The Mathematics Enthusiast

Volume 17
Number 1 *Number 1*

Article 3

1-2020

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Abstract: *Aboriginal students' education has always been the concern of the Ministry of Education in order to achieve equity in education. Among the factors that influence the poor outcomes for aboriginal students have been attributed to their poor literacy skill in both mathematics and language. Like in other dimensions, there is still much to be understood about the numeracy competency of aboriginal students. The objectives of this study are to identify the numeracy competency of primary-school aboriginal students and investigate the relationship between their performances in written and oral tests. To identify numeracy competency, 87 aboriginal students in Johor participated in a written numeracy test and their results were analysed using percentages. A paired samples t-test and Pearson correlation was used to compare written and oral test scores from randomly selected 44 students. The findings showed that the numeracy competency of the aboriginal students is at the moderate level with mean score 52.25% in written test. A significant difference was noted between the students' performances in the written and oral tests. Meanwhile, the relationship between their performances in both tests is significant with correlation coefficient 0.53. In conclusion, this study suggests that continuous efforts to improve numeracy competency among aboriginal students should be given serious attention while different form of assessments which handle language obstacles should be strictly observed by the associated parties.*

Keywords: numeracy competency, aboriginal students, indigenous students

Introduction

In Peninsular Malaysia, there are indigenous minority people who are also called orang asli (aboriginal people). According to the population statistics in 2010, the indigenous people constituted 178,197 people or 0.6 percent of the national population (Nicholas, 2012). This segment of the population is generally classified into three main tribal groups: Negrito, Senoi,

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and Proto-Malay, which are officially divided further into eighteen ethnic subgroups. Under the group of Negrito, there are Kensiu, Kintak, Lanoh, Jahai, Mendriq, and Bateq. Temiar, Semai, Semoq Beri, Jahut, Mah Meri and Che Wong are the subgroups of Senoi. As for the Proto-Malay group, it is formed by Kuala, Kamaq, Seletar, Jakun, Semelai, and Temuan.

The overall standard of education among Malaysian aboriginal students is still at low level with most of the students having only received their formal education until primary school (Ramlee Abdullah, Wan Hasmah Wan Mamat, W.A. Amir Zal and Asmawi Mohamad Ibrahim, 2013). According to the data provided by Jabatan Kemajuan Orang Asli (JAKOA) (2014), majority of the aboriginal students were able to graduate from primary school. The year 2013 recorded 213 drop-outs, a notable reduction compared to the record in 2012 (728 drop-outs). Nevertheless, in 2013, a total of 1186 students gave up their opportunity to continue secondary school; only 1533 students succeeded to finish their five years of secondary schooling and 1485 dropped out from school. This is not an ideal scenario because education is always seen as the priority for a country's achievement. Education fosters the country's human resources who in turn will ensure a tenable socio-economic growth.

Consequently, many researchers were concerned about the education of aboriginal people in Malaysia hence has investigated the issues evolving this segment of the population (Ramlee Abdullah et al., 2013; Kamarulzaman Kamaruddin and Osman Jusoh, 2008; Nicholas, 2010). Nevertheless, most of the previous researchers were mainly interested in uncovering the learning opportunities among aboriginal people and the learning problems faced by them. Accordingly, this study intends to investigate the numeracy competency among Malaysian primary school aboriginal students.

Numeracy Competency among Aboriginal Students

Due to the worrying results and high dropout rate in Malaysia, the government has implemented a programme named Literacy and Numeracy Screening (LINUS) since the year 2010. A large number of illiterate students have contributed to the high dropout rate and discipline problems, which rang the alarm to the Ministry of Education. There are four subnational Key Result Areas (NKRA) in the education part and the LINUS programme is one of the sub-NKRA which aims to improve the mastery of literacy and numeracy rate. LINUS is a remedial programme designed to ensure that every child would be able to acquire basic literacy and numeracy skills after three years of undergoing mainstream primary education by the end of 2012. This programme is targeted at students who have difficulties in 3Rs (Reading, wRiting, and aRithmetic). By the end of the LINUS program, students would be expected to be able to solve basic mathematical operations, understand the ideas of simple mathematics, and be able to apply mathematical skills in everyday life for the basic numeracy part. However, whether the numeracy competencies of the aboriginal students have been improved through the programme remained questionable.

Numeracy and literacy are the key domains for children to success at school, work field, and even for their future economic and social needs (Stephen, 2009). However, Malaysian students are still demonstrating low proficiency in numeracy and literacy and this problem has remained unsettled especially among aboriginal students (Abdul Rahman Idris, 2014; Nazariyah Sani and Abdul Rahman Idris, 2013). One contributory reason is that the aboriginal students are not familiar with the national language that is used to teach them. Similarly, a significant numbers of aboriginal communities in other parts of the world are still using their own traditional languages to communicate (Meaney and Evans, 2013).

Teaching requires students to discuss about mathematical ideas and concepts among themselves as well as with their teachers. When communication is needed, language seems to be a very important element in the classroom. Students have to relate their daily language with mathematical language and symbol (Lim and Chew, 2007). Engaging language of mathematics in aboriginal students' mathematics classroom enable students to express and discover their understanding of mathematical concepts and ideas in the numeracy learning process. The teachers sometimes need to use the first language of students in teaching and learning process in order to give more understanding on what they need to learn (Clarkson, 2009). Failing to do so may limit communications during teaching and learning process (Ramlee Abdullah et al., 2013). Unfortunately in Malaysia most teachers who are teaching aboriginal students come from other ethnicity with very little knowledge on their students' first language (Norwaliza A. Wahab, Ramlee Mustapha and Abdul Razaq Ahmad (2015).

Numeracy is not an unfamiliar subject in Malaysia. It is integrated in the subject of mathematics yet learners appear to be unable to differentiate between mathematics and numeracy. The first phase of primary school mathematics curriculum Year One to Year Three aims to construct students' mathematical understanding, skills, and basic application of mathematics. In year-one mathematics, the curriculum consists of two categories: (1) number and operation together with measurement and geometry. There are several topics and skills under these two categories (Ministry of Education, 2012). For example, whole number, addition, subtraction, fraction, and money are the topics in the number and operation category. The topics like time and periods, length, weight, volume of liquid, shape, and space are in the category of measurement and geometry. As for year-three students, they have to cover mathematics topics under three main categories: (1) number and operation, (2) measurement and geometry, and (3) statistics and probability (Ministry of Education, 2012). These topics are almost the same as the year-one topics only with additional topics like multiplication, division, decimals, percentages, mass, and representation of data. Also, the learning standards for the year-three students are harder and more challenging. In addition, many students in primary schools have difficulties in numbers that involve fractions (National Assessment of Educational Progress, NAEP, 2000; Ministry of Education, 2004). The students have difficulties in solving problems related to fractions because the concept of fractions are complex for young children (Ismail Hj. Raduan, 2010) and the intensity of this difficulty increase when unfamiliar language is used to present the problem.

Numeracy is very important because it is the foundation for mathematics learning in a higher level and also a base for other subjects (Siti Rahaimah Hj Ali and Norainildris, 2013). Numeracy is slightly different from mathematics which requires the ability to explore situational mathematical content (Ginsburg, Manly and Schmitt, 2006). In other words, numeracy is an ability to understand and to perform basic mathematical operations and ideas as well as to apply mathematical knowledge and skills in daily life (Zuriati Sabidin, Zaleha Ismail, Zaidatun Tasir and Mohd Nihra Haruzuan Mohamad Said, 2017). Also, it can be defined as “the ability to process, communicate and interpret numerical information in a variety contexts” (Askew, Brown, Rhodes, Wiliam and Johnson, 1997, p. 6). Numeracy goes beyond arithmetical calculations; it includes the conceptual understanding of numbers and the ability to apply arithmetic (Askew et al., 1997). Unfortunately, in a report by Human Rights Commission of Malaysia (SUHAKAM) (2010) confirms a clear gap in the achievement of reading, writing, and arithmetic between aboriginal students and non-aboriginal students.

There are many numeracy models all over the world as numeracy of students is always highlighted in education. Model of Essential of Numeracy for All from United Kingdom emphasizes that students must being numerate, some important topics like numbers; operations and calculations; shape, space and measure; and handling information have to be comprehended (National Numeracy, 2013). Besides, the three skills mentioned in this model also highlighted in Malaysian education system which are reasoning, problem solving and decision making. Figure 1 shows the overall ideas about this model. There are many sub-topics elaborated from the four main topics which emphasized in this model. Students are considered numerate if they master and comprehend these topics. In order to identify aboriginal students' numeracy competency, a holistic numeracy test should be prepared. It is also very important to find out students' numeracy competency as this domain is essential for higher learning in mathematics and other subjects (Siti Rahaimah Hj Ali and Norainildris, 2013).

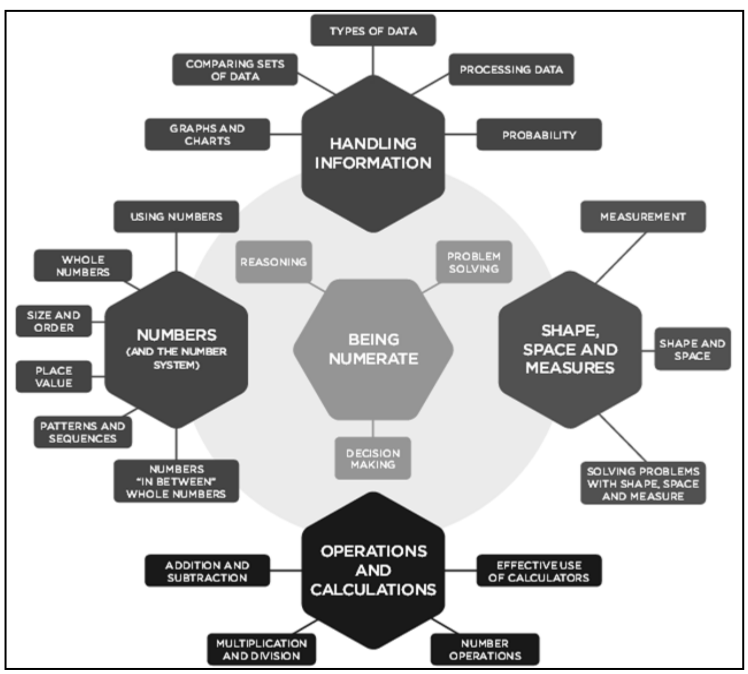

*Figure 1.*Model of essential of numeracy for all (National Numeracy, 2013).

Numeracy Competency Assessment

Australian Council for Educational Research (ACER) has shared a longitudinal study to monitor and measure students' literacy and numeracy. The study is not only suitable for mainstream students, but also suitable for aboriginal students (Frigo, Corrigan, Adams, Hughes, Stephens and Woods, 2004). The study assessed numeracy skills involving numbers, space, measurement as well as chance and time (Meiers, 2008). Besides, concrete materials such as rods, shape, coloured stars, matchsticks and so on are used to aid students in the corresponding tasks (Frigo et al., 2004). In order to demonstrate aboriginal students' abilities in paper and pen tests, a range of item types should be included such as multiple choice, open-ended questions and short answer questions (Frigo et al., 2004). However, open-ended questions are less preferred for some aboriginal students. For a numeracy test, students should be assessed orally and written (Frigo et al., 2004) as full written test might mask students' real numeracy competencies due to their poor reading skills.

Students who have difficulties in reading will be at disadvantage (Walker, Zhang and Surber (2008) in learning mathematics. They need to work harder in order to be able to interpret and understand the important information given in the problems or tasks (Phonapichat, Wongwanich and Sujiva, 2014). This situation is getting worst if the mathematical problem is involving problem solving whereby the information is described in numerous words or vocabularies. There is a relationship between reading skill and mathematics performance whereby the study of Vilenius‐Tuohimaa, Aunola and Nurmi (2008) shows that the students who have difficulties in reading skills have lower performance in mathematics skills. Moreover, the adoption of oral test in assessing students' performance in numeracy competency is one of the alternative that can help the students to show their understanding of mathematical concepts.

The implementation of written test alone in order to know students' performance in mathematics is considered not sufficient. In many situations, written test was used to assess the knowledge of mathematical procedures compared to oral test that has more inclination to assess the understanding of mathematical concepts (Videnovic, 2017). On the other hand, using both written and oral tests in mathematics course to assess students' performance in numeracy competency improve the students to be more confident with mathematics (McCartney, 2009). The positive emotion encourages students not only in developing problem solving skills and critical thinking but also allowing them to apply what they know and understand in solving the mathematical problems.

Conceptual Framework

In this research, numeracy competency of aboriginal students is investigated through 21 constructs developed from five topics. The numeracy concept is expanded from the combinations of Standard Document of Curriculum and Assessment (DSKP) Ministry of Education (2012) as well as the Model of Essential of Numeracy for All (National Numeracy, 2013) from United Kingdom (Refer to Figure 2.1). The Model of Essential of Numeracy for All is referred because the three skills presented in this model are also highlighted in Malaysian educational system which is reasoning, problem solving and decision making. Figure 2 displays the conceptual framework for this study. Numeracy test is given to the sample to identify their numeracy competency in all the topics shown in the figure.

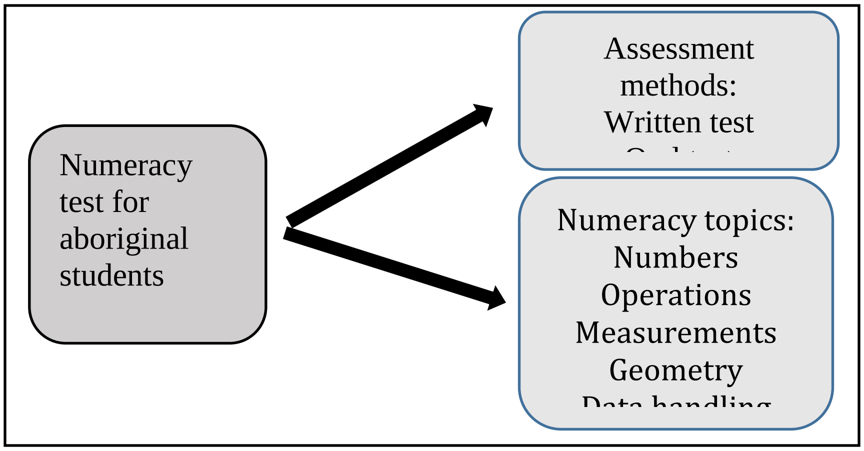

Figure 2. Conceptual framework (Frigo et al, 2004, Ministry of Education (2012) and National Numeracy, 2013).

Method

Specifically the first objective was to identify the numeracy competency among Year 5 aboriginal pupils in Johor while the second objective was to compare the numeracy competency in written test with oral test. To achieve the objectives the research was carried out in two phases. For Phase 1, numeracy written tests were distributed to 87 Year 5 aboriginal students from all 10 aboriginal schools in Johor and in Phase 2, 44 of these students representing these schools were randomly selected to sit for oral test.

Instruments

The items in the numeracy written and oral tests were constructed based on the combination between Year 4 Standard Document of Curriculum and Assessment (DSKP) and Model of Essential of Numeracy for All from United Kingdom. All of the items were constructed in Malay language as it is the medium used in schools. The test paper consisted of two parts: background of the respondents (Part A) and numeracy test (Part B). In Part A, students' year, sex, ethnic subgroup, and school are identified. Part B is the written test which consists of 24 items based on 21 constructs comprising of using numbers, place value and digit value for the topic of numbers, inverse operations and operation involving two numbers in the topic of operations, standard units of measurement and interpret numbers and read scales under measurement's topic, 2D or 3D shapes properties and types of lines and angles for the topic of geometry, and for the topic of data handling the construct that use are interpret information from graphs and charts and problem solving, reasoning and decision making.

An oral test that consists of 24 items was also prepared to compare and correlate numeracy competency between respondents' performance in the written and oral tests. Only half of the respondents were selected randomly to sit for the oral test since it is time consuming whereby a teacher has to conduct the test with each individual student. The items in written and oral test are similar testing the same constructs. Figure 3 and Figure 4 show example of an item in a written and oral test for testing understanding in identifying the digit value for any numbers up to 100 000. The questions need the students to identify the digit value in the number given. The item for written test display in Figure 3 is: What is the value for the digit 4 in 78490? A similar question in the oral test asked for: What is the value for the digit 5 in 9500? Each student was required to answer all items in the written test by themselves without intervention from others. For the oral test, each student who was selected to participate was required to answer a similar set of items during which a teacher sat beside the student to read the question or instructions. The teacher can assist the students in terms of language difficulty only if the student request. Since the nature of these students is that they are shy, very few has requested for assistance.

2) What is the digit value of 4 in 78 490?

Answer: ____________

Figure 3. Item for written test.

2) State the digit value for any numbers up to 100 000

Instruction to teachers:

- Ask students to state the digit value of 5 in the number of 9500

Teacher's instruction to student:

- " what is the digit value of 5 in the number of 9500"

Figure 4. Item for oral test.

Data analysis

Correct answers in the written and oral test were then analyzed using descriptive statistics. The students' performance level is determined based on the scoring system in Table 1. The scoring system was used to compare overall scores between written and oral tests.

Table 1

Scoring System

Percentage Score (%)	**Level**
80 - 100	Very high
60 - 79	High
40 - 59	Moderate
20 - 39	Low
0 - 19	Very low

The scores from the two tests were analyzed using a paired sample *t*-test and Pearson correlation. The interpretation of the relationship between written and oral test is based on the numerical value of correlation and from the result also it would show if the students are facing reading problem or not. The interpretation for correlation value is displayed in Table 2.

Table 2

Interpretation of Correlation

Numerical value of correlation	**Interpretation**
0.81 and above	Strong
0.61 – 0.80	Moderate strong
0.41 – 0.60	Moderate
0.21 – 0.40	Moderate weak
Less than 0.20	Weak

Source: McBurney, 2001

Results and Discussion

Prior to answering the numeracy written test, all the 87 aboriginal students filled in their demography in Part A. Results from analysis of this part shows that most of the respondents are *Jakun* (N = 58), with majority are boys (35). As for the second largest ethnic group in this study, *Kuala* (25.29 %), 12 boys and 10 girls. The 7 respondents from *Seletar* consisted of 4 boys and 3 girls. No respondent from *Kanaq* and other ethnic groups participated in the test. Overall, majority of the respondents are boys (N = 51) and only 36 girls participated in the study.

There are 24 items in the written test but there are items that are divided into parts which means more than one responses are required. Each correct response is given 1 mark. Therefore for the written test, the total mark is 35. The score for each individual student was calculated based on percentage of corrected responses. Based on the analysis of the numeracy test results, only 3 respondents scored more than 80% in the written test. Most of the respondents (37 students) were only able to achieve a score within 40% to 59%. Thirty students were able to score 60% to 79%. Only 17 students scored between 20% and 39%. No respondent scored under 20%. The standard deviation of the scores is 1.43 and the average score for the 87 aboriginal students is 52.25%. In terms of grading from A to E, most of the students scored a grade C, which equates 40% to 59%.

Numeracy Competency in Numbers

Table 3 indicates the statistical analysis of the respondents' competency in numbers. Most of the students could answer item 3a (N = 64), whereas fewer students could answer item 3b (N = 47). Both item 3a and 3b are to test students' ability in number sequences. Students have to find out the pattern of a number sequence whereby the next number is 50 less than the previous number. A total of 57 respondents managed to answer item 1 which require them to count the number of fish in a picture. Meanwhile 52 of them could answer item 2 correctly which need them to state the digit in the number given. This finding indicates that the students were able to count and write out the numbers as well as to identify the digit value for certain numbers. Thirty-one respondents could answer item 5 which require problem-solving skill in numbers. However, for item 4, only 24% of the respondents can determine a fraction on the number line. The question asks for the correct place to represent $\frac{1}{3}$ on the number line. Most of the respondents (N = 66) failed to identify the correct place for $\frac{1}{3}$ even though the place for $\frac{1}{2}$ was indicated.

Table 3

Responses in Written Test for Numbers

Construct	**Item**	**Frequency**		**Percentage Correct (%)**
		Correct	**Incorrect**	
Using numbers	1	57	30	66
Place value and digit value	2	52	35	60
Sequences and patterns	3a	64	23	74
	3b	47	40	54
Numbers in between whole numbers	4	21	66	24
Problem solving	5	31	56	36

Figure 5 shows the common mistake made by the aboriginal students. They did not know the exact value of the fraction and assumed that $\frac{1}{3}$ is bigger than $\frac{1}{2}$.

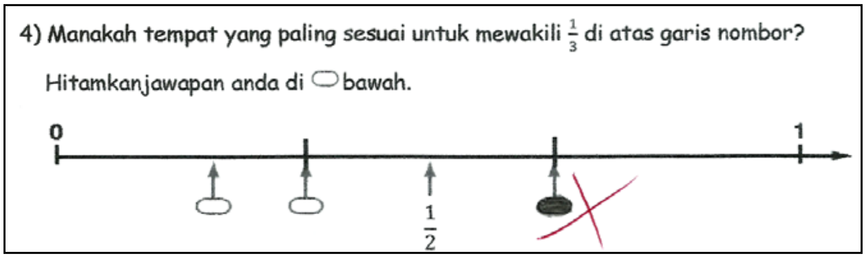

Figure 5. Example of incorrect answer for item 4

In general for the topic on Numbers, the students were able to count and state the numbers in words as well as in symbols. Besides, they can state the digit value of certain number as well as to identify the number patterns and find the missing numbers. Nevertheless, the respondents seem like having problem with “numbers in between whole numbers” which concerns about students’ ability to recognize decimals, fractions and percentage. It goes the same in the study of Warren (2009) where the researcher found that Australian indigenous students obtained lower scores in the test with respect to students’ number sense.

Numeracy Competency in Operations

As shown in Table 4, only 38 respondents managed to solve item 6, which seeks to test the students’ ability in inverse operations. A total 69% of the students were able to answer correctly item 7 which involved addition. The students were also found to be able to do addition with regrouping. Besides that, 53 respondents were able to answer item 8, which requires skills in basic addition and mental calculation. Likewise, 71 respondents could solve item 23, which require decision making skill. The numbers involved in the items are not large, therefore most of the students were able to do the calculations.

Some students (percentage 25%) were also detected having difficulty in solving multiplication and division (item 9) question. In the study of Muhammad Hafizuddin Ismail and Mazlan Ibrahim (2013), they identified that most non-aboriginal students were found struggling with multiplication facts as mentioned. Sellers (2010) also stated that students are poor in division because they find it hard to remember and are often confused with the division steps that make no sense to them. Item 13 is another item that involves multiplication and problem-solving skill. The question asks how much money that Rikong get after he sold 750 eggs with the price RM0.30 per egg. There were only 7 participants who were able to answer the question precisely.

Table 4

Responses in Written Test for Operations

Construct	Item	Frequency		Percentage Correct (%)
		Correct	Incorrect	
Inverse operations	6	38	49	44
Operations involving two numbers	7	60	27	69
Operations involving two numbers (Mental methods)	8	53	34	61
Operations involving three numbers	9	22	65	25
Problem solving	13	7	80	08
Reasoning	21	10	77	11
Decision making	23	71	16	82

Figure 6.is an example of a student's response. The researcher found that the students were having two problems: (1) they did not know how to interpret the situation and applied the correct procedures and (2) they did not know how to multiply numbers with decimals even though they had learnt the method in Year 4.

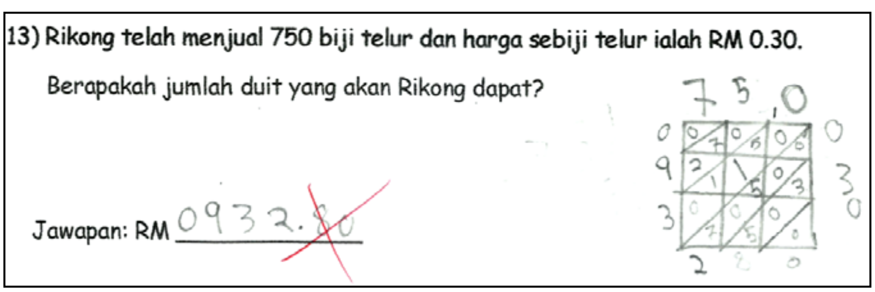

Figure 6. Example of a student's answer for item 13.

As for item 21, only 10 aboriginal students managed to answer the question correctly. This item needs the students to give reasons after they calculated using the correct procedure. The respondents failed to apply the proper procedures and provide explanation in item 21. In particular, the students were asked whether Enjik's mother can finish producing 100 baskets in 2 days if she can do 4 baskets in one hour and works 8 hours per day. The students were additionally required to explain their answer. Some of them wrote that Enjik's mother shall manage because "Enjik's mother is very hardworking," or "she works 8 hours a day," to list a few. Some of the student answered that Enjik's mother is unable to do so because "there are too many baskets," or that "she only works 8 hours," or that "one hour she only can do 4 basket" or that "my mother is too old," to list a few.

Numeracy Competency in Measurement

Table 5 demonstrates the year-five aboriginal students' competency in measurement through frequency and percentage of students answered correctly. The participants were found to be more proficient in basic measurement skills such as reading scales, knowing proper standard units for measurement, and selecting suitable measuring instruments.

Table 5

Responses in Written Test for Measurement

Construct	Item	Frequency		Percentage Correct (%)
		Correct	Incorrect	
Interpret numbers and read scales	10a	81	6	93
	10b	18	69	21
Standard units of measurement	11a	84	3	97
	11b	83	4	95
Select and use measuring instruments	12a	84	3	97
	12b	84	3	97
	12c	86	1	99
Problem solving	14	15	72	17
Reasoning	24	4	82	5

Figure 7 shows item 10 which is made up of 10a and 10b requiring the students to read a scale. Eighty-one of the students managed to determine the volume of liquid by reading scales that have precise mark and numbers on the measuring tool (item 10a). However, most of them (N

= 69) were not able to read indirect scales that required them to calculate the exact volume of liquid by themselves (item 10b) and most of the students give the answer 50ml instead of 150ml.

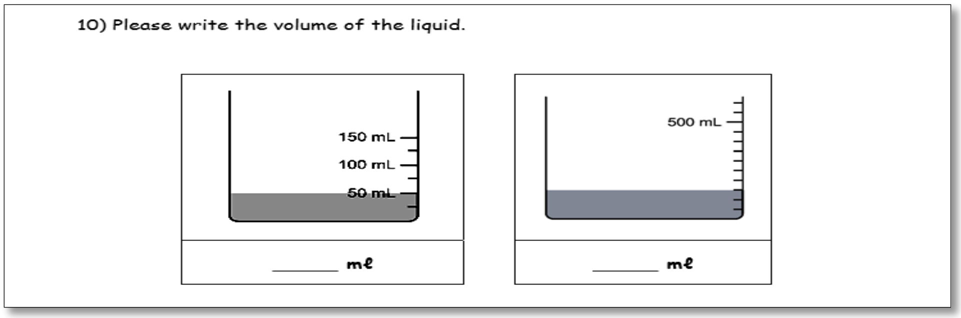

Figure 7. Item 10.

For items 11a and 11b, the percentage students that answer correctly obtained were high (97% and 95%) respectively. The students were able to match the standard units with the measurement instruments shown correctly. Besides, almost all of the students could answer item 12a, 12b, and 12c accurately. These three items required the students to match the suitable instruments with the measurements such as volume of liquid, time, length and weight. The 84 students can match item 12a and 12b precisely and only 1 student matches item 12c wrongly. Item 14 required the students to have skill in solving problems related to time in their daily life. With a percentage of 17%, only 15 respondents can answer this item correctly.

Only 5% of the students (N = 4) who participated in the written test could answer item 24. This item required a reasoning skill to figure out the answer and explain it. From the results indicated, the year-five aboriginal students appeared to master only questions that involved basic measurement skills in this topic. The answer given for item 24 shows that a student failed to understand the problem hence gave a wrong explanation and also many different explanations were provided without proper calculation and procedures. In particular, the students were asked whether Chee Seng can reach school by 8 o'clock in the morning if he walks 5 km per hour and if he departs from his house at 6 o'clock where the distance between his house and school is 13 km. Some of the respondents answered that Chee Seng is able to do so because “Chee Seng runs,” or “Chee Seng walks fast,” or “Chee Seng goes early in the morning.” Other answers include “by bus” and “very close,” to list a few. Some of the students answered that Chee Seng was unable to do so, noting explanations such as “too far” or that “he cannot walks for far distance,” to list a few. Similar to the topic operations, problem solving in measurements also became an obstacle for aboriginal students. The obstacle does not apply only to aboriginal students as Woodward *et al.* (2012) reported that students in U.S. were found less prepared in solving mathematical problems and they have been trying to improve students’ problem solving skills from Grade 4 to Grade 8 as well.

Numeracy Competency in Geometry

As shown in Table 6, item 16 can be answered by most of the respondents especially item 16c (N= 80). Item 16 (a, b. and c) test the students’ understanding about the properties and characteristics of three-dimensional shape. Item 16(a): I have 8 corners and 6 flat surfaces. Each of my surfaces is a square shape. What shape I am? And Item 16 (b): I have 8 corners and 6 rectangle flat surfaces. What shape am I? Results for items 16a (percentage = 61%) and 16b (percentage = 59%) show that some of the students misunderstood or were confused between cubes and cuboids. In addition, almost half of the respondents (48%) seemed confused between parallel and perpendicular lines (item 18a and 18b) as in Figure 8.

For item 15, the percentage of the students that answer correctly is 32%, which implies that most of the students (N = 59) could not calculate the perimeter of a two-dimensional shape. Item 15 asked the students to calculate the perimeter of rectangle shape and one of the example of student’s answer as in Figure 9. Some of the students even did not know the meaning of perimeter. This problem does not evolve among aboriginal students only, Destina Wahyu

Winarti *et al.* (2012) found that Grade 3 primary school students struggling in learning perimeter as well as area. Although some hands-on activities were provided to them, they still struggled to differentiate area and perimeter. Also, 85 participants in this study faced difficulty in answering item 17, which requires their problem-solving skill. Actually, item 17 only required the students to calculate the volume of a cuboid, but most of the students could not interpret the problem and answer it correctly. In this aspect, Woodward et al. (2012) mentioned that teachers should teach students mathematical concepts using problems in order to improve the students' problem-solving skills. For the coordinate test item, students failed to submit the correct answers when they were asked the coordinate of an object. There are two possibilities. First, they have not mastered the concept of coordinates and simply guess the answer. Second, they made careless mistake. In Luneta (2015) study, students were found having errors in Coordinate Geometry as most of the students could not tell the differences between x-axis and y-axis.

Table 6

Responses in Written Test for Geometry

Construct	Item	Frequency		Percentage Correct (%)
		Correct	Incorrect	
Perimeter, area and volume	15	28	59	32
2D/3D shapes properties	16a	53	34	61
	16b	51	36	59
	16c	80	7	92
Problem solving	17	2	85	2
Types of lines and angles	18a	42	45	48
	18b	42	45	48
Coordinates	20a	32	55	37
	20b	34	53	39
	20c	15	72	17

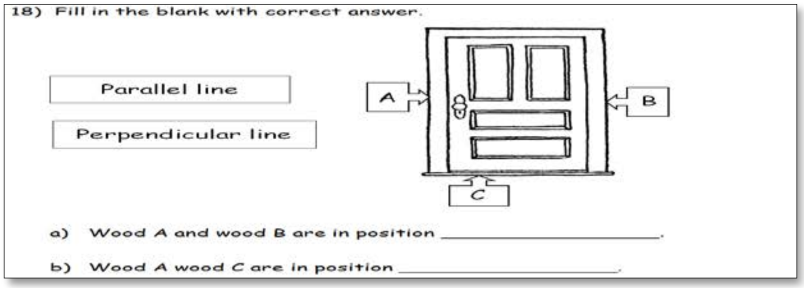

Figure 8. Item 24.

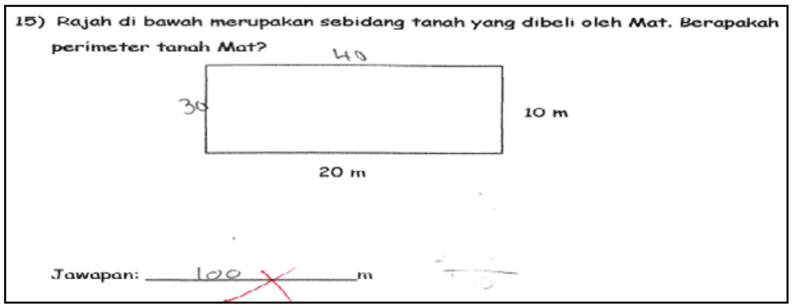

Figure 9. Example of student's answer in item 15.

As for item 20, the students were found to be capable of telling the *x*-axis (item 20a) and *y*-axis (item 20b) instead of coordinates (item 20c). The percentage of the students that answer correctly for item 20a is 37% for item 20b, 39% and for item 20c, 17%. For item 20(c), the students need to identify the coordinate for banana. From their answers in item 20c, it was apparent that the mistake that the students made in reading coordinate was to read the *y*-axis first and the answer should be C4 instead of 4C.

Numeracy Competency in Data Handling

Table 7 displays the percentage of students with correct response for item 19 is 15%. Also, the students were found to be unable to interpret the indicator given thus had solved the question in a wrong way simply by counting the number of banana pictures. The question asked the students to calculate the numbers of the banana's bunch that sold by Wong in four days if a picture of banana represent 5 bunches of banana. Item 22 (with 2 parts, namely a and b) sought to test the students' ability to interpret information from a bar graph. The question ask to identify the number of cakes that have sold by Aminah bakery on June and September. Most of them managed to answer both questions correctly. Item 22a recorded a percentage of 72% and item 22b recorded a percentage of 74% of students.

Table 7

Responses in Written Test for Data Handling

Construct	**Item**	**Frequency**		**Percentage Correct (%)**
		Correct	**Incorrect**	
Problem solving	19	13	74	15
Interpret information from graphs and charts	22a	63	24	72
	22b	64	23	74

Aboriginal students were found being able to interpret information from graphs and charts. However, when the questions posed as a short words problem, students were confused. From their responses, it shows they did not realize what information is given and hence could not give the correct response to the item. Porkess (2012) stated that it is essential to have students being assessed on how to apply statistics in problem solving and decision making.

In summary, Table 8 shows that the topic with highest (69%) correct responses is measurement, next followed by data handling (54%). The topic on numbers have 52% correct responses while only 44% in geometry. The least percentage of 43% goes to questions on operations. This shows that the most difficult topic in numeracy is geometry while students did quite well in measurement.

Table 8

Correct Responses in Written Test for Five Topics

Topics	**Percentage (%)**
Numbers	52
Operations	43
Measurement	69
Geometry	44
Data Handling	54

A Comparison between Written and Oral Test

An oral test was carried out among half of the respondents (N=44) in order to compare the performances of the aboriginal students in written and oral tests. Results as in Table 9 clearly show that the respondents have good performance in oral test compared to written test. Most of the respondents scored between 80 and 100 (43.18%), and 12 out of 44 respondents gained between 60 and 79 marks. Meanwhile, 13.64% of the respondents obtained between 20 and 39 marks and none of the students scored between 0 and 19. In both tests, none of the students scored in range of 0 to 19.

Table 9

Correct Responses in Written and Oral Test

Score	Written Test		Oral Test	
	Frequency	(%)	Frequency	(%)
80 –100	0	0	19	43.18
60 – 79	19	43.18	12	27.27
40 – 59	16	36.36	7	15.91
20 – 39	10	22.73	6	13.64
0 – 19	0	0	0	0
Total	44	100	44	100

Table 10 shows that the mean for the oral test (70.89) is higher than the mean obtained for the written test (52.08), which indicates that the aboriginal students are at high level performance in numeracy competency in the oral test compared to the written test which is at moderate level. A worrying scenario also happened in Australia where Year 5 indigenous students were having a difficulty in achieving the numeracy benchmark (MCEETY, 2007). Videnovic (2017) in his research stated that the students are given the opportunity in order to show their mathematical knowledge in oral examination so that they can perform better in oral examination compared to the written examination.

The results were further analyzed via a t-test to identify any significant difference between the aboriginal students’ performances in the written and oral tests. The level of significance was $p = 0.00$, which is <0.05. This implies a difference between the means for the written and oral tests. From the result it can be concluded that there were a significant difference between the students' performance in written and oral tests. It is also seems to show that students have problems in reading.

Table 10

Results of Paired Sampled T-Test

	Mean	**N**	**Std. Deviation**	**Sig. (2 tailed)**
Oral Test	70.89	44	20.6	.00
Written Test	52.08	44	14.2	

As shown in Table 11, the topics with significant difference based on 44 students are numbers, operations, geometry, and data handling. There is no significant difference between students' performance in written and oral tests for measurement $p = 0.291$, which is >0.05. For the topic of numbers, a significant difference was noted between the students' performance in written and oral tests ($p = 0.000$, $p < .05$). In addition, a significant difference was marked between the students' performance in the written and oral tests for operations ($p = 0.000$, $p < .05$). There is a significant difference between the students' performance in written and oral tests for geometry as well ($p = 0.003$, $p < .05$). As for data handling, a significant difference was recorded between the students' performance in written and oral tests ($p = 0.000$, $p < .05$).

The results proved that language and assessment are crucial factors that influence student's knowledge, understanding (Van Nes and De Lange, 2007) as well as learning mathematics (Warren *et al*., 2004). Shnukal (2002) also reflected that for aboriginal students, their poor performance in numeracy might simply because they do not understand the questions and they have difficulty to express their answers by writing; but not because they lack of content knowledge. This result provides an opportunity for deeper studies.

Table 11

Results of Paired Samples T-Test According to Topics

		Mean	Sig. (2 tailed)
Numbers	Oral Test	83	.000
	Written Test	52	
Operations	Oral Test	71	.000
	Written Test	43	
Measurement	Oral Test	65	.291
	Written Test	69	
Geometry	Oral Test	64	.003
	Written Test	44	
Data Handling	Oral Test	74	.000
	Written Test	54	

A correlation was also performed to determine whether a significant relationship exist between the year-5 aboriginal students' performance in both tests. Table 12 shows the result of Pearson correlation.

Table 12

Results from The Pearson Correlation

		Oral Result	Written Result
Oral Result	Pearson Correlation	1	.53**
	Sig. (2-tailed)		.00
	N	44	44
Written Result	Pearson Correlation	.53**	1
	Sig. (2-tailed)	.00	
	N	44	44

**. Correlation is significant at the 0.01 level (2-tailed).

From the correlation (in Table 12), the level of significant, $p = 0.000$ which is <.01. The p value shows that there is a relationship between written and oral test. The value r = +0.53 indicates a moderate relationship between the year-five aboriginal students' performance in the written and oral tests, and it is a positive correlation. The correlation revealed that the performance of the aboriginal students in the oral and written tests were significantly and positively related (r = +.53, n = 44, p < .01, two tails). However, only 28% (r^2 = 0.28) of the differences in their performances of written test can be explained by their performance in oral test. Hence, we cannot say that if the students performed well in their oral test, they performed well in their written test too. This result supports the significant difference between 44 year-five aboriginal students' performance in oral and written tests. According to Frigo *et al.* (2004), students should be assessed in both oral and written test. From the results from both comparison and correlation, both written and oral test are found important to assess students' numeracy competency. Aboriginal students' performances in both tests should be taken into account in order to ensure they are not being penalized for reading and language obstacles. Moreover, the results inform us that both intervention on improving language and mathematical skills should be given attention as soon as possible.

Conclusion

As a conclusion, the numeracy competency among year-five aboriginal students in Johor was found to be at the moderate level based on mean score in written test among 87 students. Most of the students performed better in measurement compared to other topics and they seemed to have problem with operations especially in relation to multiplication and division as well as problem solving. In fact they were weak with problem solving in all topics. One of the possible reasons for the weakness could be due to reading and understanding the problems. As suggested by Woodward et al. (2012), teachers need to integrate problem solving activities in their instructions and incorporate the visual aids in the problems taught. Teachers can guide students to solve problems with different strategies. Emphasizing the steps involve in problem solving might also help. Beside, Papic (2012) suggested that by promoting mathematical patterning and algebraic thinking at the early age of aboriginal students can prompt their learning opportunities in numeracy.

A significant difference was marked between the aboriginal students' performance in written and oral tests. In both tests, a moderate and positive relationship was found between year-five aboriginal students' performance in both tests. However, only 28% of the differences can be explained by one and other variable, which indicates that the teachers should not assess the students merely on the basis of their performance in written examination. Teachers can use different types of assessment to test the students' numeracy level, such as by providing a question-and-answer section, or by conducting observation and oral test, to list a few. Teachers can also take advantage of assessments as platform for students to learn mathematics. Efforts should also be geared towards improving language skills in the mathematics classrooms. The integration of learning mathematics and language simultaneously might create a meaningful learning environment.

Acknowledgment

We are grateful to Universiti Teknologi Malaysia and Ministry of Higher Education (MOHE) for financing this research through the grant 4L689.

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