RELATIONSHIP BETWEEN NUMERACY LEVEL AND SPM MATHEMATICS GRADE FOR SECONDARY SCHOOL LEAVERS ACCORDING TO GENDER

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Abstract: This quantitative study was done in order to determine the numeracy level of secondary school leavers in the field of Numbers based on SPM Mathematics grade and also to determine the relationship between the SPM Mathematics grade and the numeracy level of the secondary school leavers according to gender. As many as 386 Lower Sixth-form students categorized as secondary school leavers were involved in this quantitative study. They were given a numeracy test containing 36 items of various difficulty levels in the field of Numbers. The numeracy test involved the topics of Whole Numbers, Fractions, Decimals and Percentages in the field of Numbers in which nine items were allocated for each topic. Score percentages of this numeracy test were categorized into five numeracy levels. It starts with the basic numeracy level and is followed by low, intermediate, good and high numeracy levels. Descriptive analysis and the Spearman Rho correlation test were used in this study. Finding of this study shows that students with excellent SPM Mathematics grade were in high numeracy level and vice versa. It also shows that there is a moderately strong and positive relationship between SPM Mathematics grade and the numeracy level of the male secondary school leavers in the field of Numbers. For the female students, the relationship is positive and weak. Overall, the secondary school leavers in this study shows that the relationship is positive and moderately strong. All those relationships are significant. Thus, the Null hypotheses in this study are rejected. It is hoped that these research findings will provide inputs for certain authorized parties so that necessary actions can be planned and executed. As a result, mathematics can be applied by all students in their real-life situations.

Keywords: Numeracy level, SPM grade, Secondary school leavers, Gender, Field of Numbers

INTRODUCTION

Background of Study

The Ministry of Education Malaysia (MOE) had defined numeracy as the capability to do basic mathematical operations and understand simple mathematical ideas as well as applying mathematical knowledge and skills in daily life (Kementerian Pelajaran Malaysia, 2010). Numeracy became popular when the government introduced the LINUS (Literacy and Numeracy Screening) program in 2010, which also focused on the capacity of numeracy skills after three years of primary education. Emphasis on numeracy was given in the basic core modules of Mathematics in Primary School Standard Curriculum (KSSR) which was then implemented in 2011 (Kementerian Pelajaran Malaysia, 2011).

The curriculum aims to provide opportunities for students to acquire knowledge and skills in mathematics. This enables students to relate mathematics to daily life and experiences in and outside of school. Besides that, students are able to relate mathematics in a different context and notice that it is a subject that is relevant to daily life. Furthermore, at present, mathematics education in Malaysia also concentrates on the results that can be used in real-life situation. This is clearly shown in the objectives of the Secondary School Mathematics Curriculum which aimed to develop individuals with mathematical thinking skills and ability to apply mathematical knowledge effectively as well as being responsible in solving problems and making decisions, and also being capable in handling the challenges of daily life in accordance with the development in science and technology (Kementerian Pelajaran Malaysia, 2013).

In this study, numeracy is defined as the ability of an individual in using mathematical knowledge and skills to solve quantitative problems in real-life situations (Asiahwati Awi, 2015). A student is said to know numeracy when having the confidence to choose and apply the mathematics learnt at school into the daily life and situations in the classroom (Education Queensland, 2007). Knowing numeracy also means that the individual is able to use mathematics efficiently to fulfil own daily needs and also societal needs at present and future times (Doig, McCrae & Rowe, 2003).

Problem Statement

The learning of Mathematics does not only require the knowledge of rules, facts or principles, but it also requires understanding on when and how the knowledge is applied (Boekaerts, Seegers & Vermer, 1995). Therefore, teaching and learning strategies which are focused on text books are causing the development of procedural knowledge less connected to the out-of-classroom context (Schoenfeld, 1988). As a result, students will fail to apply the rules and methods which they have learnt in real-life situation since they do not actually understand the things they have learnt (Boaler, 1998).

It is very positive when numeracy started to get the attention and infused into the Mathematics education system in Malaysia (Kementerian Pelajaran Malaysia, 2011). The focus on numeracy starts at the primary education level. Numeracy is seen as an individual's ability to apply mathematical knowledge and skills in daily life (Kementerian Pelajaran Malaysia, 2010). Thus, numeracy may exist for an individual at all age levels. In the Malaysian education system, student's achievement at the end of the secondary level is measured based on the Malaysian Certificate of Education (SPM) examination. Hence, the need to know the relationship of achievement in Mathematics with their ability to use mathematics in real-life situations should be studied. Finally, this study may provide some reflections on mathematics curriculum provided by the MOE. Moreover, Trends in Mathematics and Science Study (TIMSS) reports showed that Malaysian students' achievement in Mathematics is less than satisfactory. The test of TIMSS focused on items concerning the solving of real-life mathematical problems. Numeracy is also defined as the ability of an individual to apply mathematical knowledge and skills to solve quantitative problems in real-life situations (Asiahwati Awi, Munirah Ghazali & Abdul Razak Othman, 2012). Therefore, the findings of TIMSS may actually describe the Malaysian students' achievement in numeracy.

Research Objective

This study intends to:

1. Identify numeracy level of secondary school leavers in the field of Numbers based on SPM Mathematics grade according to gender.
2. Determine the relationship between numeracy level and SPM Mathematics grade of secondary school leavers in the field of Numbers according to gender.

Research Question

In particular, two questions will be addressed in this paper:

1. What is the numeracy level of secondary school leavers in the field of Numbers according to SPM Mathematics grade according to gender?
2. Is there any relationship between numeracy level and SPM Mathematics grade of secondary school leavers in the field of Numbers according to gender?

Research Hypotheses

Null hypothesis 1 for relationship between variables in this study is that there is no significant relationship between numeracy level and SPM Mathematics grade for male secondary school leavers in the field of Numbers. Meanwhile, Null hypothesis 2 states that there is no significant relationship between numeracy level and SPM Mathematics grade for female secondary school leavers in the field of Numbers. Finally, Null hypothesis 3 states that there is no significant relationship between numeracy level and SPM Mathematics grade for secondary school leavers in the field of Numbers in general.

Research Scope and Limitation

MOE Mathematics Curriculum allocates nine scopes in the field of Numbers. The scopes are whole numbers; fractions; decimals; percentages; negative numbers; multiple factors; squares, square roots, cubes and cube roots; standard forms; and number base. A scope in the field of Numbers is also known as a topic. This study only focuses on four topics which are Whole Numbers, Fractions, Decimals and Percentages. This is because the four topics may depict the field of Numbers (Asiahwati Awi, 2015).

LITERATURE REVIEW

A study by Trends in International Mathematics and Science Study (TIMSS) 2015 showed that the average achievement score for Form Two students (8th grade) in Malaysia for the subject of Mathematics decreased significantly when comparing the findings of TIMSS 1999, 2003, 2007 and 2011. The average Mathematics achievement score for Malaysian students in 1999 was 519, while in 2003 it was 508 (less 11 points than the score in 1999). For 2007, the average Mathematics achievement score for Malaysian students was 474 (less 34 points than the score in 2003 and less 45 points than the score in 1999). For 2011, the average Mathematics achievement score for Malaysian students plummeted to 440 (less 34 points than the score in 2007, less 69 points than the score in 2003 and less 79 points than the score in 1999).

The latest TIMSS 2015 showed that the average Mathematics achievement score for Malaysian students increased to 465 (25 points more than the score in 2011). According to gender, the achievement in Mathematics for female Malaysian students is always higher than that of the male students (Mullis, Martin, Foy & Hooper, 2016).

Even though TIMSS identifies only the development of mathematical knowledge and skills among Form Two students, the implication given towards numeracy is clearly present. The Form Two content domain consists of Numbers, Algebra, Geometry plus Data and Probability. Since mathematics and numeracy are closely related, then all of the mathematics content domain is also considered as the numeracy domain. Furthermore, most of the items used to test students achievement in Mathematics are also suitable to test the level of numeracy. Thus, the findings of TIMSS concerning the average Mathematics achievement score for Malaysian students may give some picture concerning the numeracy level of Malaysian students.

METHODOLOGY

This section discusses on the research design, population and research sample, and research instrument.

Research Design

The quantitative research design is a cross sectional study as this study is to collect information from a sample of the population that has been identified in advance and carried out in a specific period of time (Noraini, 2013).

Research Sample

This study focused on secondary school leavers. Sample consisted of 600 secondary school leavers who were continuing their studies in the Lower Sixth-form whom are usually aged 18 years (K-12). Samples only involved students in the schools in Penang. The samples were selected by a stratified random sampling procedure from three schools that were randomly chosen in each five districts of Penang. Therefore, a total of 15 schools were involved in the study.

This study focused on secondary school leavers who had sat for the SPM examination. During this period of time, they had gone through the last stage of the syllabus by the MOE. In addition, they are undergoing a changing phase from late adolescence to adulthood which starts from the age of 18 years until the age of 64 years (Elsevier, 2009; Rakowski, et al., 1990). Meanwhile, according to Piaget's Cognitive Development Theory, they are in the stage of formal operation which is the last stage of the cognitive development. According to the theory, at this stage, they are able to think systematically and solve problems as well as applying similar principles to abstract concepts. Furthermore, an individual has to learn up till the age of 18 or 19 years in order to obtain knowledges which can be utilized in the real world (Santrock, 1996). If they fail to get those knowledges, they will have to find them on their own during their adulthood. Thus, the selection of samples which are the secondary school leavers is apt in order to accomplish the purpose of this study.

Research Instrument

This study measured the students' achievement in numeracy by using a numeracy test. Then, numeracy levels were constructed based on the scores. A set of test paper consisting of 36 items which included 25 objective questions and 11 subjective questions was prepared. All of the items in this study were to test the students' ability to apply mathematical knowledge and skills in the field of Numbers when solving quantitative problems in real-life situations. Those topics are Whole Numbers (W), Fractions (F), Decimals (D) and Percentages (P). Thus, each topic contributed as many as nine items. All the items in this study

were taken, translated and also adapted from existing items on numeracy from ten different sources (Asiahwati Awi, 2015). Four topics in the field of Numbers were chosen for this study.

For each topic, nine items were prepared with 25% weightage in five levels of item difficulty. Each topic has one item at difficulty level 1 which is very easy, followed by two items at difficulty level 2 which is easy, three items at difficulty level 3 which is moderately hard, two items at difficulty level 4 which is hard and one item at difficulty level 5 which is very hard. The distribution and number of items according to topics were determined by referring to the new version of Bloom Taxonomy Model which includes dimensions of knowledge and cognitive process. Figure 1 shows the summary of items according to the combination of knowledge and cognitive process dimensions in this study based on the new version of Bloom Taxonomy Model in two dimensions.

		Cognitive Process Dimension					
		remembering	understanding	applying	analyzing	evaluating	constructing
Knowledge Dimension	Fact	F	D	W D	P	P	W D
	Concept	D P	W	F P	F P	D P	P
	Procedure	W P	D P	F W	W D	W	D
	Metacognitive	W	F	D F	F	F	F W

Figure 1. **Summary of items according to the combination of knowledge and cognitive process dimensions based on the new version of Bloom Taxonomy Model (Asiahwati Awi, 2015)**

Item of difficulty level 1 for this study is in the knowledge dimension with categories of fact, concept and procedure, and in the cognitive process dimension with the hierarchy of 'remembering'. Meanwhile, item of difficulty level 2 is in all categories within the knowledge dimension, and in the cognitive process dimension with hierarchies of 'remembering', 'understanding' and 'applying'. Item of difficulty level 3 is also in all categories within the knowledge dimension, while sits in the cognitive process dimension with hierarchies of 'applying' and 'analyzing'. Item of difficulty level 4 too is in all categories within the knowledge dimension, while sits in the cognitive process dimension with hierarchies of 'analyzing', 'evaluating' and 'constructing'. Finally, item of difficulty level 5 is also in all categories within the knowledge dimension, while sits in the cognitive process dimension with hierarchies of 'evaluating' and 'constructing'.

Data Collection Procedure

Data was collected through a numeracy test in order to identify students' ability in numeracy knowledge and skills in solving quantitative problems in the field of Numbers. The numeracy test is also appropriate to determine whether an individual naturally uses suitable knowledge and skills in different contexts (The Quantitative Literacy Design Team, 2001). Samples were required to sit for a numeracy test at their own

schools. The samples needed to give answers inside the given question paper. They had to show their workings for the subjective questions in the provided spaces. The time allocated for the samples to answer was one hour. After that, checking of the answers was done manually and the data was keyed-in for analysis. The maximum marks for the level of difficulty of item 1 allocated 1 point, level of difficulty in item 2 is 2 points and so on until the level of difficulty of item 5 will be awarded 5 points. Score for each item was keyed-in according to the four topics in the field of Numbers. To facilitate the analysis, cumulative and aggregated data was distributed based on the numeracy scores. This study has distributed scores obtained on the level of numeracy and numeracy categorization in Table 1.

Table 1: The Score Distribution By Level And Categorization Of Numeracy

Numeracy Level	Score (%)	Numeracy Category
Numeracy Level 1	0 - 45	Basic
Numeracy Level 2	46 - 55	Low
Numeracy Level 3	56 - 65	Moderate
Numeracy Level 4	66 - 75	Good
Numeracy Level 5	76 - 100	High

Numeracy level 1 is the 'basic' numeracy level. At this level, the individual is said to have knowledge of concrete facts and ideas in the field and can easily relate to some context knowledge with some simple daily help. Individuals at this level do routine activities in real-life as well as the use of very simple skills with assistance. Numeracy level 2 is the 'low' numeracy level and at this level, the individual is said to have knowledge of the facts and the simple idea combined with the field and can relate to the context of the knowledge that led to personal and / or daily context. Individuals at this level perform routine activities in the context of personal and / or daily in the world of real-life, and can use their skills to carry out normal and routine tasks. Numeracy level 3 is the 'moderate' numeracy level. Individuals in this stage have a basic knowledge of the subject, particularly the fact that some of the facts and the simple idea that is associated with the field. These individuals also have a basic knowledge of the processes, materials and terminology. Individuals at this level are also using some direct skills to complete simple tasks that are not routine in the context of personal and / or practical in real-life.

Numeracy level 4 is the 'good' numeracy level. At this stage, the individuals have the basic knowledge in the field, especially the fact with some theory components. These individuals have a variety of facts and simple ideas related to the field. They also have the knowledge and understanding of the basic processes, materials and terminology. Individuals at this level use a variety of routine and non-routine skills in the context of personal and / or practical. Numeracy level 5 is the 'high' level of numeracy and considered as the best in the numeracy level categorization. Individuals at this level have a general knowledge in the field; factual and theoretical knowledge; and knowledge of various facts, ideas, property, materials, practices, terminology, techniques about / associated with the field. These individuals can relate to various practical fields and / or daily.

In the meantime, all secondary school leavers should have sat for the SPM examination and had taken the Mathematics subject. The systems of marking, categorizing and grading had been set by certain authorized parties.

Data Analysis

In order to achieve the first research objective which is to identify numeracy level of secondary school leavers in the field of Numbers based on SPM Mathematics grade, a descriptive analysis was done by getting the frequency percentage according to numeracy level and Mathematics grade. Meanwhile, to achieve the second research objective which is to determine the relationship between numeracy level and SPM Mathematics grade of secondary school leavers in the field of Numbers, the Spearman Rho correlation test was done. Correlation analysis was done to observe the relationship between two variables and also to determine the strength of the relationship between the variables. Since percentage of the numeracy score was categorized into levels while SPM Mathematics grade was using ordinal scales, the relationship between numeracy level and SPM Mathematics grade of secondary school leavers was analysed using the Spearman Rho correlation test.

Strength of relationships was shown by correlation coefficients. Spearman Rho correlation coefficient, 'r' has a value between 0.0 and 1.0, ($0 \leq r \leq 1$). The value r = 0.00 shows no correlation while r = 1.0 shows a full correlation. The value of r is considered 'very weak' between 0.01 – 0.30, ($0.01 \leq r \leq 0.30$), 'weak' between 0.31 – 0.50, ($0.31 \leq r \leq 0.50$), 'moderately strong' between 0.51 – 0.70, ($0.51 \leq r \leq 0.70$), 'strong' between 0.71 – 0.90, ($0.71 \leq r \leq 0.90$), and 'very strong' between 0.91 – 1.00, ($0.91 \leq r \leq 1.00$) (Chua, 2008). Descriptive analysis was done using the software Statistical Package for Social Sciences (SPSS) version 20. In addition, Spearman Rho correlation test was also done in order to analyze the obtained data using the software Statistical Package for Social Sciences (SPSS).

RESULTS

Only 386 samples fully completed the required information. Hence, analysis was done only on those 386 respondents. Results showed that 191 (49.5%) male students and 195 (50.5%) female students respectively were involved in this study. Discussion of results is to answer the research questions and thus fulfilling the research objectives. Numeracy test scores in percentage were categorized into five levels of numeracy. Percentage of the numeracy test scores had been categorized into five levels of numeracy by referring to Asiahwati Awi (2015).

Finding of this study shows that 47 (12.2%) respondents had obtained the A+ grade in SPM level Mathematics. Meanwhile, grades A and A- were 107 (27.7%) and 29 (7.5%) respectively. A total of 183 (47.4%) respondents were having grades A+, A and A-. Following that, 84 (21.8%) respondents had obtained grades B+ and B, 71 (18.4%) obtained grades C+ and C, while 36 (9.3%) obtained the grade D. Only 11 (2.8%) respondents obtained the grade E and 1 (0.3%) respondent obtained the grade F in SPM for the subject of Mathematics.

The finding on numeracy level of secondary school leavers in the field of Numbers based on SPM Mathematics grade shows that more than three-fourth of students with SPM Mathematics A+ grade (78.7%,

n=37, M=27, F=10) were in numeracy level 5. It also shows the highest percentage (40.2%) compared to students with other SPM Mathematics grades which were also in numeracy level 5. For the A+ grade students, only 12.8% (n=6, M=4, F=2) were in numeracy level 4, 6.4% (n=3, M=3, F=0) were in numeracy level 3 and 2% (n=1, M=1, F=0) was in numeracy level 2. None of the A+ grade students was in numeracy level 1.

For the 107 students with SPM Mathematics A grade, 24.3% (n= 26, M=19, F=7) were in numeracy level 5, while 29% (n= 31, M=17, F=14) were in numeracy level 4. These A grade students also became the group with the highest percentage within numeracy level 4 (48.4%, n= 31, M=17, F=14), numeracy level 3 (38.3%, n= 18, M=8, F=10), and numeracy level 2 (27.5%, n= 11, M=2, F=9) compared to students with other SPM Mathematics grade. However, 19.6% (n= 21, M=9, F=12) of the A grade students were in numeracy level 1.

For students with SPM Mathematics grades A- and below, the percentage of students in numeracy level 1 was higher than the other numeracy levels. Students with the SPM Mathematics grade D showed the highest percentage (17.5%, n=25, M=12, F=13) within numeracy level 1 compared to students with other SPM Mathematics grade within numeracy level 1. For students with the E grade (2.8%, n=11, M=6, F=5), more than half of them (54.5%, n=6, M=3, F=3) were in numeracy level 1. Meanwhile, the only student who failed the SPM Mathematics was in numeracy level 1. Table 2 shows the numeracy levels of secondary school leavers based on SPM Mathematics grade in the field of Numbers according to gender. Figure 2 shows the distribution of numeracy levels based on SPM Mathematics grade for male secondary school leavers while Figure 3 shows the distribution of numeracy levels based on SPM Mathematics grade for female secondary school leavers and Figure 4 shows the distribution of SPM Mathematics grades according to gender.

Table 2 Numeracy Level Based on SPM Mathematics Grade for Secondary School Leavers According to Gender

SPM Mathematics Grade		Numeracy Level					Total
		1	2	3	4	5	
A+	Male		1	3	4	27	35
	Female		0	0	2	10	12
	Total		1	3	6	37	47
A	Male	9	2	8	17	19	55
	Female	12	9	10	14	7	52
	Total	21	11	18	31	26	107
A-	Male	3	0	1	3	4	11
	Female	7	4	3	3	1	18
	Total	10	4	4	6	5	29
B+	Male	10	3	2	4	9	28
	Female	8	3	2	6	2	21
	Total	18	6	4	10	11	49
B	Male	7	2	0	1	5	15

	Female	14	2	3	1	0	20
	Total	21	4	3	2	5	35
	Male	8	2	0	0	2	12
C+	Female	11	4	5	5	1	26
	Total	19	6	5	5	3	38
	Male	6	2	3	1	0	12
C	Female	16	2	0	1	2	21
	Total	22	4	3	2	2	33
	Male	12	2	1	0	1	16
D	Female	13	1	3	1	2	20
	Total	25	3	4	1	3	36
	Male	3	0	2	1		6
E	Female	3	1	1	0		5
	Total	6	1	3	1		11
	Male	1					1
G	Female	0					0
	Total	1					1
	Male	59	14	20	31	67	191
	Female	84	26	27	33	25	195
	Total	143	40	47	64	92	386

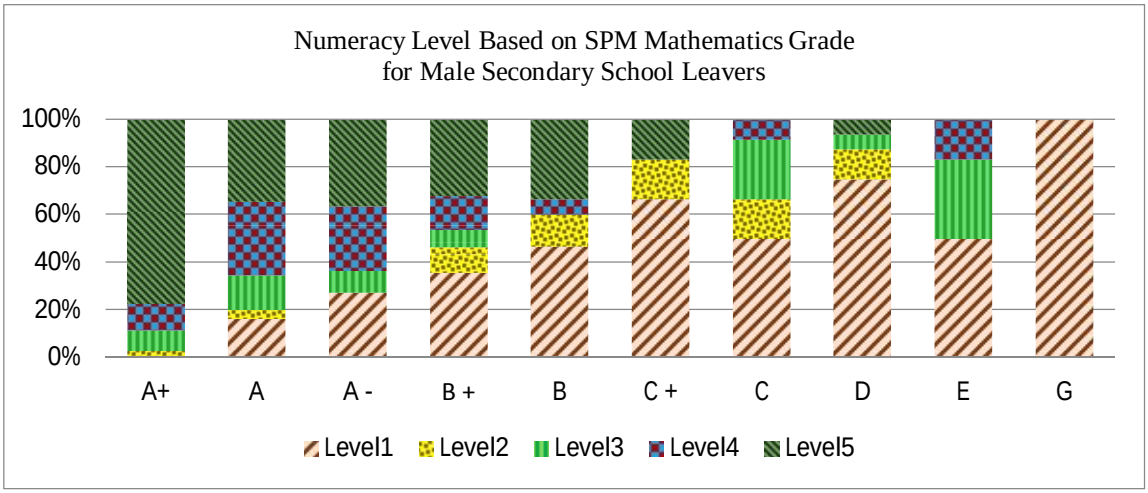

Figure 2 **Distribution of numeracy level based on SPM Mathematics grade for male secondary school leavers**

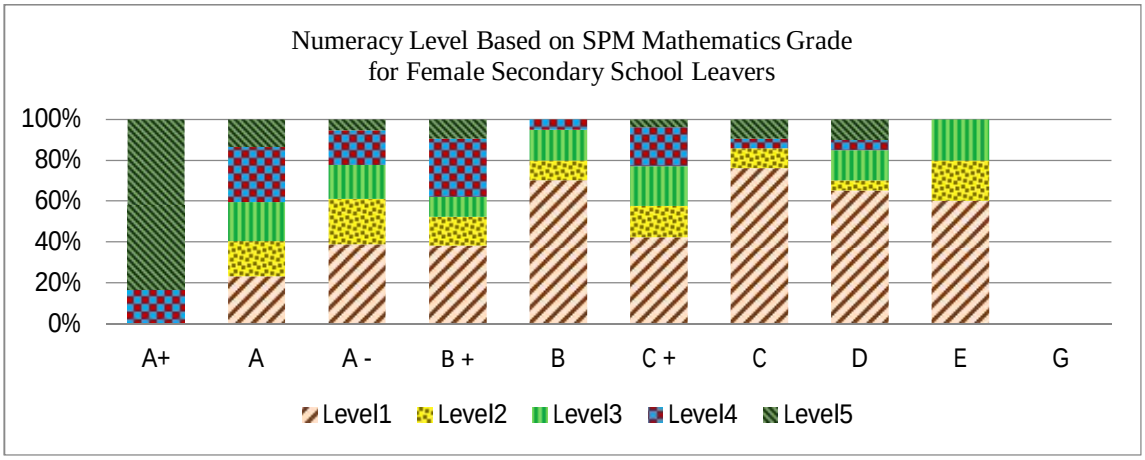

Figure 3 **Distribution of numeracy level based on SPM Mathematics grade for female secondary school leavers**

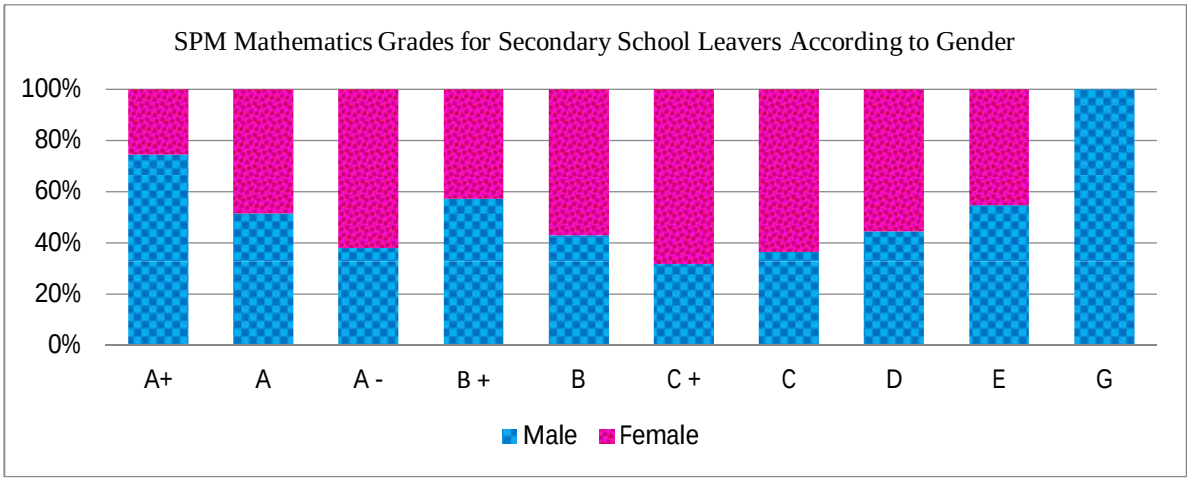

Figure 4 **Distribution of SPM Mathematics grades for secondary school leavers according to gender**

For male students, the results showed that 30.9% (59) of 191 respondents in this study were in numeracy level 1. Meanwhile, 7.3% (14) of the respondents were in numeracy level 2, whilst 10.5% (20) were placed in numeracy level 3. Next, a percentage of 16.2% (31) of the respondents were in numeracy levels 4 and finally, 35.1% (67) were in numeracy level 5. Numeracy results showed that more than one-third of male respondents were in numeracy level 5.

Then for female students, the results showed that 43.1% (84) of 195 respondents in this study were in numeracy level 1. Next, 13.3% (26) of the respondents were in numeracy level 2, whilst 13.8% (27) were found to be in numeracy level 3. Meanwhile, a percentage of 16.9% (33) of the respondents were in numeracy level 4 and lastly, 12.8% (25) were in numeracy level 5. Numeracy results showed that more than two-fifth of female respondents were in numeracy level 1, whilst almost one-fifth of respondents were placed in numeracy level 4. Figure 5 shows the distribution of numeracy levels for secondary school leavers according to gender.

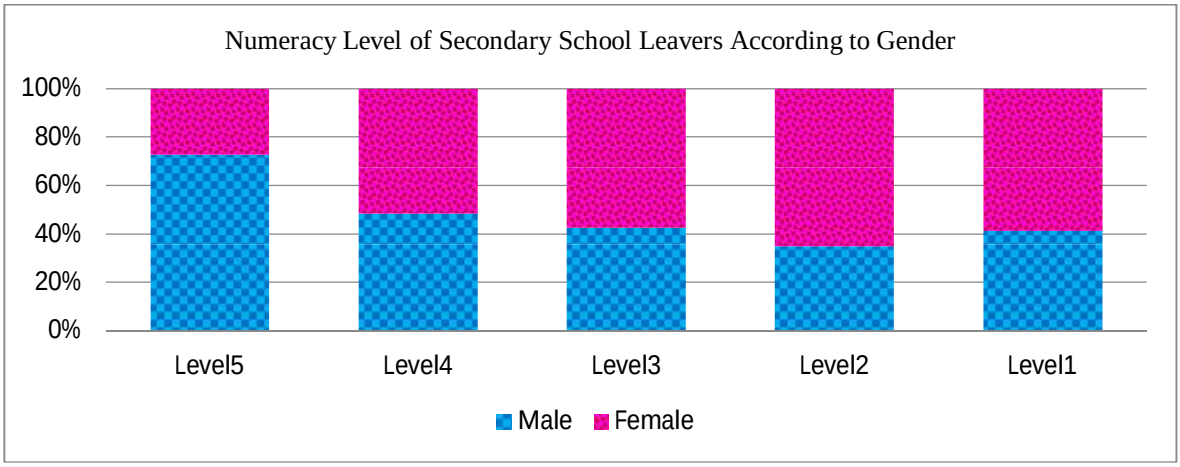

Figure 5 **Distribution of numeracy levels for secondary school leavers according to gender**

Spearman Rho correlation test was used to determine the relationship between two variables. Calculation of correlation was done by testing the relationship between numeracy level and SPM Mathematics grade for secondary school leavers in the field of Numbers. For the male students, the value of Spearman Rho correlation coefficient is r = .565 in which the relationship is positive and moderately strong. For the female students, the value of Spearman Rho correlation coefficient is r = .427 with a positive and weak relationship. For all the secondary school leavers, the correlation is positive with the value of Spearman Rho correlation coefficient r = .530 and the relationship is moderately strong. All of these relationships are significant with the value $p < 0.01$. Hypotheses Null 1, Null 2 and Null 3 in this study in which there is no significant relationship between numeracy level and SPM Mathematics grade for male students, female students and for all students in the field of Numbers were rejected. Table 3 shows the relationship between numeracy level and SPM Mathematics grade for secondary school leavers in the field of Numbers.

Table 3 Relationship Between Numeracy Level and SPM Mathematics Grade for Secondary School Leavers

Spearman *r*	Male	Female	Total
Correlation Coefficient	.565**	.427**	.530**
Sig. (2-tailed), *p*	.000	.000	.000
n	191	195	386

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

DISCUSSION

The research finding has shown that almost four-fifth (79%) of students who obtained A+ grade for the SPM Mathematics were in numeracy level 5. This shows that four out of five A+ grade students involved in this study were in the highest numeracy level for this study. They also made the highest percentage (40%) within numeracy level 5 compared to students with other SPM Mathematics grades. It is also found that none of the A+ grade students was in numeracy level 1. Meanwhile, students who obtained the A

grade, which is the second best SPM Mathematics grade, were found to be the second highest group (28%) within numeracy level 5 after the A+ grade students. However, 20% of the A grade students were in numeracy level 1. On a positive note, 24% of the A grade students were in numeracy level 5. Many of the A grade students made the highest percentage (29%) within numeracy level 4. The analysis results also show that the percentage of students who obtained SPM Mathematics grades A- and below is higher within numeracy level 1 than the percentage within the other numeracy levels. Figure 4 and Figure 5 each shows that the percentage of male students is higher than the female students in obtaining SPM Mathematics A+ grade (74.5%) and numeracy level 5 (73%). This gives an impression that in this study, the achievement of male students is better than that of the female students. Nevertheless, this particular finding is not in line with TIMSS which stated that Malaysian female students' achievement in Mathematics is always higher than that of the the male students (Mullis, Martin, Foy & Hooper, 2016).

The finding from the correlation test shows that there is certainly a significant relationship between numeracy level and SPM Mathematics grade for secondary school leavers. The value of Spearman Rho correlation coefficient for the male students is .565 in which the relationship is positive and moderately strong. Meanwhile, the value of Spearman Rho correlation coefficient for the female students is .427 with positive and weak relationship. The correlation value of .530 for the whole secondary school leavers in this study shows that the relationship is positive and moderately strong. All of the relationships between numeracy level and SPM Mathematics grade for secondary school leavers in the field of Numbers are significant. Positive labelling shows that the direction of the existing relationship is parallel in which, when one variable shows a high score, then the second variable will show a high score as well (Noraini Idris, 2013). This also means that the better SPM Mathematics grade for the students, the higher numeracy level they will be in. Thus, students who are more knowledgeable in mathematics will exhibit better achievement in mathematics and vice versa (Yeong & Johari Hassan, 2009). High achievement in mathematics will in turn increase their mathematical skills (Nguyen, 2016). As a conclusion, when an individual is more knowledgeable in mathematics, that individual will know numeracy better.

IMPLICATION OF STUDY

In the Malaysian education system, Form Six students are given a choice of subject packages where certain packages do not include Mathematics subject at all. Hence, if a student takes a package which does not include Mathematics, then the learning of mathematics will stop at the secondary school level. Since mathematics and numeracy are closely related (Asiahwati Awi, 2015), then this situation will definitely give an impact on the student's numeracy. A student may face the problem of 'does not know numeracy' (innumerate) if formal learning (which includes numeracy) stops at Form Five (Crowther, 1959, para 401). Form Six students also need to go through learning basics that expose them to numeracy which is usually included in the Mathematics subject. This becomes the most important task for those who produce the Form Six syllabus in order to ensure that no student leave school as a person who 'does not know numeracy' so that they will be able to function in their real-life situations. An individual is categorized as having numeracy when that person is confident in making choices and use the mathematical skills which has been learnt at school for daily life and situations in the classroom (Education Queensland, 2007).

This study involved Lower Six students who are labelled as secondary school leavers. It is considered that these students had gone through mathematics education system which is constructed by the MOE for as long as 11 years, starting as early as in Standard One until Form Five. Within this critical range of age, they were trained with basics to make wise decisions and reasonable conclusions in real-life. With this research finding, the MOE should take certain actions so that every effort that has been done can be beneficial for the students in their real-life.

The finding gives implication towards the MOE so to focus more on secondary school leavers especially Form Six students in numeracy since they are the seed-time for a lifelong harvest (Crowther, 1959, para 400). Efforts in creating the 'Malaysia Education Blueprint 2013 – 2025' which enhances the National Education Philosophy by giving concern towards numeracy, is a very noble one. This proves that the MOE is aware that numeracy is a mathematical knowledge which is applied in real-life and important throughout the whole life of an individual. It is a desired outcome for students to have knowledge and skills before going to the university level. If students who would be enrolling into the university have low knowledge and skills concerning 'numbers', they might not perform well when continuing their studies at the university level (LeFevre, Douglas, & Wylie, 2017).

CONCLUSION

Numeracy is being given attention by developed countries as special organizations are being set up to handle matters concerning numeracy. Furthermore, many hold an opinion that numeracy and mathematics are closely related and inseparable (The Quantitative Literacy Design Team, 2001; Kemp, 2005; Ginsburg et al., 2006). Therefore, an improvement in the mathematics curriculum will also bring about an implication towards numeracy. Since theoretically the curriculum prepared by the Ministry of Education is already considered comprehensive, the educators will just need to give focus on methods of implementing the curriculum so that the objectives of mathematics education will be achieved. At the same time, the education in Malaysia also need to have the same focal point on numeracy and more favourable according to gender.

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