaken by the researchers themselves, who were international in origin. The authors note that the children used in their study may not be representative of children generally in Indonesia, in that they attended a private school and were taught in Bahasa Indonesian at this early stage rather than in local dialect.

Consequently, this screening is not yet ready to use with children attending local schools who only use local dialect in the first 3 years of schooling. Nevertheless, the publication by Jap and colleagues fills an important gap in the literature in further establishing the need for screening and support in Indonesia.

There is considerable government interest in the use of technology to improve outcomes in Indonesia, although in 2015, out of 208,000 schools in Indonesia, 118,000 had been connected to internet, whereas 17,000 still experienced a lack of electricity. The current study evaluated a computer-based dyslexia early identification system for Indonesian which is intended for use as early as ages 5 to 7 years old, even pre-school, which generates a report in Indonesian. The perspective adopted is that of the authors, pediatricians who identify dyslexia in Indonesia, based on an interest in the whole child, not just the potential school attainment of the children. Their questionnaire, therefore covers many of the pre-reading skills as well as other aspects of learning that may be impaired in these children. Included here are some aspects of dyslexia that the authors have highlighted themselves from their extensive case histories, in their contribution to the literature from this region.

In recognition of the need for a formal evaluation, the outcomes for 2 groups of children are compared: children drawn from a state school, in comparison with a group of children diagnosed previously by the experts, and re-evaluated on the expert system. It is interesting to note that a short checklist approach has been used successfully elsewhere in Asia, for example in Malaysia, with the 2011 Senarai Semak Disleksia' for teachers and parents to examine concerns and progress in literacy for Standard 1. Similarly, in India, the DALI checklists (Singh, 2015) contain 15 questions for 6-7 year olds, and 21 questions for 8-10 year olds, in Hindi, Marathi, Kannada and English, with around 75% sensitivity and specificity. Typically, checklists are used in school, but a recent study by Dewi (2018) one of the authors of the current study, has identified very low levels of understanding of dyslexia in a large-scale questionnaire survey of 1450 respondents in Indonesia, mainly female teachers aged 30-39. In this survey, 76% identified a variety of 'magic cures' for dyslexia, including swimming with dolphins, but only 24% understood the need for remediation. Moreover, around half of the respondents thought that dyslexia was associated with low IQ. Considerable further awareness is needed in Indonesia to improve provision for children with dyslexia.

In this study, the input to the dyslexia identification system is the answers to the questionnaire and the dyslexia screening results. The output of the dyslexia identification system is the identification result and screening report. The dependent variables here are the accuracy of the identification and the usefulness of the sentences generated for the questionnaire, and the independent variable is the validity of the instrument, the experts' criteria, and the dyslexia screening report.

The accuracy of identification is influenced by both the validity of the instrument and the expert criteria. The processes that have to be undertaken by the expert to diagnose dyslexia are as follows, and involve many hours of observation by highly trained personnel, typically taking a full day:

1. Collect information about the child's background, family background, and the academic and non-academic experiences at school and home.
2. Give the child's parents a recommendation to examine the child's IQ, visual, and hearing ability.
3. Observe the child's condition by assessing the child's academic and non - academic ability.
4. Analyze the observation results, to decide on the severity of the case.

Interest and awareness of dyslexia are increasing rapidly in Indonesia, based on the work of the Dyslexia association of Indonesia in their awareness programme. However, this lengthy process of diagnosis forms a bottleneck in identifying children who would benefit from early support, given the scarcity of experts and the far-flung nature of Indonesia itself.

1.1 ASSUMPTIONS

This study assumes that the inputs to the proposed system are as follows:

1. The age of children who are examined is 5 - 7 years old (preschool age).
2. Main screening inputs are questionnaire answers filled by parents based on their children's condition and the answers are assumed to be valid answers.
3. The skills examined in the main screening are as follows: background, academic and non-academic abilities. The academic abilities consist of language in oral and written communication. The non-academic abilities consist of sequences and direction, working memory, and organization.

1.2 SCOPE AND DELIMITATION

This research formulated the scope and delimitation are as follows:

1. The system is dedicated for Indonesian where there is a lack of instruments of this type.
2. The output of the main screening process is the main screening report in the Indonesian language. The main screening report consists of scoring, a brief description about the screening result (dyslexia risk or not), and recommendations for further examination.
3. The main screening report will be read by parents and experts.

2 REVIEW OF LITERATURE AND STUDIES

Historically, the study of dyslexia in the UK and the USA originated with the medical profession, notably Orton (1925) in the USA, and Critchley (1970) in the UK, with clinics within hospital environments. These practitioners and researchers focused on the whole child, rather than simply the educational manifestations of dyslexia. Over time, research moved into the field of psychology (Miles, 1983) and education, focusing primarily there on literacy and phonology (Snowling, 1987), with more recently a return to the role of neurologists (for example, Shaywitz and Shaywitz, 2005) in highlighting the role of the brain in developmental differences. This pattern has been adopted in Indonesia, where the authors have led awareness and diagnosis through founding the Dyslexia association of Indonesia, which is now celebrating 8 years of research, intervention and seminars.

Most practitioners and researchers in the field of dyslexia agree that a diagnosis can be established when the children is age of 7 years / 1st grade, because under the age of 7 years, children's problems in learning are still considered normal (Dewi and Solek, 2013). Early screening was first proposed by Badian (1982) in the USA, administering a screening battery including tests such as language, pre-academic and visuo-motor skills in kindergarten and following up these predictions 4 years later in school.

Dyslexia is primarily diagnosed through an academic field test, such as reading skill, and the common symptoms of dyslexia. Dyslexia cannot be determined based on one or two signs, but it requires a comprehensive battery of signs so that the child can be categorized as a child at risk from dyslexia. Prior to formal diagnosis, a number of screening tests are in use internationally (Fawcett and Nicolson, 1996, 2004) that can identify problems by comparing children with their peers, in order to put in place support for those children not making the expected progress.

Based on the Diagnostic and Statistical Manual of Mental Disorder (DSM-5), there are several criteria to diagnosing Specific Learning Disorder, including Dyslexia (APA, 2013). Difficulties in learning and using academic skills, as indicated by the presence of at least one of the following symptoms that have persisted for at least 6 months.

1. Difficulty in reading.
2. Difficulty in understanding the meaning of what is read.
3. Difficulty in spelling.
4. Difficulty in written expression.
5. Difficulty in mastering number sense, number facts, or calculation.
6. Difficulty in mathematical reasoning. The skills are under the level expected in relation to their age and intelligence.
7. Difficulty in learning, starting in the early school years.

In addition, there are early signs or symptoms of dyslexia that can be identified as follows:

1. A history of family members (especially siblings, father, and mother) who are late to talk, and have difficulty in learning, reading, writing in kindergarten-elementary school, but they are recognized as bright in another field.
2. Starting to talk later than 3 years old
3. Unclear articulation of many vocabulary items.
4. Difficulty in learning and recognizing rhythm.
5. Difficulty in finding an appropriate term for communicating.
6. Difficulty in recognizing the letters from the shape or the sound.
7. Stuttering or elongating words in speaking not coherent / systematic.
8. Difficulty in pronouncing particularly difficult words like "proklamasi" (proclamation).
9. Difficulty in labeling objects and colors.
10. Difficulty in recognizing numbers, especially writing the shape, often not following the general rule. For example, writing the number one from the lower to upper, writing the number eight with an unusual line, etc.
11. Difficulty in discriminating similar letters, such as:
    b', 'd'
    'p', 'q'
    'u', 'n'
    'm', 'w'
    '6', '9'
    '5', 's', 'z'.
12. Difficulty in determining right and left.
13. Difficulty in remembering something.
14. Difficult in memorizing the name of friends, teachers, or the people in their environment.
15. IQ is in the normal range or above average.

SCREENING FOR DYSLEXIA

The existence of this range of early indicators of dyslexia has led researchers internationally to propose that the most effective way of supporting children at risk of dyslexia is to provide support before children fail. There is a considerable literature internationally on this approach, with methodologies ranging from a computerized check-list (e.g. Weedon and Reid, 2012) to a full-length screening battery that can provide objective data on the performance of the children in standardized tests normed for the age group (e.g DEST 2, Nicolson and Fawcett, 2004, DST-J, Fawcett

and Nicolson, 2004). In a series of studies, for example, Nicolson and colleagues, (1999, Fawcett et al, 2001) demonstrated that 5-7 year- old children at risk for dyslexia could be identified with a screening test and their performance accelerated in reading and spelling following a 10-week intervention for 1 hour weekly. These screening tests have proved useful to address the shortage of qualified practitioners able to formally diagnose dyslexia across the world, and the cost of these assessments, as well as avoiding the dangers of waiting for children to fail.

Unfortunately, standard approaches to formal diagnosis at around age 8 and above have meant that children must fail for some years before they receive support, and this inevitably impacts on their self-esteem and motivation. This situation has been addressed in the USA with a series of studies of response to intervention, (Fuchs and Fuchs, 2006) based on screening children and providing support in the early years of school, so that they have the best opportunity to catch up with their peers.

The problems above are compounded for a country such as Indonesia, where there is an even greater shortage of skilled personnel to conduct expert assessment. The above considerations led to the design of the system devised for Indonesia. This is based on a computerized system, devised by the experts in conjunction with IT consultants, with the concept to encapsulate all the skills of the expert within a system that can be easily addressed without the need for the experts' attendance, thus eliminating the bottleneck in identifying children with problems.

The approach here follows many of the recommendations of Nicolson and Fawcett, (1997) who proposed an expert system for use in universities in the UK to deal with the range of students coming forward for assessment, to reduce the need for expert judgement. This followed on from their earlier study on the feasibility of a computerized system (Nicolson, Fawcett and Miles, 1993). The difference here is that a checklist approach is adopted, rather than more formal screening, because of an ongoing scarcity of trained experts in the field.

The proposed system works with the introduction of a new category in dyslexia assessment, the certified councillor, trained by the experts to recognise the signs and symptoms of dyslexia, in much the same way that qualified teachers are now used in the UK to share the load with psychologists in undertaking assessments. Moreover, the information on the child is provided by parents, who are currently those most likely to identify their child as potentially at risk in Indonesia, based on a lack of awareness in schools, outlined above.

3 RESEARCH METHODOLOGY

In this study, we are comparing the effectiveness and efficiency of 2 systems of diagnosis, firstly expert pediatricians, and secondly an expert system incorporating knowledge derived from these experts. In table 1 below, a comparative analysis is presented.

Table 1: The differences between expert assessment and assessment using the proposed computer based system

<table>
<tr><th>ASPECT</th><th>EXPERT ASSESSMENT</th><th>ASSESSMENT USING PROPOSED SYSTEM</th></tr>
<tr><td>Duration</td><td>More than 1 day</td><td>Shortly after completing the questionnaire</td></tr>
<tr><td>Time</td><td>The experts' office hours</td><td>Every time as long as there is an internet connection</td></tr>
<tr><td>Place</td><td>At the experts' office</td><td>Everywhere as long as there is an internet connection</td></tr>
<tr><td rowspan="4">Procedure for identifying children at risk for dyslexia</td><td>The parents and child come to the expert for consultation about the child's condition</td><td>The parents fill in the questionnaire about the child background, family background, academic, and non-academic experiences at school and home.</td></tr>
<tr><td>The experts collect information about the child's background, family background, academic and non- academic experiences at school and home.</td><td rowspan="3">The system will identify whether the child has a risk of dyslexia.</td></tr>
<tr><td>The experts identify whether the child has a risk of dyslexia.</td></tr>
<tr><td>The experts tell the identification result to the parents.</td></tr>
</table>

Table 1b: The differences between expert assessment and assessment using the proposed system with certified counsellors

ASPECT	MANUAL ASSESSMENT	ASSESSMENT USING PROPOSED SYSTEM
Procedure for identifying the severity level of dyslexia	The parents and child come to the expert for assessing the severity level of dyslexia.	The parents and child come to the certified counsellor for assessing the severity level of dyslexia
	The experts observe the child's academic and non-academic ability.	The certified counsellor observed the child's academic and non-academic ability.
	The experts administrate the results manually.	The system administrates the result automatically.
	The experts identify the child's severity level of dyslexia.	The system identifies the child's severity level of dyslexia.
	The experts write the report on the severity level of dyslexia.	The system writes the report on severity level of dyslexia.

Based on Table 1, the difference between expert examination and proposed system were the duration, the time, the place, and the number of steps involved.

Furthermore, the concept of the proposed method was divided into two stages,

1) the preliminary design and
2) the system design and implementation.

The preliminary design was aimed for the experts (in this case the authors Dewi and Solek, pediatricians specializing in dyslexia) to develop the model of assessment for identifying dyslexia. The system design and implementation described the method that was proposed and the rationale behind its choice. Finally the experiment scenario described the objective, the procedure and the variables which will be used in the experiment.

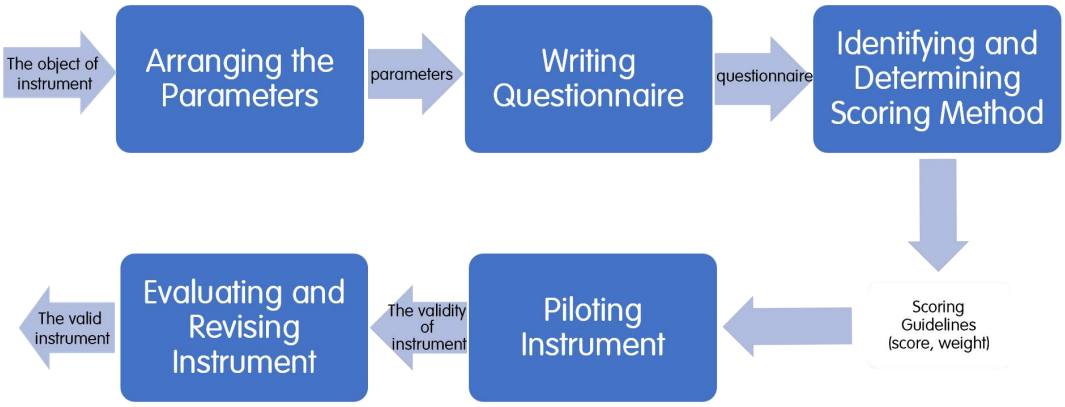

Figure 1: Designing the Instrument and Scoring Method

Based on Figure 1, there were seven processes that had to be undertaken for designing the instruments and the scoring methods. The processes were determining the objective of the instrument, arranging the parameters, writing the questionnaire, identifying the scoring technique, determining the scoring guidelines, piloting the instrument, and evaluating the usefulness of the system.

In table 2 below, some of the symptoms of dyslexia that have been identified internationally in the UK and USA are listed, with notes of their incidence within the Indonesian dyslexic population, as well as a recent publication from the UK, by Reid (2017). The pattern of difficulties commonly associated with dyslexia in school age children was first outlined by Miles, 1983, with the publication of the first screening test, the Bangor dyslexia test (Miles, 1982) which examined 10 areas of difficulty including left right, repetition, subtraction, tables, b-d confusion, and moths of the year, as well as family history in a checklist for children aged 8 and above.

However, the main criteria for diagnosis of dyslexia has typically been poor reading, based on accuracy in single word reading, and attributed to difficulties in phonological skills, that impact on segmentation and blending, as well as delays in becoming automatic in identifying graphemes and translating these to phonemes, all of which impact on both reading and spelling. A further strand of difficulty relates to speed of processing, evident in both reading fluency and in speed of naming in a series of rapid naming tasks, including everyday objects as well as letters and numbers (Wolf and Bowers, 1999).

Moreover, difficulties have been identified in rhythm and rhyme in children with dyslexia and support with these skills impacts on the development of reading (Bradley and Bryant, 1983). Another strand of difficulty relates to memory and organization, originally identified by Baddeley (1986) and more recently in issues with executive function (Diamond, 2000). Recent research has also identified problems in motor skills, attributable to the cerebellum, and evident in difficulties with speed of articulation (Fawcett and Nicolson, 2003) and speech production (Catts, 1989). There is also strong evidence for co-morbidity, with many children with dyslexia showing problems with speech and language, motor skills, and attention, as well as dyscalculia (Kaplan et al, 2001). Of course, many of these symptoms have been widely identified over the years, (see Miles, 1983) but others are based on the clinical expertise of the authors, supported by the theoretical data base on dyslexia more widely, and screening tests developed in other languages (Nicolson and Fawcett, 2004; Fawcett and Nicolson, 2004). Adopting this approach, it should be possible to compile a questionnaire that will cover a broad range of skills that have been implicated in early learning in dyslexia.

Table 2: Signs/symptoms of Dyslexia based on literature and observations

NO	SIGN OF DYSLEXIA	CITATION
1	Difficulty in writing and counting.	Dewi and Solek, 2013; Reid 2017; Miles, 1983
2	History of family members (especially siblings, father, and mother) who are late to talk, and have difficulty in learning, reading, writing in kindergarten- elementary school, but were recognized as a bright child in another field.	Dewi and Solek, 2013; Dewi, 2010; APA, 2013; IDA, 2013; Gilger et al, 1991; Miles, 1983.
3	Starting talking at the age of more than 3 years old	Dewi and Solek, 2013; Reid, 2017; Badian, 1982.
4	Articulation of vocabulary is often unclear.	[Dewi and Solek, 2013][APA,2013] [Reid, 2017]Miles, 1983
5	Difficulty in learning and recognizing rhythms / beats.	Dewi and Solek, 2013; Reid, 2017; Bradley and Bryant, 1983; Nicolson and Fawcett, 1996, 2004.
6	Difficulty in finding the right word or term in communicating such states as thick for deep, or long for tall.	Dewi and Solek, 2013; Reid, 2017; Miles, 1983; Catts, 1989; Snowling, 1987.

Table 2: Signs/symptoms of Dyslexia based on literature and observations (Cont.)

NO	SIGN OF DYSLEXIA	CITATION
7	Difficulty in knowing the shape of the letter.	Dewi and Solek, 2013; APA, 2013; Miles, 1983; Snowling, 1987; Nicolson and Fawcett, 1996, 2004.
8	Difficulty in knowing the sound of the letter.	Dewi and Solek, 2013; APA, 2013; Snowling, 1987, Nicolson and Fawcett, 1996, 2004
9	Stuttering or elongating sounds in speaking, not coherent/ systematic.	Dewi and Solek, 2013; APA, 2013; IDA 2013; Reid, 2017; Miles, 1983.
10	Difficulty in naming the object.	Dewi and Solek, 2013; IDA 2013; Reid, 2017; Wolf and Bowers, 1989; Nicolson and Fawcett, 1996, 2004.
11	Difficulty in recognizing numbers, especially writing the shape often not following the general rule. For example, writing the numbers one from the lower to upper, writing the number eight with an unusual line, etc.	Dewi and Solek, 2013; APA, 2013; Miles, 1983; Nicolson and Fawcett, 1996, 2004.
12	Difficulty in reading letters like: b, d; p, q; u, n; m, w; 6, 9; 5, s, z.	Dewi and Solek, 2013; Dewi, 2010; Miles, 1983; Reid, 2017.
13	Difficulty in determining right and left.	Dewi and Solek, 2013, Dewi, 2010; IDA 2013; Miles, 1983.
14	Forgets easily	Dewi and Solek, 2013; Dewi, 2010; Baddeley, 1986; Miles, 1983.
15	Difficulty in memorizing the name of a friend or teacher's name, or the name of the people in their environment.	Dewi and Solek, 2013; Reid, 2017; Miles, 1983.
16	IQ is in the normal range or above average.	Dewi and Solek, 2013; Miles, 1983.

Table 2: Signs/symptoms of Dyslexia based on literature and observations

NO	SIGNS OF DYSLEXIA	CITATION
17	Difficulty in following instructions	[IDA 2013; Miles, 1983
18	Appearing clumsy, and unskilled in activities that rely on motor coordination.	Dewi and Solek, 2013; IDA, 2013; Miles, 1983; Nicolson and Fawcett, 1996, 2004.
19	Difficulty in arranging days of the week or the alphabet and numbers sequentially.	IDA,2013; Miles, 1983
20	Difficulty in determining direction (left/right)	Dewi, 2010; Miles, 1983
21	Difficulty in reading or sounding unfamiliar words	Dewi, 2010; Miles, 1983; Snowling, 1987; Fawcett and Nicolson, 1996, 2004.
22	Difficulty in pronouncing similar words (misalnya: dia-ada, sama-masa, lagu-gula, batu-buta, tanam-taman, dapat-padat, mana-nama)	Dewi, 2010; Reid, 2017; Miles, 1983.
23	Poor handwriting	Dewi, 2010; Miles, 1983; Fawcett and Nicolson, 1996, 2004.
24	Short attention, when listening	IDA, 2013; Kaplan, et al, 2001.
25	Difficulty in remembering words	Dewi, 2010; Miles, 1983.
26	Difficulty in understanding the concept of time	Dewi, 2010; IDA,2013; Miles, 1983.
27	Difficulty in distinguishing vowels and consonants	Dewi, 2010]; Snowling, 1987.
28	Difficulty in determining alphabet and symbols	Dewi, 2010; Reid, 2017; Snowling, 1987.
29	Difficulty in remembering routine daily activities	Dewi, 2010; Miles, 1983.
30	Difficulty in recognizing symbols in arithmetical operations	Dewi, 2010; Miles, 1983.
31	Difficulty in defining words / terms that often appear in maths. (such as greater than, less than, equal to)	Dewi, 2010; Miles, 1983

Table 2: Signs/symptoms of Dyslexia based on literature and observations (Cont.)

NO	SIGNS OF DYSLEXIA	CITATION
32	Difficulty in recalling the day of the week	Dewi, 2010; APA, 2013; Miles, 1983.
33	Difficulty in telling the time	Dewi, 2010; Miles, 1983
34	Less interest in playing games with language sounds (eg., repetition, Rhyming)	Dewi and Solek, 2013; Miles, 1983.
35	Difficulty in learning rhyme	Dewi and Solek, 2013; IDA, 2013; Miles, 1983; Reid, 2017; Bradley and Bryant, 1983.
36	Running slowly	IDA, 2013.
37	Ambidexterity, or delays settling on one dominant hand	IDA, 2013; Miles, 1983.
38	Difficulty remembering and following directions	Reid, 2017.
39	Easily frustrated	Reid, 2017.
40	Difficulty in dressing, buttoning clothes and putting shoes on the right feet	Reid, 2017, Miles, 1983.
41	Frequently tripping, bumping into things and falling	Reid, 2017; Miles, 1983
42	Difficulty in catching, kicking or throwing a ball, and jumping rope	Reid, 2017; Miles, 1983.
43	Easy to understand a story based on the pictures thatare not related to the text book	IDA, 2013; Reid, 2017.

Based on Table 2 above, this study summarized dyslexia characteristics from several different literature bases internationally. These overall characteristics became the basis for designing the parameters to identify dyslexia.

The main screening parameters are the aspects that influence symptoms of the children at risk for dyslexia. The parameters of the main screening were the children's and the parents' background, academic ability, and non-academic ability. Academic ability was divided into four parameters: oral language, written language,

social language, and mathematics ability. Non-academic ability was divided into four parameters: organizational ability, sequence identification ability, direction identification ability, and working memory capacity.

There were two types of main screening questionnaires based on child's age, which were for children of 5 – 5.11 years old and 6 - 7 years old. Written language parameters were observed for children of 6 - 7 years old, but not for children of less than 6 years old. Therefore, for 6 - 7 years old children, there were 21 questions that had to be completed by the parents, whereas for under 6 years old, there were 17 questions.

This study checked the validity of the main screening compared with the full deep screening by experts. Each participant in the screening received a further blind assessment from the authors, experts in the field, before their results from the screening instrument were examined, in order to check the efficacy of the system. The respondents of this piloting instrument are outlined in Table 3.

In order to check the effectiveness of the current system, the True Positive (TP), True Negative (TN), False Negative (FN), and False Positive (FP) were necessary to evaluate the main screening in comparison with experts. The results of the main screening piloting are outlined in Table 3.

Table 3: True positive, false positive, true negative, false negative, and accuracy of main screening piloting

NO	SCHOOL	RESP	TP	FP	TN	FN	ACCURACY
1	Fatimah Azzahra	23	14	0	4	5	78%
2	Fithrah Insani	29	17	0	6	6	79%
TOTAL		**52**	**31**	**0**	**10**	**11**	**79%**

Based on Table 3, results from one school were ignored, because the assessment had not been done. Thus, this study only took two schools, and found that the accuracy of TK/SD nursery Fatimah Azzahra was 78%, while the accuracy of SD Fithrah Insani was 79%. Thus, the total accuracy was 79%. The main screening had

good enough accuracy when compared with lengthy expert assessment. It could be concluded that the main screening could be used to identify whether the children had a risk of dyslexia or not.

RESULTS

The main screening was run with 3 further schools, including Indigrow, a small-scale special school for dyslexia run by Dewi and Solek and colleagues. If the system devised is accurate it should identify all the children in Indigrow who have already received a full expert diagnosis, as dyslexic. In order to analyze the main screening sensitivity, specificity, and accuracy were necessary. In particular, they are used to quantify how good and reliable a test is in identifying children with risk for dyslexia. The sensitivity, the specificity, and the accuracy are described in terms of True Positive (TP), True Negative (TN), False Negative (FN), and False Positive (FP) as and it is shown in Table 4.

Table 4: Analysis of main screening sensitivity, specificity, and accuracy

NO	SCHOOL	RESP	TP	FP	TN	FN	SENSITIVITY	SPECIFICITY	ACCURACY
1	SD Fithrah Insani	46	27	2	11	6	0.82	0.85	83%
2	Indigrow	6	6	0	0	0	1	-	100%
3	SDN Nilem	53	29	0	15	9	0.76	1	83%
TOTAL		**105**	**62**	**2**	**26**	**15**	**0.81**	**0.93**	**84%**

Based on Table 4, the sensitivity of main screening in SD Fithrah Insani was 0.82, the specificity was 0.85, and the accuracy was 83%. The sensitivity of the main screening in Indigrow was 1, as predicted, but here the specificity could not be calculated because all the sample were dyslexic, and the accuracy was 100%. Meanwhile, the sensitivity of main screening in SDN Nilem was 0.76, the specificity was 1, and the accuracy was 83%. Thus, the total sensitivity of main screening in SD Fithrah Insani, Indigrow, and SDN Nilem was 0.81, the specificity was 0.93, and the accuracy was 84%.

DISCUSSION

The situation in Indonesia, based on lack of awareness within both the teaching profession and parents, the scarcity of skilled resources and the geography of this archipelago has meant that there is a premium on the services of the pediatricians skilled in assessment and diagnosis. In order to address this issue, the pediatricians, authors of this paper set out to evaluate the literature internationally on early signs and symptoms of dyslexia, refine this into a questionnaire for parents to complete, train up certified counsellors and evaluate a computer expert system that would compare the results generated with expert opinion in the full assessments previously adopted. The approach adopted is a whole child perspective on the broad range of difficulties encountered in dyslexia, based on their clinical work and the literature.

An ideal screening test would have a 100% hit rate and 0% false positive rate, so that no children were overlooked, and support was limited to those who really needed this. However, a more realistic target would be 80-85% hits and no more than 20% false positives. In fact, there is a trade-off between hits and false positives, so that it is easy to increase the proportion of hits by relaxing the 'at risk' cutoff, but this will increase the proportion of false positives. Interestingly, it is always much easier to predict those who have strengths in literacy rather than those who are at risk.

In the current study, the values of the sensitivity represented the probability of the main screening test identifying children that had a risk of dyslexia. The higher sensitivity, the less likely the test returns false-positive results. From Table 4, the highest value of the main screening sensitivity was obtained from Indigrow. This condition occurred because there was no false negative (FN) cases, as predicted, given that all the children had received a previous expert diagnosis of dyslexia. Satisfying this criteria is a major issue in research, in that any system that failed to identify children known to be dyslexic has to be flawed.

In terms of the 2 test schools, the value of the main screening sensitivity from Fithrah insani was higher than the value of main screening sensitivity from SDN Nilem, because the number of false negative (FN) cases in SDN Nilem was higher than the number of false negative (FN) cases in SD Fithrah Insani. The number of false negative (FN) was still high because based on analysis between parents' answers in the main screening and the experts' observation during the assessment, the parents were not always totally aware or open about their childrens' difficulties. Furthermore, the sensitivity from all samples was 81%, This meant, by conducting the main screening test on a child at risk for dyslexia, there was an 81% chance, the children would be correctly identified as at risk for dyslexia. This compares favourably with

the results from the DALI checklists in India (Chatterjee, 2015) with 75% sensitivity and specificity.

What are the implications here of the high number of false negatives? It must be remembered that in Indonesia as a whole knowledge or awareness of dyslexia is in its infancy and most teachers have little familiarity with the syndrome or its symptoms. Consequently, risk for dyslexia is more easily identified by parents who have been familiarized with these concepts, and may even have experienced these difficulties themselves. Naturally, not all parents are aware of the expected performance of the child for the 5-7 year-old age group, and this means that the results are likely to be less than perfect. Moreover, it is likely that there is still some stigma involved, based on misunderstanding of dyslexia as a form of mental retardation, which may make parents reluctant to label their child as having difficulties. It is likely therefore that prediction in these cases will be less than perfect.

The numerical value of the specificity represented the probability of the main screening test identifying children that did not have a risk of dyslexia. From Table 4, the highest value of main screening specificity was obtained from SDN Nilem. This condition occurred because there were no false positive (FP) case. Meanwhile, from SD Fithrah Insani, there were 2 false positive (FP) cases, meaning that the children were identified to have a risk of dyslexia by the main screening, but identified to have no risk of dyslexia by the experts. The false positive (FP) case was also observed by the deep expert screening. Many researchers, however, argue that false positives are not too much of a problem, in that some early extra support will help children with difficulties, whether or not they are dyslexic. Therefore, false positives in this instance may be less important.

The value of main screening specificity from Indigrow could not be calculated because all sample were dyslexic, but this provides a yardstick against which to compare the other 2 schools. Overall, the specificity of a main screening test from all samples was 93%. It meant when the main screening was conducted on a child without risk of dyslexia, there was a 93% chance, the children would be identified at no risk of dyslexia. The main screening had good enough sensitivity and good specificity in terms of international standards. Thus, the main screening could be used as the assessment to identify whether the children had a risk of dyslexia or not.

In addition to the accuracy, the sensitivity, and the specificity, this study used a Receiver Operating Characteristics (ROC) analysis. The ROC space depicted whether the diagnostic classification was good or not. Before the ROC was analyzed, the true positive rate (TPR) against false positive rate (FPR) had to be measured. The TPR of the main screening was 0.81, and the FPR was 0.071. The ROC curve is depicted below in Figure 2.

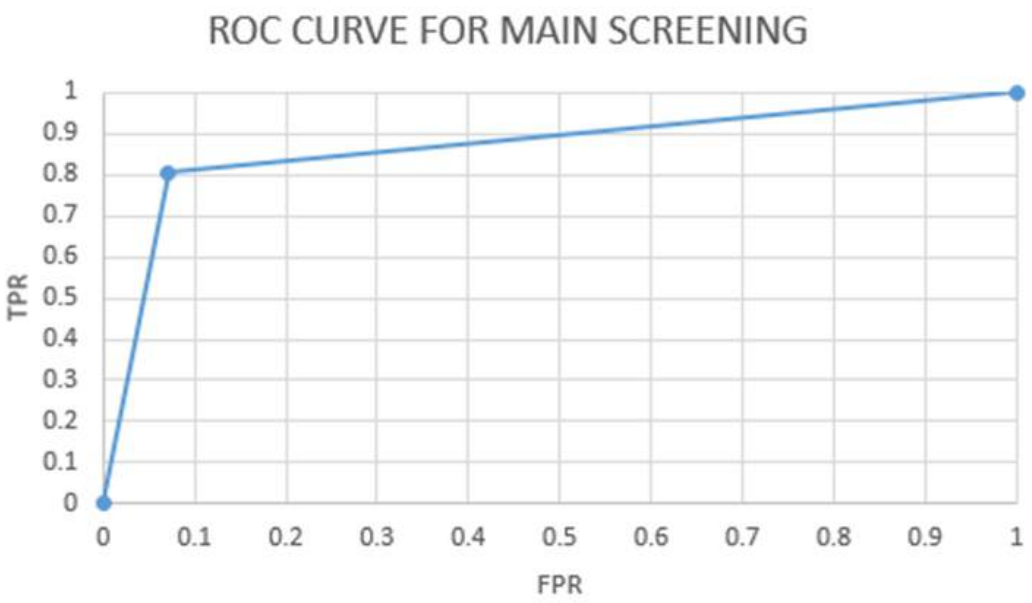

Figure 2: ROC Curve for Main Screening

Based on Figure 2, the area under the ROC curve (AUC) provided a way to measure the accuracy of the main screening test. The larger the area, the more accurate the main screening test was. The AUC was trapezoid. Thus, with the formula to measure the trapezoid area, the AUC was 0.87. According to Table 3, the main screening test had good accuracy. It could be concluded that the main screening questionnaire could be used to identify whether a child had a risk of dyslexia or not. This condition occurred because:

1. The instruments that were used were valid. This study had run the piloting process 5 times. After piloting, the evaluation process had been done according to expert guidance. Based on the evaluation, the instrument was revised.

2. The instrument used a simple sentence structure such that it was easily understood by the parents.

3. Dyslexia has a varied spectrum, each child might have different signs and symptoms, in addition to the core issues. This study was not only assessed based on the total score, but also on each of the aspects, to provide an individual profile for each child to inform remediation.

LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH

The system developed in this study enriches provision in Indonesia, a region where dyslexia awareness is growing fast, based on the work of the authors and their colleagues. It is clear that a system designed to take the role of the expert would be beneficial, given the constraints on availability of expert support and guidance in this region.

The system as it currently stands cannot ascertain the overall cognitive ability of the children taking part. In this context, dyslexia is usually diagnosed in children with an IQ in the average range or above. However, most screening tests do not attempt to provide a measure of intelligence, and therefore this system should be seen as a first stage in a lengthier diagnostic process, that may follow on from attempts to remediate the deficits, in a response to intervention paradigm.

Furthermore, there are limitations in using parents to evaluate their children, as discussed above, with more specifically the assumption parents will provide valid answers, but in the current situation it is likely to present the best outcome available. However, as knowledge and awareness of dyslexia grows throughout Indonesia, it is likely that a similar approach could be adopted by teachers, who could complete the questionnaires on early school progress to identify those children who may previously have been overlooked.

In future research, the outcomes for children should be evaluated, once they have been identified by this system and have received support via Lexipal, the computerized system devised for Indonesia by the authors.

CONCLUSION

The Dyslexia early identification system (DEIS) consists of a main computer-based screening that can be accessed anywhere and anytime, even via your mobile phone. Based on the results of several experiments, testing, and analysis, this study concluded that the main screening is able to identify whether the children have a risk of dyslexia or not, in line with expert opinion. Further research is needed to build on the capabilities of this system, but it represents an important contribution to the field, notably in a region where expertise is restricted, thus creating a bottleneck in the further development of dyslexia screening and support.

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UnITE SpLD 2018 CONFERENCE

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UnITE SpLD 2018 Conference Presentation Abstracts

Asia Pacific Journal of Developmental Differences
Vol. 5, No. 2, July 2018
Abstracts originally published in the above Journal

Technology Advancing Education

Geetha Shantha Ram
Dyslexia Association of Singapore

Abstract

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

Keywords: Education Technology, SpLD, dyslexia

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

Mary Lee Lay Choo, Susan Rickard Low, Elizabeth J. Teh
National University of Singapore

Abstract

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

Keywords: Language Development; Early Intervention; Assessment Tools

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

Wong Meng Ee[1*] **and Deborah Chua**[1]
National Institute of Education, Nanyang Technological University

Abstract

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

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

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

John Everatt
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Abstract

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

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

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

Angelica Benson and Andy Russell
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Abstract

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

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

Also Presented as a Poster

Madras Dyslexia Association (MDA) - a 25 years journey

D Chandrasekhar
Madras Dyslexia Association, India

Abstract

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

Keywords: MDA Evolution Meeting challenges Multilingual Volume

Effectiveness of Reading Comprehension Instruction for Primary School Learners with Dyslexia

Chen Fang-Ju and Lilian Yue
Dyslexia Association of Singapore

Abstract

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

Keywords: Chinese, Reading Comprehension, Structured Literacy

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

Suvarna Rekha Chinta and Bipin Indurkhya
Madras Dyslexia Association, India

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

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

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

Maria De Palma, Uma Kulkarni, Maureen W. Lovett

1. The Hospital for Sick Children, Canada
2. Anjali Morris Foundation (AMF), India
3. University of Toronto, Canada

Abstract

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

Keywords: scaling up; global partnership; literacy; reading; struggling readers; evidence-based intervention

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

Vilasini Diwaka, Mala Raju Natarajan
Madras Dyslexia Association

Abstract

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

Keywords: Specific Learning Disabilities, Remedial Centre Mainstream, Inclusion

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

Angela Fawcett[1*]
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Abstract

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

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

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

Sharyfah Nur Fitriya
Dyslexia Association of Singapore

Abstract

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

Keywords: preference, on-task behaviour, attentiveness, active engagement, classroom setting, inter-observer agreement (IOA), attentiveness hyperactivity disorder, dyslexia

Effect of Exposure on self esteem of Dyslexics

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Madras Dyslexia Association, India

Abstract

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

Keywords: Self esteem of Dyslexics

Speech, Language and Communication Needs - Case Studies

Lee Er Ker, Ho Shuiet Lian, Elizabeth Lim and Sharon Reutens
Dyslexia Association of Singapore

Abstract

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

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

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

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

Keywords: Speech and Language Intervention

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

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Abstract

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

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

The Development of Education for Students with Learning Disabilities in Taiwan

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Abstract

In Taiwan, the child with Learning Disabilities had been provided the special education service acted by the Special Education Regulations in 1977. The term, learning disabilities, is a broad term used to define the child who exhibits significant learning difficulties in one or more of these areas: listening, speaking, reading, writing or calculation. The current definition and identification was required in the Regulation of Students with Disabilities and Giftedness by the Ministry of Education in 2013. The education for the students with learning disabilities has been developed for 40 years.

The Ministry of Education in Taiwan has been publishing national statistics pertaining to special education annually since 1999. Those data come from the national Special Education Transmit Net that collects special education related information across the whole country. This report will present the tendency analysis with the incidence rate, education placement, gender and related issues for the students with learning disabilities in Taiwan.

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

Music Teachers and Dyslexia: Perceptions, Understanding and Observations

Mary Mountstephen
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Abstract

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

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

Going Beyond Instructional Technology Integration Models in Instructional Designs with EdTech

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

Keywords: technology integration

Case Management Discussion - Supporting Challenging Learners

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Dyslexia Association of Singapore

Abstract

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

Keywords: behaviour difficulties, dyslexia, attention deficit hyperactivity disorder (ADHD), specific language impairment (SLI), dyspraxia, dysgraphia, sensory processing, auditory processing

Phonological processing skills for typical and atypical readers in Singapore

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Abstract

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

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

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

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Abstract

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

Keywords: Reading in English Language, SMARTER*phonics

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

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Abstract

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

Keywords: special needs, constructivist-oriented teaching and learning

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

Eleonora Palmieri and Crispiani Piero
Victor Center Macerata , Italy
Macerata University, Italy

Abstract

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

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

A Stitch in Time

Gowri Ramanathan and Sanskruti Shah
Madras Dyslexic Association, India

Abstract

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

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

Keywords: Early intervention, holistic development.

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

Harini Ramanujam and Meenakshi Sriram[1]
Madras Dyslexia Association , India

Abstract

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

Keywords: Full time Pull out centre

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

Nor Ashraf Bin Samsudin and Geetha Shantha Ram
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Abstract

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

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

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

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

Emilyn See and Joanne Tan
Dyslexia Association of Singapore

Abstract

The effectiveness of sequential, cumulative and multisensory intervention programmes on learners with dyslexia has been proven in multiple academic literature. This study serves as a follow-up on a previous research which explored the classroom practices of the English Exam Skills Programme (EESP). In comparison between students with dyslexia and a control group, the study found significant progress in their grammar, vocabulary and comprehension components of their English examination paper after intervention.

Aligning with Universal Design for Learning (UDL) framework, the EESP is postulated to benefit all learners, including struggling learners with or without a diagnosis of SpLD or any learning disorders, and are scoring below 65% in their school English Language examination papers. This study seeks to investigate the possible effectiveness of the EESP on a group of struggling non-dyslexic learners after a 20-week intervention.

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

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

Priscillia Shen
DAS Academy, Singapore

Abstract

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

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

Fumie Shibuya and Akira Uno
University of Tsukuba

Abstract

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

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

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

Siti Aishah Shukri and Sathi Manon
Dyslexia Association of Singapore

Abstract

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

Keywords: non-dyslexic, maths, intervention, remediation, primary school learners without dyslexia, struggling learners

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A Qualitative Study of Collaborative Practices between Allied Educators and Teachers in Mainstream Primary Schools

June Siew
DAS Academy, Singapore

Abstract

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

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

Parent Advocacy - A Success Model

Tina Tan
Society for Promotion of ADHD Research and Knowledge, (SPARK) Singapore

Abstract

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

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

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Evaluating the MOE-Aided DAS Literacy Programme

Tan Wah Pheow, Lois Lim, Winston Quek, Pearllyn Kang and Lee Yong Jun
Temasek Polytechnic and Dyslexia Association of Singapore

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

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

Deborah Tan Wen Li and Liu Yimei
Dyslexia Association of Singapore

Abstract

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

Keywords: Dyslexia, subtypes of dyslexia, cognitive factors

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

Serena Tan
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Abstract

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

Keywords: Dyslexia, Reading comprehension,

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

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Abstract

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

Strategies shared will include:

- Teaching decoding of single-syllabic and multisyllabic words to youths who experience a great deal of frustration in their learning and who need to see quick success
- Touching the chords of their heart
    - - motivating learning through music
    - - building alliteration and semantic fluency via rhythm
    - - teaching decoding and reading using music
- Working with students with poor working memory
    - - teach students to remember information by:

  a) getting them to use drawings to create meanings for themselves
  b) teaching them to learn via association
  c) helping to develop their access skills using mnemonics and stories
  d) explicitly teaching chunking skills
- Use of assistive technology

Keywords: .Low language, low literacy, youths

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

Weng Yiyao
Dyslexia Association of Singapore

Abstract

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

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

Our Literacy World: The Preschool Class at DAS

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Dyslexia Association of Singapore

Abstract

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

Keywords: Preschool, workshop, intervention

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

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Abstract

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

Keywords: Memory Games

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

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Abstract

The purpose of this study is to clarify the effects of different types of Japanese font on reading performance in Japanese speaking children with developmental dyslexia.

Methods : Participants included 36 children with typical development and 23 children with developmental dyslexia from fourth to sixth grades elementary school student. We conducted rapid reading tasks and hearing of the introspectiveness. In this study, we used four kinds of stimuli: two scripts (paragraph and kana non-words) by two font types (Round-Gothic and Mincho style font). We asked participants to "read the words and paragraph as fast as you can without making mistakes". We analyzed duration time of reading, number of errors and self-corrections. After the reading tasks, participants were required to answer which font type was easy to read.

Results : Typical development and developmental dyslexic group did not show significant differences in duration time of reading, number of errors and self-corrections between two types of font. On the other hand, the answer in subjective readability from the group with developmental dyslexia showed significant differences and children with developmental dyslexia had impression that Round-Gothic as the font easily to read.

Discussion : In this study, Round-Gothic and Mincho style fonts did not improve reading performance for children with dyslexia. However, Round-Gothic style font tended to be recognised "readable font" subjectively by children with developmental dyslexia. Our results suggest that subjective readability for the Round-Gothic style font contribute to reduce mental burden of reading among children with developmental dyslexia.

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

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

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Abstract

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

Keywords: risk factor, expressive language

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

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Abstract

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

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

How I guide a child with language development delay

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Abstract

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

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

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

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

Keywords: Reading, Writing, Language Development Delay

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

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Abstract

The use of interactive screen media such as televisions, smartphone and tablets by young children is increasing rapidly. The American Academy of Pediatric (AAP) recommends that children ≥ 2 years of age should have < 2 hours of screen time per day and that children< 2 years of age be discouraged from television watching. Recommendations for use by toddlers are crucial, because effect of screen time are potentially more pronounced in this group. Therefore, need to identify screen time factors that may have impact on language development. This study investigated the association between children's exposure screen time and expressive language delay. The source of data was collected in Zainab Hospital during 2017. The subjects of this study were children with expressive language delay. In addition, normal children were used as control subject. Linguistic ability were reviewing by language Milestone and Denver II, The data were analyzed by chi-square test. Odds ratios and 95% confidence interval were presented.

There were 24 boys and 19 girls; mean 41,8 ± 12,108 month of the case group and 17 boys and 14 girls, mean 36,45 ± 12,129 month of the control group were enrolled. Children with ≥ 3 hours screen time had around 3.2 times (OR 3,167 95% CI: 1.139-8.806) more risk of expressive language delay. Children with expressive language delay spent more time screen time than normal children (3,61 ± 0,0609 hours/day vs.2,00 ± 0,949 hours/day; p= 0,025). Conclusion: children had screen time more than 3 hours /day were approximately 3,2 times likely to have expressive language delay than normal children.

Keywords: screen time, expressive language delay

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

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Abstract

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

Keywords: special needs, constructivist-oriented teaching and learning

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

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Abstract

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

Keywords: expressive language delay, risk factor

Developing A Dyslexia – Friendly Environment in classroom

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Abstract

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

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