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# A Survey on Problems of Dyscalculia in Primary Schools

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**Abstract:** Dyscalculia is a learning difficulty faced by an individual. The purpose of this study is to investigate the level of problems of dyscalculia in primary schools. The researchers employed quantitative design to carry out the study. Survey method is used to collect the data. Descriptive and inferential statistics are used to analyse the survey data. A study was conducted with 381 primary schools Mathematics teachers in Malaysia. Means and standard deviation were used to analyse the level of problems of dyscalculia, whereas independent t-test were used to compare the level of problems of dyscalculia between school locations. The results show that the level of problems of dyscalculia is medium high (M=3.31, σ=0.97). On the other hand, the problem of dyscalculia in rural area is slightly higher (M=3.822, σ=0.697) than the urban area (M=3.717, σ=0.696). In short, there is no significant difference for the level of problems of dyscalculia between different school locations (p=0.147, p>0.05). This study is able to bring significances to Ministry of Education Malaysia, educators, teachers, and researchers. The result is useful to determine the allocations of funding and resources for the students with learning difficulties. It is also able to create the awareness of dyscalculia among the people. As a conclusion, interventions and diagnosis need to be carried out in order to improve the capabilities of these pupils to the maximum.

**Keywords:** dyscalculia, Mathematics, learning difficulties, education, primary school

## 1. Introduction

Zero Reject Policy compels the education of student with learning difficulties. However, it does not specifically address how state and local education agencies must carry out the zero reject rule. Often, agencies begin to implement it by evaluation to determine if the student has a disability and needs special education (Meral & Turnbull, 2014). In Malaysia, Ministry of Education would introduce Zero Reject Policy in phases to guarantee that students with special needs have access to education without adequate paperwork. Teachers were expected to be able to cater to all the students with special needs, included the students with learning difficulties (Omar & Ali, 2019). Otherwise, these students may experience double failures, which are educational and social. This will threaten effective participation in school life with a consequent risk of dropping out (Filippello, Buzzai, Messina, Mafodda, & Sorrenti, 2019).

Teaching should be conducted and planned properly in order to assist the students with learning difficulties such as dyscalculia, so that they are able to achieve their goal and become productive citizen in future (Ahmad & Yoong, 2018). More policies and guidelines should be put in place to steer-drive the current integration model to become more flexible to promote inclusion in social, artistic, and vocational domains while continuing to support the students in other academic domains, rather than targeting a total education inclusive model which is too idealistic to achieve (Low, Lee, & Ahmad, 2019). The level of problems of dyscalculia needs to be identified in order to understand the real situation happening in the classrooms. Thus, this survey had been carried out to investigate the problems of dyscalculia in primary schools.

### 1.1 Problem Statement

In Malaysia, the school system in all education levels is not introduced to use screening tools for early identification. So, early detection in the educational setting is essential (Shyielathy, Kway, & Isa, 2019). Data of Special Education shows that there are seven categories of learning disability in Malaysia, namely attention deficit hyperactive disorder, Autism

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Spectrum Disorder (ASD), intellectual disability, slow learner, Down syndrome, dyslexia, and others (Ministry of Education Malaysia, 2020). Dyscalculia is a specific learning difficulty as common as dyslexia. The symptoms of dyscalculia can be occurred as early as in primary school. However, there is lack of awareness among the society about the problems of dyscalculia. Hence in this study, the researcher had investigated the level of problems of dyscalculia by carrying out a survey among the Mathematics teachers in primary schools.

## 1.2 Research Objectives

1. To investigate the level of problems of dyscalculia in primary schools.
2. To investigate the level of problems of dyscalculia between different school locations.

## 1.3 Research Questions

1. What is the level of problems of dyscalculia in primary schools?
2. Is there a significant difference for the level of problems of dyscalculia between different school locations?

## 1.4 Hypothesis

1. There is no any significant difference for the level of problems of dyscalculia between different school locations.

# 2. Literature Review

Literature review will be discussed in two sections, which are Mathematics and dyscalculia.

## 2.1 Mathematics

Mathematics is a core subject in primary education. However, students might face difficulties in learning it (Yoong & Ahmad, 2018). Some barriers to learn Mathematics for students with dyscalculia are; inability to work with symbols, Mathematics vocabulary, working memory, short-term memory, speed of processing, long-term memory, sequencing, reversing, cognitive style, generalizing or patterns, and anxiety (Chinn, 2019). Three general cognitive abilities that related to arithmetic performance are working memory, processing speed, and long-term memory. Meanwhile, two specific number skills that related to arithmetic performance are approximate and exact numerical systems (Soltani & Mirhosseini, 2019).

Mathematics has a central role in students' academic achievement and skills development. Therefore, difficulties in this area may represent a serious problem, both short term and long term (Sousa, Dias, & Cadime). As a summary, Mathematics is an important subject in primary and secondary schools. It affects our everyday life and daily activities. Pupils should be able to master the arithmetic skills when they are in primary education. However, Mathematics can be a very difficult subject for students with dyscalculia. Hence, teachers should be able to deal with these students in order to help them to achieve their maximum level in Mathematics learning.

## 2.2 Dyscalculia

Dyscalculia is yet a new term to be discovered and further explored. Researches in this field of dyscalculia is relatively very small if compare with dyslexia (Yoong & Ahmad, 2020b). This learning difficulty affects between five to eight per cent of primary school students (Aquil & Ariffin, 2020). Many of the students with dyscalculia in our normal classroom have not been detected (Yoong & Ahmad, 2020a). Often, students with dyscalculia always failed in their Mathematics subject and were identified as stupid or lazy. If these students were not being detected, they will be continued to left behind in the classroom. Hence, the problem of dyscalculia needs to be identified in order to give the proper intervention and diagnosis to them.

# 3. Research Method

The methodology employed in this study is quantitative design. The research method will be discussed in three sections, namely; (1) procedures; (2) respondents; and (3) survey instrument.

## 3.1 Procedures

A survey design provides a quantitative description of trends, attitudes, and opinions of a population, or tests for association among variables of a population, by studying a sample of that population (Creswell & Creswell, 2018). The data had been analysed by using SPSS version 23. The data had been described by using descriptive and inferential statistics

The instrument had been adapted from Checklist of Dyscalculia by Chinn (2020). The original checklist of dyscalculia consisted of 31 items. Twenty-nine items had been adopted, one item had been removed, while one item has been adapted to suit the currency of our country. The original item was [think an item priced at £4.99 is '£4 and a bit' rather than almost £5]. The researcher had distributed a survey questionnaire through the platform of Google Form to 381

Mathematics teachers. Google Form is selected as a medium to distribute the survey as it is the most suitable and convenience medium during the Covid-19 pandemic in order to avoid the physical interactions among people. Fig. 1 shows the flow chart of the study.

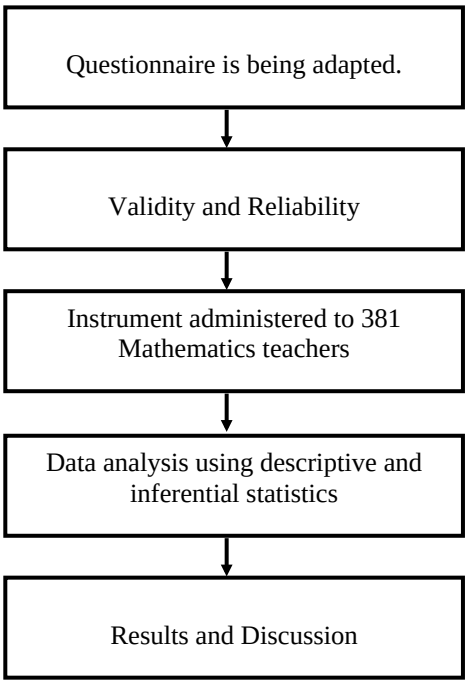


**Fig. 1 - Flow chart of the study.**

## 3.2 Respondents

There are a number of 381 respondents participated in this survey. All of them are voluntary to involve in the study. Table 1 shows the demographic data of respondents in the survey. Based on the demographic data obtained, there are 104 male respondents and 277 female respondents involved in this survey. Among the respondents, 56 of them aged between 21 to 30 years old, 163 of them aged between 31 to 40 years old, 128 of them aged between 41 to 50 years old, and 34 of them aged above 50 years old. Then, 219 of the respondents are teaching in urban area, whereas 161 of the respondents are teaching in rural area.

On the other hand, 286 of the respondents are teaching in Malay-medium National School (SK), 75 of the respondents are teaching National-type Chinese Primary School (SJKC), and 19 of the respondents are teaching in National-type Tamil Primary School (SJKT). Subsequently, 14 respondents have less than one year teaching experience, 19 respondents have between one to two years teaching experience, 18 respondents have between three to five years teaching experience, and 330 respondents have more than five years teaching experience.

**Table 1 - Demographic data of respondents in the survey.**

| Aspect | | Percentage (%) | Number of Respondents |
|---|---|---|---|
| **Gender** | Male | 27.3 | 104 |
| | Female | 72.7 | 277 |
| **Age Group** | 21 – 30 years old | 14.7 | 56 |
| | 31 – 40 years old | 42.8 | 163 |
| | 41 – 50 years old | 33.6 | 128 |
| | above 50 years old | 8.9 | 34 |
| **Location** | Urban | 57.5 | 219 |
| | Rural | 42.3 | 161 |
| **School Type** | SK | 75.1 | 286 |
| | SJKC | 19.7 | 75 |
| | SJKT | 5 | 19 |
| **Teaching of Experience** | < 1 years | 3.7 | 14 |
| | 1 – 2 years | 5.0 | 19 |
| | 3 – 4 years | 4.7 | 18 |
| | ≥5 years | 86.6 | 330 |

## 3.3 Survey Instrument

There are a number of 35 items in this survey questionnaire. Five items are about demography, whereas 30 items are about problems of dyscalculia. The purpose of this questionnaire is to study the problems among dyscalculia in primary schools. The respondents who answered this questionnaire are Mathematics teachers in primary schools.

Five experts had been invited to validate the content of questionnaire. Table 2 shows the score of content validity from five experts. Overall, all of the scores given by the experts are above 0.70. Hence, all experts give a high validity score for each of the constructs in this questionnaire.

**Table 2 - Score of content validity from five experts.**

| Expert | E1 | E2 | E3 | E4 | E5 | Mean |
|---|---|---|---|---|---|---|
| Score | .86 | .83 | .92 | .90 | .86 | .87 |

On the whole, the content validity score for this questionnaire is 0.87. Since the scores are above 0.70, so the content validity of this questionnaire is high. To determine the reliability of the items, 30 Mathematics teachers had been involved in the pilot test. The sample in the pilot test is the primary school teachers who are teaching Mathematics subject. The data of this pilot test had been analysed by using Cronbach's Alpha.

Table 3 shows the Cronbach's Alpha value of the questionnaire. Besides the five items of demographic data, there is a number of 30 items in the questionnaire. Overall, the items in this questionnaire has Cronbach's Alpha value of 0.97. Since the value is above 0.7, the recommended value for good internal consistency, hence the items are considered reliable. Thus, the items are accepted and can be used to carry out the field test.

**Table 3 - Cronbach's Alpha value of the questionnaire.**

| Cronbach's Alpha | Number of Items |
|---|---|
| 0.97 | 30 |

## 4. Results

The results will be discussed in two sections namely; (1) problems of dyscalculia; and (2) comparison between school locations.

## 4.1 Problems of Dyscalculia

The teachers were asked to tick (✔) to express their opinion according to the scale provided. In this five-point likert scale, 1 represents [never], 2 represents [once], 3 represents [once in a while], 4 represents [several times], and 5 represents [many times].

To interpret the data for problems of dyscalculia, the researcher had adapted the interpretation scale of average mean by Mustapha (2017). Table 4 shows the interpretation scale of average mean. The average mean score of 1.00 to 2.00 is interpreted as [low], 2.01 to 3.00 is interpreted as [medium], 3.01 to 4.00 is interpreted as [medium high], whereas 4.01 to 5.00 is interpreted as [high].

**Table 4 - Interpretation scale of average mean.**

| Average Mean | Interpretation |
|---|---|
| 1.00 – 2.00 | Low |
| 2.01 – 3.00 | Medium |

| | |
|---|---|
| 3.01 – 4.00 | Medium High |
| 4.01 – 5.00 | High |

Fig. 2 shows mean and standard deviation for the items. The blue line indicated the mean score, whereas the red line indicated the standard deviation for each item. Averagely, the range of mean scores for these 30 items is between 2.98 to 3.56. On the other hand, the range of standard deviation is between 0.849 to 1.766. Overall, the average mean for the problem of dyscalculia is 3.31, which can be interpreted as medium high.

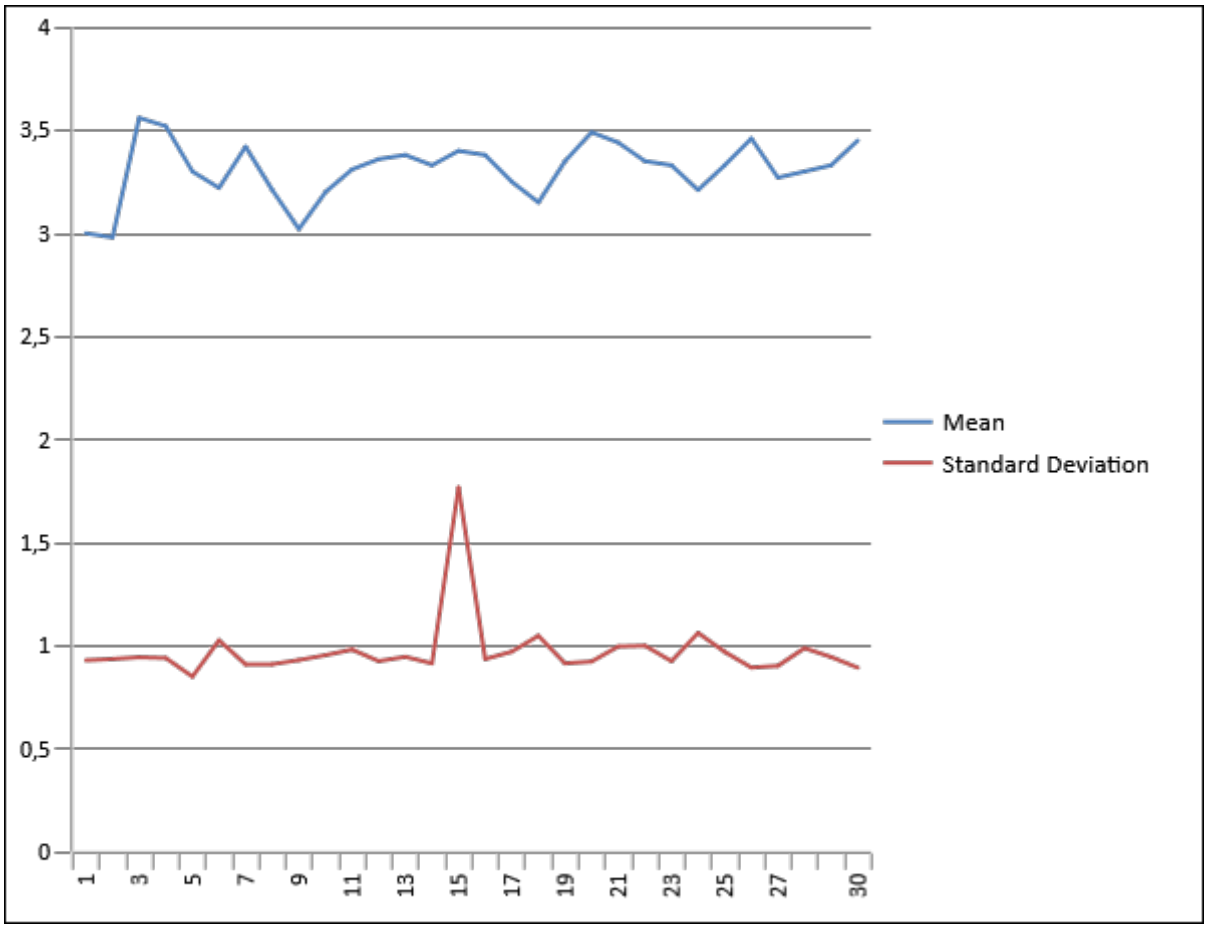


**Fig. 2 - Mean and standard deviation for the items.**

## 4.2 Comparison between School Locations

There were 381 Mathematics teachers involved in this survey. A number of 220 teachers (57.74%) from urban school and 161 teachers (42.26%) from rural schools had been responded to this questionnaire. An independent-samples t-test was conducted to compare the problems of dyscalculia in different school locations. Table 5 shows comparison between the school locations. The data shows that the problem of dyscalculia in rural area is slightly higher (M=3.822) than the urban area (M=3.717), whereas the standard deviation of both school location is about the same, which is 0.697 for rural area and 0.696 for urban area. In short, both of the school locations show the same level of problems of dyscalculia, which is the level of medium high.

**Table 5 - Comparison between the school locations.**

| Location | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| Urban | 220 | 3.7171 | .69553 | .04689 |
| Rural | 161 | 3.8219 | .69711 | .05494 |

Table 6 shows the results of t-test. Since the p-value is larger than 0.05 (p=0.985), so equal variances have been assumed. The two-tailed significance value is also larger than 0.05 (p=0.147), hence the null hypothesis is accepted. There was no significant difference in the level of problems of dyscalculia for urban area (M=3.717, SD=0.696) and rural area (M=3.822, SD=0.697); t(379)=-1.45, p=0.147. These results suggest that there is no significance difference for the level of problems of dyscalculia between urban and rural schools.

**Table 6 - The results of *t*-test.**

| | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence interval of the Difference | |
| | | | | | | | | Lower | Upper |
| Equal variances assumed | .000 | .986 | -1.452 | 379 | .147 | -.10483 | .07221 | -.24681 | .03714 |
| Equal variances not assumed | | | -1.451 | 344.471 | .148 | -.10483 | .07223 | -.24690 | .03623 |

## 5. Discussion

The survey instrument has a high validity and reliability. The validity score of this questionnaire is 0.87, whereas its reliability is 0.97. Since both of the value are larger than 0.70, hence this questionnaire is valid and reliable. Based on the findings, the problems of dyscalculia are actually occurring in our primary schools. The problem of dyscalculia among these students is in the level of medium high (M=3.31).

Students with dyscalculia poses the characteristics such as those stated in this survey questionnaire. This is in line with Bird (2017) who mentioned that students with dyscalculia are being unable to remember facts and procedures accurately, or consistently, no matter how many times they try to learn them by heart. According to Ahmad and Khoo (2019), students with weak working memory and with difficulties in the rapid processing of information need to be assisted. Besides, Chinn (2019) also mentioned that fractions are included as a top topic for causing difficulties among the topics in Mathematics. Then, Khing (2016) stated that dyscalculia has made difficult for the students to count numbers in a sequence. If the students with dyscalculia are not taught specific concepts, such as counting principles, they are unlikely to understand and acquire them (Dessemontet, Opitz, & Schnepel, 2019).

Then, the analysis of problems of dyscalculia according to school locations revealed that urban students have higher mean (M=3.837) than the rural students (M=3.524). The findings by Wong, Pang, Chin, and Tan (2016) also revealed that urban students showed higher evidence of dyscalculia (3.91%) than the rural students (3.42%). In addition, there is no significant difference for the problems of dyscalculia in rural area and urban area based on the perceptions of the primary schools Mathematics teachers. This finding is contradictory with the findings of previous researches which showed there is a significant difference between the prevalence of dyscalculia in rural and urban areas (Wong, Pang, Chin, & Tan, 2014) and students in rural areas presented lower scores in one aspect of number processing if compare with students in rural areas (Santos et al., 2015), as students in rural areas mostly engaged in household works, field and

also looking after their siblings which made them away from their studies and cause lack of concentration in their studies, in turn resulting in learning difficulties such as dyscalculia (Khing, 2016).

In a nutshell, the problems of dyscalculia are occurring among primary school students. This happens in both urban schools and rural schools. This results also show that the awareness among the teachers for dyscalculia has risen, if compare with the previous findings by Fu and Chin (2017) which shows that the awareness of dyscalculia among educators was very low. In fact, the knowledge of dyscalculia is very crucial among teachers and parents as to help their students or children in minimizing with the impact of dyscalculia on their daily lives (Yoong, 2020). These findings emphasize the critical need for early identification and targeted intervention strategies to support students with dyscalculia in both urban and rural settings. The high reliability and validity of the instrument used indicate that the data collected provides an accurate representation of the current situation in schools. Dyscalculia is often underdiagnosed, and students affected by it may go unnoticed without proper screening tools. This underscores the importance of equipping teachers with not only the knowledge but also the tools and training necessary to recognize and address learning difficulties effectively. With proper support structures in place, students with dyscalculia can be guided to overcome their challenges and improve their mathematical understanding and confidence.

## 6. Conclusion

To summarise, the findings from this study contributes to the body of knowledge and research on learning difficulties by adding an insight on the possibility for Ministry of Education, educators and teachers, parents, and students with dyscalculia. This study will also enhance awareness among the society that dyscalculia is actually happening in our daily environment. Despite the strength of the significant results of this study, it has its limitation due to the scope of the studies that focused on government schools only. Future studies are suggested to focus on interventions and diagnosis for students with learning difficulties, especially dyscalculia.

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## Conflict of Interest

The authors declare no conflicts of interest.

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