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## An Online Survey Research Regarding Awareness of Dyscalculia among Educators in Sandakan District, Sabah

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### Abstract

In Sabah, it was reported that the prevalence rate 5.5% of the primary school students in Sabah suffered from Dyscalculia using the computer-based Dyscalculia screener by measuring pupils' response accuracy and response time to test items (Wong et. al., 2014). This research probes into the awareness of Dyscalculia among educators in Sandakan district, Sabah. An online Dyscalculia questionnaire is employed in this study to collect the relevant data which will be analysed by using the descriptive statistics. The purpose of this paper is to report the results of awareness for Dyscalculia which involved 80 educators from different primary schools in Sandakan, Sabah. The results show that 57.5% of the respondents in Sandakan do not know Dyscalculia.

**Keywords:** Dyscalculia, Awareness, Primary, Pupils, Educators

### Introduction

Mathematics can be a very interesting and fun subject for those learners who can really enjoy their learning. On contrary, mathematics can also be a frustrating subject for many children who have problems with computation and application (Chinn, 2004).

Dyscalculia is one of the learning difficulties that pupils may encounter like Dyslexia, Dyspraxia but rarely it is known by teachers and parents (Henderson, 2013). Some of the young learners cannot recognise numerals, cannot make sense of number and face difficulties to connect relationship with the number magnitude (Bird, 2013). Dyscalculic pupils may face some routine problems in their daily life. For instance, they cannot identify numbers, counting backwards and counting in steps, difficulty in understand direction, confusion over left and right, cannot perform the simple arithmetic for money exchange and read the time on the clock. Yet, this inability may influence their future life because when they grow up, they will be the part of this community and they also need to deal with numbers in their routine life like buying goods, reading time and date and as a consequence, it becomes a barrier for them in getting a good job in their future (Chinn, 2015). Therefore, it is important for educators, psychologists and

neuroscientists to assist them to master the basic skills and knowledge of mathematics so that they can utilise them to cope with this inability and subsequently to make sense of simple mathematics in their daily life.

### Literature Review

According to the Malaysia community welfare official website, learning difficulty means problem-related to intelligence that is not consistent with the biological age. Those who fall into this category are known as Late Global Development, Down syndrome and intellectual disabilities which include Dyscalculia. Dyscalculia pupils behave similarly like a normal child except in learning mathematics. Butterworth et al (2011) stated that dyscalculic pupils can read well, behave well in their classroom and even active in other lessons provided they have no comorbidity with dyslexia and Attention Deficit Hyperactivity Disorder(ADHD). But when they come across to mathematics lessons, they will feel unsafe, anxiety and try to avoid from mathematics lessons. This is because they cannot make sense of numbers. As suggested by the Taiwanese scholar (Ko, 2005), operational dyscalculia pupils tend to calculate using their own fingers rather than retrieving basic facts of mathematics. This is the reason why dyscalculic pupils will consume more time to solve mathematics problem if compare with their peers without any dyscalculia symptoms. Additionally, dyscalculia pupils face difficulties in understanding and applying the basic mathematics concepts to solve problems. More specifically, dyscalculia pupils will count with fingers and nod their heads and use more time to count if comparing with their peers, their speed of calculation will only increase slowly after a short period of intervention, they may not solve mathematics problems with different types and patterns. The respondents of his research are pupils without comorbidity with dyslexia, Turner syndrome, finger agnosia and Gerstmann syndrome.

Haddad (2009) defines that children with dyscalculia have difficulties learning the most basic aspect of arithmetic skills. The difficulty lies in the reception, comprehension, or production of quantitative and spatial information (the physical location of objects and the metric relationships between objects). Children with dyscalculia may have difficulties in understanding simple number concepts, lack an intuitive grasp of numbers and have problems learning number facts and procedures. Dyscalculia is in some ways like “dyslexia for numbers.” Very little is known about the prevalence of dyscalculia, causes or treatment. Most children with dyscalculia have cognitive and language abilities that are well within what is considered the “normal” range. They may excel in non-mathematical subjects.

In Sabah, it was reported that the prevalence rate 5.5% of the primary school students in Sabah suffered from Dyscalculia by using a computer-based Dyscalculia screener by measuring pupils’ response accuracy and response time to test items (Wong et al., 2014). It is paralleled to Emerson et al (2010) statement that about 5 percent of school-age children have dyscalculia. In other words, at least one pupil is suffering from dyscalculia in every class of 30 children based on probability (Hannell, 2013). Also, the result is consistent with Thompson (2017) which reported that the prevalence about 5% of pupils have dyscalculia. Therefore, it clearly showed that this group of pupils who have dyscalculia is not extremely rare.

Hudson & English (2016) stated that dyscalculia is discovered equally in genders. It was supported by Wong et al (2016) that there was no significant gender difference in prevalence rates of dyscalculia, but there was a significant difference between low achievers in urban and rural school. Pupils with dyscalculia may master some numeracy skills and succeed in their future life with effective teaching. Hudson & English (2016) pointed out that dyscalculia pupils may encounter problems such as unable to recognise numbers, confuse with similar Arabic digit 3 and 8, cannot compare numerosity, cannot do mental arithmetic, difficult to memorise and recite times table and so on. Karagiannakis and Cooreman (2014) have categorised four subtypes which are known as core number, reasoning, memory and visual-spatial.

Hudson & English (2016) indicated that teachers should be sensitive, understanding and supportive to those pupils with dyscalculia and not think they are stupid or lazy. Hornigold (2015) suggested that abstract concepts such as place value and number lines need to be taught gradually using concrete materials and pictorial representations then shift to abstract representations for the dyscalculia pupils. In accordance with what is right, it is essential for educators or teachers to be aware of dyscalculia in order to suit the pupils' learning needs in their classrooms. However, recently, a quantitative research showed that only 45.2% of the educators in Rio de Janeiro reported did not know what dyscalculia is. Only 12.9% believed they can identify signs of dyscalculia (Dias et al., 2013). In addition, a qualitative case study research indicated that the teachers did not have proper conception on learning disability and dyscalculia in India. The interviews data indicated that the teachers did not know the term 'dyscalculia' and the educators had limited knowledge of the characteristics of dyscalculia and feel insecure dealing with this disorder (Adhikari, 2014). Therefore, this research is significant to identify the level of awareness of dyscalculia among educators in Sandakan district, Sabah, Malaysia.

### **Method and Procedure**

A survey research design was chosen to investigate the awareness of Dyscalculia among educators in Sandakan district, Sabah. The research question of this study is do the teachers in Sandakan District know about Dyscalculia? There were 80 respondents who were educators of Sandakan district involved in this study. The instrument used in this study was an online based questionnaire built as Google form and the researchers shared the website link of the Google form to the participants.

### **Finding**

This paper aims to study the awareness of dyscalculia among the educators in Sandakan district. There were 80 respondents in this survey and 75% of the respondents were female and 25% were male. The age group distributions showed that 50% of the respondents were in the range of 31-40 years old, 28.7% within 41-50 years old and 21.3% within 21-30 years old. Most of the respondents were academic teachers and this comprised of 83.8% of the respondents, 12.5% were remedial teachers, 2.5% were FasiLINUS (FasiLINUS is a new position in district education office who handle the literacy and numeracy programme in district level) and others 1.2%. Regarding the teaching experience of the respondents, 27.5% of the respondents had teaching experience less than 5 years, 33.8% of the respondents not more than 10 years, 36.3% of the

respondents not more than 20 years and only 2.5% less than 30 years of teaching experience. From the perspective of academic qualification, 73.8% of the respondents were bachelor degree holders, 21.3% diploma holders, and 2.5% respectively for certificate holders and master degree holders. Regarding the specialisation of the respondents, 21.3% were majoring in mathematics education, 18.8% majoring in Bahasa Malaysia, 7.5% majoring in science education, 3.8% majoring TESL and the rest 48.8% majoring in various subjects.

The results of first item (i.e. Do you know what dyscalculia is?) showed that 57.5 % (47 respondents) of the respondents responded "NO" for this item whereas 42.5% (34 respondents) responded "YES". Then this 42.5% of the respondents will proceed to item 2 (i.e. if yes, can you describe dyscalculia?). Even though 34 respondents responded YES for item 1 but only 30 of them gave the descriptions as Table 1 below.

<b>BIL</b>	<b>Response:</b>	<b>Comments</b>
1	Difficulty in learning arithmetic.	counting problem
2	Mathematics problems	Difficulties in learning
3	Maths learning disabilities	maths
4	tidak sempurna dari segi fizikal atau mental	Disability
5	Anxiety Of mathematics	Disability
6	Kegagalan	Anxiety
7	calculate problem	failure
8	Cannot count	counting problem
9	Ketakutan dengan matematik	counting problem
10	Difficulty reading analog clocks, Difficulty stating which of two	Anxiety
11	numbers is larger	Recognition problems
12	Weak in mathematic	Weak in mathematics
13	Hard to make sense of maths concept.	Difficulties in learning
14	Difficult to understand math/ arithmetic	maths
15	Learning problem	Difficulties in learning
16	Ketidakmampuan belajar dalam matematik	maths
17	Difficulty in learning or comprehending arithmetic	Difficulties in learning
18	Having problems in calculating	maths
19	weakness in calculation and arithmetics	Difficulties in learning
20	Dyscalculia is a brain-based condition that makes it hard to make sense of numbers and math concepts	maths
21	Pupils cannot counting with fingers	Difficulties in learning
22	Tidak dapat mengenal nombor	maths
23	Problem with number and calculating	counting problem
24	Masalah berkaitan nombor	counting problem
25	It's about Mathematics problem.	Disability
26	Have difficulty to count n identify number	Finger agnosia
27	Masalah berkaitan nombor dlm matematik..	Recognition
28	Problem recognise no	Counting problem
29	Cannot identify numbers	Mathematic problem
30	Tidak mampu menguasai angka	Mathematic problem
	Problem in mathematic	Counting problem
		Mathematic problem
		Recognition
		Recognition
		Recognition
		Mathematic problem

Table 1: Description about dyscalculia

We categorised the respondents' descriptions of dyscalculia into a few categories as shown above. 3 of them described dyscalculia as a disability, 7 of them described dyscalculia as a kind of counting problem, 5 of them described dyscalculia as difficulties in recognising number, 4 respondents described dyscalculia as problems in mathematics (4/34), 6 respondents described dyscalculia as difficulties in learning maths, 2 respondents conceived dyscalculia as mathematics anxiety, 1 respondent conceived dyscalculia as failures in mathematics, 1 respondent described dyscalculia as finger agnosia and 1 respondent described dyscalculia as weak in mathematics.

The third item was about the exposure of dyscalculia which asked: "Was the topic of dyscalculia discussed during your teacher training programme in college?" It is discovered that 72.5% of the respondents responded negatively and only 27.5% of the respondents had exposed to the dyscalculia topic in teacher training colleges. Item 4 of the questionnaire asked, "Was the topic of dyscalculia discussed during your continuous professional development course?" The results were almost same with the previous item, there were 78.8% of the respondents claimed that dyscalculia was not discussed in their continuous professional development courses. Only 21.3% admitted that they had discussed the topic of dyscalculia in their continuous professional development courses. Yet, there were 62.5% of the respondents indicated that dyscalculia was just another name for mathematics anxiety and 37.5% respondents did not agree with the statement of item 5.

The following item asked "Which of the following can be signs of dyscalculia?" and it was a multiple choice item, 7.5% of the respondents stated that the difficulty of telling left from right is the sign of dyscalculia, 20% of them pointed out that the difficulty of remembering phone numbers is the sign of dyscalculia, 5% responded that the trouble of keeping track of time was the sign of dyscalculia and 67.5% of them indicated that all of the above-mentioned symptoms were the signs of dyscalculia. It was interesting to note that 66.3% of the respondents stated that dyscalculia was extremely rare among children and 33.8% of them did not agree with the statement.

Item 8 asked, "which of the following terms for dyscalculia are you most likely to hear in your child's school?" 56.3% of the respondents explained as a specific learning disability in mathematics, 31.3% responded as mathematics dyslexia, and 12.5% responded as mathematics disorder. Item 9 stated, "There's no surely test to diagnose dyscalculia." Respondents are required to answer YES or No for this item. 50% of the respondents stated that there was no confirmatory test to diagnose dyscalculia. Item 10 asked "Kids outgrow dyscalculia. Yes / No". Almost two-thirds of the participants (61.3%) said that kids outgrew dyscalculia and 60% of the respondents claimed that signs of dyscalculia didn't show up until they started their school. The majority who responded (90%) to this item admitted that they never encountered situations during their professional career that made them suspected a dyscalculia. Only 8 out of 80 respondents answered the item which asked: "If yes, what was your conduct?".

**See Table 2 for their responses to this item.**

Nothing
Basic Drilling
I did assessment through special instrument to identify and make sure that child was dyscalculia
Drilling.
Let the pupils start from the basic with involvement of teaching materials
Continuous/repeat exercise to overcome his problem
Keep on learning with different methods
Bimbing murid dengan penuh kesabaran
<b>Table 2: Response for further action when the respondents suspected a dyscalculia</b>

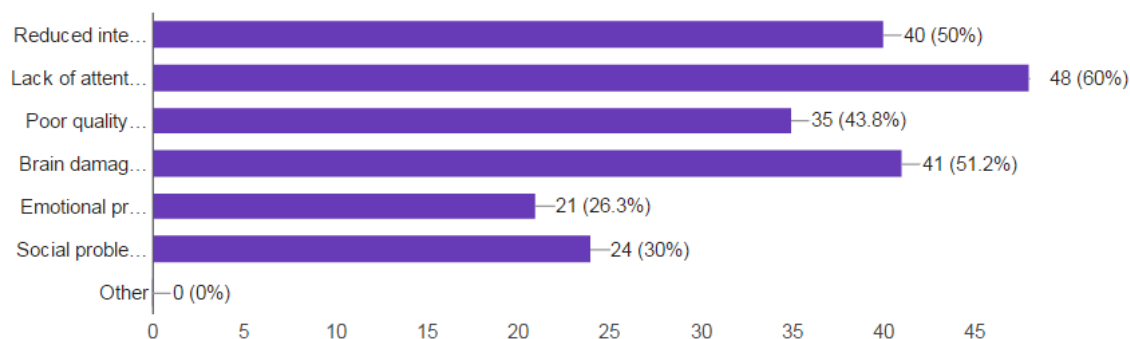


Surprisingly in analysing the item which asked “Do you think that you are able to identify a child with dyscalculia in your class?”, there were 70% of the respondents perceived that they were able to identify a child with dyscalculia in their class. Over half (55%) of them responded that a pupil with dyscalculia always had dyslexia. 58.8% felt that a pupil had difficulties in measurement could be dyscalculia as well. Interestingly, a majority of the respondents (82.5%) felt that a pupil who had difficulty in sequencing elements could be dyscalculia.

The following analysis (see Table 3) is the cause of dyscalculia, the table below showed that 40 out of 80 respondents felt that reduced intelligence was the core cause, 48 respondents indicated that the lack of attention was one of the causes, 35 of them claimed that poor quality teaching was a cause, 21 respondents conceived that emotional problems may lead to dyscalculia and 24 respondents pointed out that social problems may affect dyscalculia.

In your opinion, what is the cause of dyscalculia? (more than one alternative can be ticked)

(80 responses)



**Table 3: Cause of Dyscalculia**

### Discussion

From the educational perspectives, dyscalculia pupils show difficulties in learning mathematics such as difficulties in learning number facts, number concepts, problem-solving and so on (Holliman, 2014). Department for Education and Skills in the United Kingdom described that:

“Dyscalculia is a condition that affects the ability to acquire arithmetical skills. Dyscalculic learners may have difficulty understanding simple number concepts, lack an intuitive grasp of numbers, and have problems learning number facts and procedures. Even if they produce a correct answer or use a correct method, they may do so mechanically and without confidence” (DfES, 2001).”

The data showed there were 57.5 % of the respondents did not know about dyscalculia. We noticed that was more than half of the educators in Sandakan district had no idea about dyscalculia. The consequence is dyscalculic pupils' learning needs may be ignored by the teachers during mathematics lessons. It is an alarming signal for the Malaysia Ministry of Education to focus on the issue of teachers with inadequate exposure to dyscalculia and necessary training should be provided to teachers to account for the special learning needs of dyscalculia pupils. Teachers should know how to identify the symptoms of dyscalculia pupils and send them to special educational needs class if necessary. A teacher without dyscalculia knowledge might label dyscalculia pupils as lazy pupils or stupid pupils when they cannot follow the learning pace of an ordinary mathematics classroom. This may cause the pupils to lose confidence in learning mathematics. We found that some of the respondents did mix up the definition of mathematics anxiety with dyscalculia. Based on Arem (2010), dyscalculia may lead to mathematics anxiety.

This study discovered that 66.3% of the respondents stated that dyscalculia was extremely rare among children and 33.8% did not agree with this statement. Actually, research showed that it was estimated that dyscalculia influenced roughly 4 -6% of the population and it was not extremely rare among the children in the classroom (Bird, 2013). This was equal to at least one child in any average classroom (Bird, 2013).

The majority of the respondents(90%) admitted that they never encountered situations during their professional career that made them suspect dyscalculia. We speculate that they did not suspect dyscalculia because they didn't really understand what dyscalculia is. On contrary,10% of the respondents responded that they had met dyscalculia pupils in their classrooms before and they tried to help these dyscalculia pupils by drilling, giving more exercises, and keep on trying with different teaching methods and so on. Only of the respondents responded that he did a dyscalculia screening through the special instrument to identify and make sure that child was dyscalculia. Yet he didn't mention which instrument he used to identify his pupils.

## **Conclusion**

Dyscalculia is a learning disability that may affect dyscalculic learners to learn mathematics in schools. Teachers and educators play important roles to detect the symptoms and tendency of dyscalculic pupils as to assists them in different learning styles. However, this study found that there were 57.5 % of the respondents did not know what dyscalculia is. 72.5% of the respondents stated that they never exposed to the topic of dyscalculia in teacher training colleges and there were 78.8% of the respondents claimed that dyscalculia was not discussed in their continuous professional development courses. Interestingly, 62.5% of the respondents conceived dyscalculia as a synonym for mathematics anxiety. Surprisingly, there were 70% of the respondents thought that they were able to identify a child with dyscalculia in their classrooms. In a nutshell, it can be concluded that educators in Sandakan district have a low level of awareness of dyscalculia as they had limited knowledge of the characteristics of dyscalculia and the topic of dyscalculia rarely been discussed in their teaching field. It is an alarming signal for the educators in Sandakan district, Sabah even the district education officers should plan some intervention to raise the awareness of dyscalculia among the teachers.

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