Languages and Mathematics Achievements Among Rural and Urban Primary Four Pupils: A Malaysian Experience

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The change in the language of instruction for Mathematics under PPSMI had been opined to prejudice learners’ achievements due to their weakness in the subject matter as well as in English. This study sought to analyse 186 urban and rural Primary 4 pupils’ Mathematics achievements in tests using English and English/Bahasa Malaysia presentations. This quantitative study employed two instruments, in English and English/Bahasa Malaysia respectively, to measure the pupils’ achievements in Mathematics. The results from this study indicated that both urban and rural pupils performed weakly in both the English and English/Bahasa Malaysia test. The rural pupils were weaker in mathematics compared to the urban pupils. It was found that rural pupils’ Mathematics achievements were not influenced by the language used during the tests, while urban pupils’ Mathematics achievements were influenced by the language the tests were presented in. Urban pupils’ Mathematics achievements in both tests surpassed those of their rural counterparts’. Although both groups’ mean scores for the English Test were slightly lower than those of the English/Bahasa Malaysia Mathematics Test, the difference was only significant for urban pupils. In conclusion, while it was shown that both rural and urban pupils were slightly advantaged by the use of Bahasa Malaysia’s accommodation with the English test, the bulk of their inaccurate answers seem to originate from errors in content-knowledge.

Key words: Mathematics; Language; Learning; Achievement; Rural; Urban
Background
The PPSMI (Teaching and Learning of Science and Mathematics in English) in Malaysia came into being in 2002 when it was announced that mathematics and science, at both the primary and secondary levels, shall be taught in English. The move was deemed necessary as it would enable learners to access information using the multimedia means to gather knowledge in the dynamic fields of mathematics and science using English, a language in which the two subjects’ current and latest knowledge is most commonly available. PPSMI is also meant to prepare Malaysians to be globally competitive. Learners taught mathematics and science in English are hoped to be of a new generation who are competent and conversant in English. Since the implementation of the policy, various studies had been conducted to evaluate its effectiveness.

Detractors of the policy foregrounded learners’ lack of competency in English as the factor that complicates the execution of the PPSMI (Johari, Nor Hasniza & Meor Ibrahim, 2006; Isahak, Abdul Latif, Md Nasir, Abdul Halim & Mariam, 2008). Such ineptness caused learners to be challenged academically during the process of teaching and learning and ultimately their achievements in the two subjects would suffer. Juriah Long cited in Isahak et al. (2008), meanwhile, described that her rural area subjects were highly concerned over the use of English in the learning and teaching of mathematics and science. There was also the view that learners from the rural areas were victimised by the policy as they were poor in the two subjects and in English as well (Utusan Malaysia Online, December 13th, 2008).

Johari et al. (2006), Isahak et al. (2008), Nor Hashimah (2003), and Noraini, Loh, Norjoharuddeen, Ahmad Zabidi and Rahimi (2007) raised the issues of learners’ unpreparedness to adopt and adapt to English being used as the language of learning and teaching mathematics and science. During the early years of its implementation (2003 to 2005) various studies had evaluated the policy and came to the conclusion with regards to its virtues and flaws. It should be noted that most of these studies were conducted, or took into consideration outcomes during a period very soon after the policy came into effect. The subjects of the abovementioned studies, both teachers and students alike, were thus still in the process of coming to terms with the use of English in mathematics and science classrooms. As such, the abovementioned difficulties in adopting and adapting to PPSMI were not unexpected. We believe that ideally the policy should have been allowed a
time frame of a minimum of four years as the first batch of learners would end their primary education in 2007/08. Such duration would offer the learners some experience in adopting and adapting PPSMI before a meaningful study could be conducted on their achievements in the two subjects.

Furthermore, studies that had been done in relation to PPSMI thus far were perception studies that sought learners’ and teachers’ opinions regarding attitudes and achievements (Nor Hashimah, 2003; Zainuddin, Juriah, (cited in Isahak et al., 2008); Johari et al., 2006; Siti Azura, 2008; Noraini et al., 2007; Ahmad Faizal, 2006). They had not specifically looked into identifying whether achievements in mathematics, which is the concern of this study, differ when identical tasks are presented in different languages. While opinions indicate the levels of usefulness and success of the policy, it is perhaps more desirable to have empirical evidence in the form of two sets of achievement scores that can be analysed statistically to determine whether pupils’ achievements differ with regards to the languages used in the tests and between rural and urban subjects. In other words, it is pertinent to provide empirical evidence whether pupils are facing problems with the language, or with the content, or both!

It is useful to note that learners operate on two levels when faced with a mathematical task. According to Halai (2004), on the one level, learners attempt to interpret and make sense of the language (i.e. the grammar, vocabulary, etc.) in which the question was posed, while on the other, they attempt to decipher the subject matter’s requirement of the question. As such, there is then a second element that has an important role to play in the equation that culminates in a learner’s mathematical achievement. Besides language, mathematics acumen contributes significantly to how a learner performs in attempting to solve mathematical tasks. It is highly probable then, a flaw in either would bring about inaccurate answers and ultimately lower achievement. Therefore, in the PPSMI scenario, it is important to investigate whether the impediment for learners’ mathematics achievement was its medium of instruction or the learners’ mathematics content knowledge.

As was mentioned earlier, English has been tagged as the cause for learners’ less than ideal achievements in mathematics under PPSMI and for the language’s purported failure to improve learners’ conceptual understanding of the subject matters. Isahak et al. (2008) made a call for a
reversion of the medium of instruction to Bahasa Malaysia. Theirs and the other abovementioned studies, unfortunately, had not been able to shed light with regards to learners’ comparative achievements in mathematics tests conducted in English and in English moderated by Bahasa Malaysia. Without such comparison, there is little justification in labeling English as the scourge of the policy that caused the purported hardship to its learners. The mathematics achievement test incorporated in Isahak et al.’s (2008) study unfortunately used only monolingual items. As such, it is not possible to tell whether the subjects’ achievements would be different if the tasks were presented in a different language. Thus, there is a need find out whether the learners’ weaknesses were due to a particular language.

Two studies lent credence to a commonly held belief that urban learners have relatively lesser problem coping with the said language being used as the language of learning and teaching compared to their rural counterparts. In a study by Juriah, cited in Isahak et al. (2008), it was found that nearly half of the respondents, mostly learners from the rural areas, were reported to have expressed concern over the use of English as the medium of instruction in mathematics (and science) classrooms as they faced difficulty in comprehending what was taught. The reality has been highlighted in Ong and Tan’s (2008) study, which reported that although the teachers interviewed were supportive of the implementation of teaching mathematics in English, they were still struggling with some problems, such as weak linguistic environment in school, students’ abilities in using English language and also the teachers’ prior educational background. This scenario was supported by data from a study which stated that only 60% of mathematics and science teachers were not fluent in the English language although 45% said they are comfortable in using the language to teach (The Star, 2006). One hundred and twenty rural Form Two learners, subjects of the study conducted by Johari et al. (2006) shared similar experiences, when they were found to have faced learning difficulties due to English being used to teach mathematics. Their problems were compounded by their low proficiency in the said language as well. Unfortunately, the said studies did not provide any comparison between rural and urban learners’ mathematics achievements. Such would have provided empirical evidence as to whether their mathematics achievements were indeed influenced by geographical settings.
The issue of the use of language in teaching and learning mathematics becomes more complex when we consider studies such as that of Setati (2006, 2008) that used data from a multilingual country, namely South Africa to explore the use of language in relation to students’ learning of mathematics in multilingual mathematics classrooms. In his study, he discovered that the multilingual students who chose their preferred language for the interview, liked to learn mathematics in English. Students’ preference for English in learning mathematics is concerned with access to social goods. However, students who focus and were keen on improving mathematical knowledge in studying mathematics prefer the use of their home languages. This finding provides an insight that shows the complexity of teaching and learning in multilingual classroom.

Most Malaysian learners can be taken as English Language Learners (ELL), based on the definition of Abedi, Courtney, Leon, Kao and Azzam, (2006), as they are yet to master English proficiency to satisfactorily operate in an academic classroom conducted purely in the English language. Therefore, they have to go through the rigmarole of and the hardship associated with learning and acquiring the English language while at the same time learning, strengthening and applying mathematical adroitness through the very language they are in the process of acquiring. Isahak, et. al (2008) claimed that PPSMI had failed to raise learners’ conceptual understanding, knowledge and skills in mathematics and science. However, caution should be exercised in too readily agreeing to assign blame on the language factor alone for learners’ low achievement in mathematics conducted in English. Parmjit (2004) had identified students’ thinking process through a clinical interview. He found that mathematical acumen was also necessary besides knowledge of language in order to satisfactorily arrive at the solutions for mathematical tasks. Similarly, Lerman (2001), cited in Parvanehnezhad and Clarkson (2007), wrote of ‘strategies’, which were related to mathematical content knowledge that learners need to bring with them to a mathematical task along with the ability to interpret and comprehend mathematical jargons and semantics. These points of view are strong indications that for learners to be successful in learning mathematics

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1 English language learner (ELL) refers to students whose level of English language proficiency is not at a level where they are able to fully participate in an English-only instructional environment.
in English they require two skills – that of language as well as that of mathematics. This was substantially true as found by Rasidah and Wong (1998) that teachers need to find effective teaching and learning strategies to assist students develop their conceptual understanding as well as broadening their vocabulary power of mathematics. Since mathematics was taught in English, the students should be assisted to strengthen the ability of using English language.

**Purpose and Objectives of the Study**

The first purpose of this study was to determine whether the English language is the root cause of learners’ low achievement in Mathematics. The second purpose was to find out whether those from the rural areas were more disadvantaged due to English being used as the medium of instruction in Mathematics as compared to urban school pupils. To determine whether English affects learners’ performance in learning mathematics, it is useful to analyse the learners’ performance in answering questions presented in English comparative to their achievement in answering similar questions posed in English and moderated by Bahasa Malaysia to see if indeed the learners were handicapped by the said language. In order to address the issue of urban-rural dichotomy, there was a need to find out whether there exists a difference in mathematics achievements with respect to the above two modes of question items formats between learners from the rural and urban schools.

**Research Questions**

This study attempted to answer the following research questions:

1. Is there a significant difference in rural area’s Primary 4 pupils’ mean scores between English Mathematics Test (EMT) and English/Bahasa Malaysia Mathematics Test (EBMMT)?
2. Is there a significant difference in urban area’s Primary 4 pupils mean scores between the EMT and the EBBMMT?
3. Is there a significant difference between rural and urban areas pupils’ mean scores in the EMT?
4. Is there a significant difference between rural and urban areas pupils’ mean scores in the EBMMT?
Methodology
For the purpose of determining Primary Four pupils’ mathematics achievements in relation to the language presentations, this study incorporated the administration of two sets of mathematics achievement tests. The first set of the instrument presented its items in the English language (i.e. the EMT) while questions in the second instrument were in dual-language, comprising of English with Bahasa Malaysia translations (i.e. EBMMT). Rationally, if a pupil is comfortable to learn and solve mathematical problems in English language, he would not need to refer to the mathematical problems in Bahasa Malaysia. The achievement tests were administered to 186 among the Primary Four pupils ages 9 – 10 years (93 urban and 93 rural) from five schools in the district of Maran, Pahang.

The question booklet (EMT) that was administered first to the Primary 4 pupils consisted of 20 mathematical test items written in English. These tasks are shown in Appendix A. The items were adapted from Parmjit (2006) and constructed based on the Year 4 Mathematics Curriculum Specification. The word problem items in the test included the four basic operations, namely addition, subtraction, multiplication and division as the fundamental requirements of elementary mathematics for primary pupils. These questions also followed closely the format of the standardised Ujian Penilaian Sekolah Rendah (UPSR) (Primary School Assessment Test) Mathematics Paper 2 and incorporated adequate spaces following every question for the research subjects to show their workings and solutions. The second question booklet (EBMMT) consisted of exactly the same questions and formats except for the questions being accommodated by the appearance of Bahasa Malaysia translation following every question.

The content validity of both the EMT and EBMMT instruments were established by three experienced Mathematics teachers who were experts in the related area. The content was validated based on the specification of the Year 4 Mathematics syllabus and on the language used for both instruments. Several suggestions were given and the items were amended accordingly.

In order to determine the stability of both tests (EMT and the EBMMT), two groups of pupils (25 pupils and 29 pupils respectively) from two different schools (intact classes with similar characteristics of the subjects for the actual study) completed the tests on two occasions and the time interval between
the tests was one week. The test-retest reliability coefficients (0.917 and 0.950) for both tests (EMT and the EBMMT) present a strong reliability coefficient.

Each of the EMT and EBMMT test was allotted a 50-minute duration during which the pupils were expected to answer all twenty questions. Eight items were assigned the maximum of 3 marks; eleven had the maximum of two marks, while one item carried 1 mark. The total score for the test was 47 marks. About two hours after the pupils had completed answering and had handed in the EMT booklets, the EBMMT booklets were commenced. The two-hour gap was deemed too short for the subjects of the tests to discuss and find alternative answers to the EMT test items. This is because as the tests were conducted during school session, the test subjects had to attend to their formal academic concerns during the break. As such, there was little opportunity for them to exploit the lapse in ways that may undermine this study. Therefore, it is safe to assume that the subjects having language difficulties while answering EMT would find the language moderation in EBMMT helpful to assist them perform better. In such a manner then, the effect of using another moderated language can be measured.

Data Analysis and Results

This section details the findings of the study based on the four research questions.

Research Question 1

Table 1 shows the descriptive statistics for rural area Primary Four pupils’ EMT and EBMMT Tests. It shows that the mean score obtained in the EMT is 6.52 as compared to 7.30 in the EBMMT.

Table 1
Descriptive Statistics for Rural Schools Pupils

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMT</td>
<td>93</td>
<td>6.52</td>
<td>0.66</td>
</tr>
<tr>
<td>EBMMT</td>
<td>93</td>
<td>7.30</td>
<td>0.74</td>
</tr>
</tbody>
</table>
A paired-sample t-test was conducted to find out whether these mean scores were significantly different. The result is shown in Table 2.

Table 2
\textit{t-test Comparing Means of Rural Pupils’ Achievement in EMT and EBMMT}

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMT – EBMMT</td>
<td>-1.761</td>
<td>92</td>
<td>0.082</td>
</tr>
</tbody>
</table>

It was determined that, among the rural pupils, there was no significant difference in their means scores between the English and English/Bahasa Malaysia Tests at the 0.05 level \((t(92) = -1.761, p > .05)\). This is indicative that for this group of pupils, their performance is not dependent on whether the test is moderated by Bahasa Malaysia or not. The differences in their abilities to perform in the two tests may stem from reasons other than language. Further survey is needed to find the reasons.

\textbf{Research Question 2}

The descriptive statistics for urban area Primary Four pupils in the EMT and EBMMT is shown in Table 3. Their mean scores were 14.37 in the EMT and 15.60 in the EBMMT.

Table 3
\textit{Descriptive Statistics for Urban Schools Pupils}

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMT</td>
<td>93</td>
<td>14.37</td>
<td>1.02</td>
</tr>
<tr>
<td>EBMMT</td>
<td>93</td>
<td>15.60</td>
<td>1.05</td>
</tr>
</tbody>
</table>

A paired-sample t-test was conducted to find out whether these mean scores were significantly different statistically, the result of which is found in Table 4.

Table 4
\textit{t-test Comparing Means of Urban Pupils’ Achievement in EMT and EBMMT}

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMT – EBMMT</td>
<td>-3.594</td>
<td>92</td>
<td>0.001</td>
</tr>
</tbody>
</table>
It was determined that, among urban pupils, there is significant difference in their mean scores between the English and the English/Bahasa Malaysia Tests at the 0.05 level \((t(92) = -3.594, p=0.001)\). It may be said that the pupils’ achievement in the tests was influenced by the language the tests were presented in. However, further study is needed to investigate for other reasons. As the mean score for the EBMMT Test is higher, this is reflective of the pupils from urban schools performing better in the EBMMT in comparison to the EMT.

**Research Question 3**

As shown by Table 5, rural and urban areas Primary Four pupils mean scores in the English Test were 6.52 and 14.37 respectively.

<table>
<thead>
<tr>
<th>Table 5</th>
<th>Descriptive Statistics for Rural and Urban Schools Pupils (EMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>EMT (Rural)</td>
<td>93</td>
</tr>
<tr>
<td>EMT (Urban)</td>
<td>93</td>
</tr>
</tbody>
</table>

An independent sample t-test was conducted to find out whether there existed a significant difference between rural and urban Primary Four pupils’ mean scores in the English Test. The result is found in Table 6.

<table>
<thead>
<tr>
<th>Table 6</th>
<th>t-test Comparing Means of Rural and Urban Pupils’ Achievement in EMT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t</td>
</tr>
<tr>
<td>EMT</td>
<td>-6.241</td>
</tr>
</tbody>
</table>

It was determined that there is significant difference between the rural and urban pupils’ mean scores in the English Test at the 0.05 level \((t(184) = -6.241, p=0.000)\). Essentially, this means that among the pupils in different regional segregation, the implication of using EMT and EBMMT on the pupils’ performance in mathematics is that pupils from the urban schools perform better than pupils from the rural schools. The discussion of the above results was limited to the study based on the experimental tests on EMT and EBMMT.
Research Question 4

Table 7 shows the descriptive statistics for rural and urban areas Primary Four pupils in the EBMMT. Their mean scores in the test were 7.30 and 15.60 respectively.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBMMT (Rural)</td>
<td>93</td>
<td>7.30</td>
<td>0.74</td>
</tr>
<tr>
<td>EBMMT (Urban)</td>
<td>93</td>
<td>15.60</td>
<td>1.05</td>
</tr>
</tbody>
</table>

An independent sample t-test was conducted to find out whether there existed a significant difference between rural and urban Primary Four pupils’ mean scores in the EBMMT. The result is as depicted by Table 8.

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBMMT</td>
<td>-6.244</td>
<td>184</td>
<td>0.000</td>
</tr>
</tbody>
</table>

It was determined that there is significant difference between the rural and urban pupils’ mean scores in the English/Bahasa Malaysia Test at the 0.05 level ($t(184) = -6.244$, $p=0.000$). Essentially this means that regional segregation among the pupils has implications upon their performance in the EBMMT, when pupils from the urban schools perform better than pupils from the rural schools. In addition, the results from Table 6 and Table 8 showed that urban pupils’ mathematics tests achievement scores surpassed those of rural pupils.

Discussion and Conclusion

For Primary Four pupils from the rural area, the result of the paired-sample t-test is indicative that regardless of the language used in the tests, there was no statistically significant difference in their achievement. For this group of learners it could be said that English did not victimise their test performance. The finding concurs with that of Abedi et al. (2006) who established that learners’ achievements do not differ between tests with and without home language accommodation. However, despite their
achievements in the two tests having been found as bearing no statistical significance, they did portray the trait found by Abella, Urrutia & Shneyderman (2005) that ELLs performed better in tests using their home language when their mean score in EBMMT \((M = 7.30)\) was higher than their mean score in the EMT \((M = 6.52)\). Even though Bahasa Malaysia is not the home language for all the pupils, the language is Malaysia’s National Language which is commonly used in schools, in addition, other subjects in school are mainly taught in Bahasa Malaysia.

For their counterparts from the urban area, the result of the paired-sample t-test indicates that the language used during the test has influence over their achievement. Their mean score in the EBMMT \((M = 15.60)\) is higher than their mean score for the EMT \((M = 14.37)\).

From the findings of the research questions above, it can be said that there is a difference in the influence of the use of English as the medium of instruction for mathematics on the pupils from the rural and urban areas whereby the choice of language did not significantly matter to rural pupils, while their counterparts from the urban schools seem to respond better to test items presented in English/Bahasa Malaysia. What may be gleaned from these findings are, firstly, rural pupils low mathematics achievement did not derive only from the use of English during the test; rather it was the product of other reasons, which may not be quite related to the said language. Secondly, in contrast to rural area learners, pupils from the urban schools benefitted from the use of Bahasa Malaysia moderation in test items. Therefore, Bahasa Malaysia may be deemed as having assisted the urban pupils achieving higher scores. This may be due to the pupils’ and teachers’ emphasis on the use of the Malaysia’s National Language during the learning and teaching process. Advantaged by the assistance of a familiar language of instruction, naturally the urban test-takers performed better in EBMMT.

The comparison between rural and urban pupils’ achievements in the English Test showed that their mean scores were significantly different. A similar result was also found with the English/Bahasa Malaysia Test. These two results indicated that the urban-rural geographical locations could be an important influence on the achievements in the Mathematics Tests regardless of the language of instruction used, as the two groups’ mean scores in both tests showed that learners from the rural area consistently performed less well than urban area learners.
The findings to the research questions showed that the urban pupils’ mean scores in both the English and English/Bahasa Malaysia Tests were consistently higher than those of the rural pupils’. These provided concrete evidence to claims made by other researchers with regards to urban learners outperforming their rural counterparts achievement-wise, at least in the case of mathematics (Nor Hashimah, 2003; Zainuddin, Juriah, cited in Isahak et al., 2008; Isahak et al., 2008). The finding from Research Question 3 suggested that the rural pupils achieved low performance in answering mathematics questions in English, which shows agreement with Ratnawati and Ismail (2003) that learners from such an area lacked exposure to the said language, thereby, leading to their comparatively lower achievements. Meanwhile, Research Question 4 concurred with the opinion of Ismail Hussein that rural area learners were weak in the content-knowledge of mathematics and science (Utusan Malaysia Online, December 13th, 2008). Such a weakness, compounded by their English language shortcomings, had enabled urban area pupils to outperform them in both the English and English/Bahasa Malaysia Tests.

The quantitative analyses thus far established that besides language, there were other factors that also posed as obstacles for pupils from both the rural and urban areas from obtaining high scores in the two achievement tests. The pupils’ mean scores for those tests (EMT and EBMMT) were low in comparison to the maximum possible score of 47 (6.52 and 14.37 respectively for the English Test; 7.30 and 15.60 respectively for the English/Bahasa Malaysia Test). This showed that the pupils were weak in all the mathematics tests, indicative that they were weak in content-knowledge as well.

The results of this study indicated that neither the usage of English nor English/Bahasa Malaysia could provide an advantage for pupils from the rural area in Mathematics tests. Since the language of instruction was considered to be a non-issue by virtue of the tests scores being not significantly different, it may be inferred that their low scores were indicative of them having mathematical acumen difficulties. The results for their counterparts from the urban area, however, painted a slightly different picture. These pupils displayed significant difference between their achievements in the English Test and the English/Bahasa Malaysia Test. As had been discussed earlier, the significant difference between the urban test-takers’ EMT and EBMMT scores may be attributable to the choice of language of instruction during the teaching and learning process they
underwent prior to the tests. These two groups of pupils differ in terms of the influence that languages have over their mathematics achievements. One consistency that could be observed was urban pupils outperforming those from the rural area in both the English and English/Bahasa Malaysia tests.

The differences in their achievements highlight an important matter – the inaccuracy of the accusation that English as the medium of instruction in mathematics is the cause of the pupils’ less than ideal achievements in the said subject. This is because both groups of pupils were weak in content knowledge as evidenced by their low mean scores in both tests. Noteworthy as well was the fact that learners from the rural area were not significantly handicapped by the said language in their mathematics achievements. As for the urban pupils, while it was shown that they were slightly advantaged by the use of Bahasa Malaysia’s accommodation, the bulk of their inaccurate answers seem to originate from errors in content-knowledge. To reiterate a point made earlier, the pupils’ lower scores in the English Test should not summarily be assigned to the use of the English language as the medium of instruction alone. It is important to acknowledge that mathematical acumen also has a role to play in determining the pupils’ achievements in the said subject.

Since this study and other research had indicated of pupils’ weakness in Mathematics, future more qualitative approaches ought to be taken in determining the roots of the difficulties faced by them.

References


Ahmad Faizal Tajuddeen (2006). The Effectiveness of the ETeMS Programme and the Effects on the Teaching of Mathematics and Science in the Classroom. (Masters Dissertation, UiTM)


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Appendix A

Questions for the Instrument

1. 2 l of coconut juice is poured equally into 8 glasses. How many milliliters of coconut juice are there in each glass?

2. Chin buys a bag that costs RM29.30. The shopkeeper returns RM70.70 as change to her. How much money does Chin give to the shopkeeper earlier?

3. Alison has RM80.00. She buys two books at a cost of RM39.00 each. How much is her balance?

4. A strip of paper is 35 cm long. Find the total length of six strips of paper.

5. The perimeter of a square board is 160 cm. What is the length of each side of the board?

6. The length of a piece of wood is 1.75 m. Azmi cuts off a part of it. Now the length of wood is 1.55 m. What is the length, in cm, of the piece of wood that Azmi cuts?

7. A bag weighs 2.88 kg. A basket weighs 320g less than the bag. Calculate the total weight of both the bag and the basket.

8. Write the fraction of the shaded part.

9. The price of four oranges is RM4.80. Find the price of two oranges

10. Hashim took 36 minutes longer than Krishnan to complete a 10,000m race. If Krishnan completed the race in 2 hours and 49 minutes, calculate how much time did Hashim run for?

11. Ruby needs 0.8 m of pink ribbon, 2.4 m of blue ribbon and 1.85 m of yellow ribbon. Calculate the total length of ribbon she needs.
12. Calculate the volume of the cuboid.

[Diagram of a cuboid with dimensions 5cm x 6cm x 3cm]

13. The diagram below shows the number of muffins sold in a bakery shop.

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Monday</td>
<td><img src="image" alt="Muffins" /> <img src="image" alt="Muffins" /> <img src="image" alt="Muffins" /></td>
</tr>
<tr>
<td>Tuesday</td>
<td><img src="image" alt="Muffins" /> <img src="image" alt="Muffins" /></td>
</tr>
<tr>
<td>Wednesday</td>
<td><img src="image" alt="Muffins" /> <img src="image" alt="Muffins" /> <img src="image" alt="Muffins" /> <img src="image" alt="Muffins" /></td>
</tr>
<tr>
<td>Thursday</td>
<td><img src="image" alt="Muffins" /> <img src="image" alt="Muffins" /></td>
</tr>
<tr>
<td>Friday</td>
<td><img src="image" alt="Muffins" /> <img src="image" alt="Muffins" /></td>
</tr>
</tbody>
</table>

represents 3 muffins

Calculate the total number of muffins sold in 5 days.
14. The following diagram shows an incomplete pictograph of the number of books read by Aisyah in 4 months.

<table>
<thead>
<tr>
<th>Month</th>
<th>Books</th>
</tr>
</thead>
<tbody>
<tr>
<td>March</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>📚📚📚📚📚</td>
</tr>
<tr>
<td>May</td>
<td></td>
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<tr>
<td>June</td>
<td>📚📚📚📚</td>
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</tbody>
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📚 Represents 4 books

The total number of books read in 4 months is 44 books. Calculate the number of books read in May.

15. The diagram below shows the time Tini has her breakfast. Tini starts washing her clothes 35 minutes later. At what time does she start washing clothes?

16. Which number when added to the largest number card would total to 646649?

| 54607 | 78913 | 21005 | 625644 |
17. 3 794 marbles are packed into 7 boxes. How many marbles are there in each box?

18. Devi spends a total of 300 minutes a week practicing piano. She practices 3 times a week and spends an equal amount of time for each practice. How many hours and minutes does she spend for each practice?

19. A clerk typed several letters and arranged some files in 4 hours and 15 minutes. If he spent 2 hours and 30 minutes typing the letters, how much time did he spend arranging the file?

20. Faiz has 32kg of langsats and 15kg 750g of rambutans. How much heavier are the langsats than the rambutans?