The Malaysian Literacy Assessment Project

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Ranking the performance of education systems across the world using international literacy indexes is a trend that is on the rise. International literacy tests such as the Programme for International Student Assessment (PISA) and Progress in International Reading Literacy Study are among the most well-known international tests used to assess and monitor the performance of education systems. The prestige of education systems is often being equated to the performance of students in these literacy tests. The importance and function of these tests are now more complex as they do not merely measure the students' abilities but have become a yardstick of an education system's effectiveness and success. The performance of a nation in various literacy and reading tests, and its index in relation to its counterparts, assigns to the nation a level of prestige and recognition that is highly esteemed in the international educational scene. At present, Malaysia does not participate in these international tests on a regular basis nor does it possess its own literacy tests and indexes. Therefore, it is essential that a system be developed that would allow for the measurement of those aspects that constitute literacy which will include not only global elements but Malaysian ones as well. To initiate such a system that will put Malaysia on the map, it will have to start with the design of an instrument to measure literacy (e.g. a literacy test) and another to determine the level of literacy (e.g. an index).

Background

Rating Literacy in Malaysia

Literacy rates in Malaysia have conventionally been derived from data that is bound to the school context such as grade-level reading ability or attendance in the formal schooling system. For example, a 1984 study by Long and Zaidan reported a literacy rate in Malaysia of 74% based on the reading habits of Malaysians. However, the study applied grade-level reading scales to rate literacy without taking into consideration other basic literacy skills (Kadir, 1997). Other Malaysian-based surveys relied on school attendance figures to report a literacy rate of 85% for the population aged 10 years and above (Malaysian Department of Statistics, 1995). Furthermore, the United Nations Development Programme (2008) reported a literacy rate of 91.5% for the Malaysian

population aged 15 years and above, a figure arrived at by taking into account "enrolment at the primary, secondary, and tertiary level." These surveys do not measure basic literacy rates but rather interpret enrollment and attendance in formal schools as a measure of literacy.

What is Literacy?

Traditionally, the word *literacy* has been understood as communicating through printed letters and words that are based on a standard usage (Cope & Kalantzis, 2003; Kress, 2000, 2003). However, the rapid advance of new information and communication technology in this age, often regarded as new media technology, necessitates a reconceptualisation of the term literacy and its meaning (Cope & Kalantzis, 2003; Luke, 1995). No longer can we apply a linguistic-based theory to deal with the term literacy because new technologies frequently use both images and writing to create meaning in communication. Because of these changes, the science of communication and representation cannot be confined to language alone as "language alone cannot give access to the meaning of the multimodally constituted message; language and literacy now have to be seen only as partial bearers of meaning" (Kress, 2003, p. 35).

A more complete understanding of literacy requires a new theory that needs to take into account the different modes that are available to represent meaning. This is because the written text is inextricably linked with visual, audio, and other modes of meaning creation. Although the written text is still important, texts are now presented in a highly visual form and the meaning of messages is more often communicated through images rather than through the accompanying printed text. These complex yet subtle links between visual images and texts are apparent in various aspects of our everyday lives from websites and television programmes to the advertisements in newspapers and supermarkets. Therefore, the concept of literacy should not be confined solely to printed text but rather encompass ways of effectively communicating in diverse settings (Cope & Kalantzis, 2003).

Literacy in today's era is multimodal and occurs within unfamiliar contexts in which people must search for textual meaning through analysing a text's contexts and purposes (Cope & Kalantzis, 2003; Kell, 2003, Kist, 2000). A current understanding of literacy should include the acquisition of the abilities and skills to negotiate meaning making (Kaur, 2001). Eisner (1997) defines literacy as a way of conveying meaning through and recovering meaning from the form of representation in which it appears. Clearly, the traditional understanding and definition of literacy cannot accommodate the new demands made on the term because texts today are "more than content or form, more than discourse or genre" (Kress, 2003, p. 103). It is therefore quite inevitable that our understanding of literacy has to undergo a paradigm shift away from the traditional because texts today are always more than just language.

The teaching objectives in Malaysian schools are very much motivated by student achievement on examinations. It has grown to become a culture and trend that is worrisome because the notion of academic success is unequivocally hinged on how well the students perform in examinations. Therefore, as our understanding of the term *literacy* in the post-modern era is being broadened to surpass merely the development of an ability to read and write, the objectives of schooling and the curricula need to be reassessed to accommodate how literacy should be currently defined.

The Organization for Economic Cooperation and Development (OECD) (2002) defines literacy as the acquisition of "knowledge, understanding, and skills required for effective functioning in everyday life" (p. 11). According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO) (2004), literacy is the process of learning that will enable individuals to "achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society" (p. 13). The present definition of literacy should therefore be realistically perceived not just as an ability to read and write, but rather as the acquisition of knowledge and the ability to integrate reading and writing skills in the wider context of the individual's social circumstances. Hence, the focus of the Malaysian Literacy Assessment project reported on in this article is based on the broader concept of literacy that is proposed by the OECD and UNESCO.

Development of the Model of the Malaysian Literacy Assessment

The main objective of the Malaysian Literacy Assessment (MLA) project is to design a test that will measure how well young adults in Malaysia who are approaching the end of compulsory secondary school education are prepared to meet the challenges and demands of daily life and effectively participate in community and society. The concepts that form the basis for the design of the MLA have been adapted from PISA because testing information, literature, and samples were more readily accessible. PISA is conducted by the OECD and was launched in 1997 and the tests are oriented towards an approach to literacy that is concerned with the ability of students to apply skills in analysis, reason, logic, and communication. Here PISA explains its use of the term literacy:

> PISA uses the term literacy to encompass the broad range of competencies relevant to coping with adult life in today's rapidly changing societies. In such a context, adults need to be literate in many domains, as well as, in the traditional literacy areas of being able to read and write (OECD, 2004: 9).

The MLA also focuses on assessment of the ability of young Malaysian adults to apply their knowledge and skills to meet real-life challenges and function effectively in the circumstances of the present society rather than their ability to perform in school and national-level examinations that are based on the national curriculum.

The MLA test questions are arranged in levels of difficulty beginning with questions where the answers may be found directly from the text or easily interpreted contextually from charts or tables. There are three sections in the test. Each section contains two problems and presents ten questions following the information/text given.

The first section of the MLA, Reading Literacy Assessment, consists of ten questions regarding two different problems. The first problem requires the students to briefly review Kuala Lumpur's bus system inclusive of their scheduled advertisements. The four questions that follow are two multiple-choice questions and two short-answer questions. The second problem is a short story pertaining to and describing piracy in the Straits of Malacca. The six questions that follow consist of three multiple-choice and three short-answer questions. The students are required to write short answers that must be legible and logical. It is also the intent that these test questions assure student awareness of issues and information not only needed in their everyday lives but that they understand and apply the information given regarding events in Malaysia.

The second section of the MLA, Mathematical Literacy Assessment, contains problems that test students' understanding of the fundamental concepts in the areas of human growth, living space, and travel distance calculations. It is the intent that these test questions assure student awareness of the calculations needed in their everyday lives. These three testing sections are each followed by a series of ten questions. Ultimately, the students should be able to read the information given, be knowledgeable enough to understand what calculation needs to be done and derive an acceptable answer. Their mathematics literacy is tested as they are given a variety of information where they must read columns and rows in tables, understand how to relate the "X" axis with the "Y" axis as well as calculate the relationship between speed, time, and distance.

In the third section of the MLA, Scientific Literacy Assessment, there are two problems presented within the topics of population growth and wildlife and land conservation. They were chosen for their particular popular concerns and international interest. Other topics included are environmental and conservation issues related to the plight of the Penan people of Sarawak and conservation groups such as *Friends of the Earth, Love to Save,* and *Borneo Conservation Trust*. Each problem is associated with current issues of importance that students are or should be aware of in their own country, and ultimately, these issues help students realize that scientific thinking is not just for scientists but is very often needed by all citizens. Their scientific literacy is tested as they are given various pieces of evidence for each problem for which they must come to a conclusion drawn from that evidence. Because of this process, students should be able to communicate their knowledge and understanding of particular scientific topics in order to effectively argue their viewpoints and findings.

Purpose of the Study

The present study aims to find out the extent to which young adults, who are on the threshold of completing compulsory secondary school education, are equipped in selected literacies that will enable them to meet the challenges of daily life and participate effectively in society. The study seeks to answer the following research questions:

1. How well equipped in the different literacies are young adults who are approaching the end of secondary school education?
2. What type of literacies are the young adults more competent in?

Method

The test is designed for 16-year-old students who are approaching the end of compulsory Malaysian secondary schooling. The test consists of 30 questions that are a combination of multiple-choice or short-answer questions. The test requires 75 minutes, which is within the teaching session timeframe common to Malaysian secondary schools. The test is available in English as well as Bahasa Malaysian which is the national language, so that students have the opportunity to participate in the language that they are more comfortable with.

Participants

The participants for the test were selected from two secondary schools in Penang, Malaysia. A total of 84 students from four Form-Four arts classes participated in the initial test which was conducted by teachers from the selected schools in separate sessions after being briefed on the procedures. As this is a preliminary study, the students sampled in this test do not fully represent the national population of 16 year-old Form-Four students as they were selected only from the arts stream classes of two urban schools.

Scoring

Marking of the answer scripts was carried out by members of the MLA research team, all of whom are English language teachers with a minimum of 10 years of language teaching experience. Some of the teachers have had experience teaching Science and Mathematics in secondary schools. The marking was done based on the marking guidelines provided for each section. While the multiple-choice questions in the test have either a correct or incorrect answer, partial credit marking is employed for the questions that require more complex answers for which students need to construct their own answers. Raters were advised to ignore spelling, grammatical, and mechanical errors unless the errors substantially impeded understanding of the answers.

Literacy Assessment Scales

Three separate scales were developed for each area of literacy in order to facilitate interpretation of the scores. First, the Reading Literacy Assessment scale is a 5-band scale

with a total score of 100 marks divided between each band. The scores in each band represent levels of proficiency that are related to the difficulty of the questions in the reading literacy section of the test. Each band in the assessment scale is accompanied by short descriptors that explain what is being assessed and the characteristics of expected performance at each band. Each successive band represents the ascending level of difficulty of the selected tasks. The tasks were designed for each level and their assumed level of difficulty was ascertained by experienced English language teachers within the research team. A student with a score of zero marks would be placed in the lowest band (Band 1) whereas one with a score of between 75-100 marks on the highest band (Band 5) (see Table 1). Therefore, a student with a score of between 75-100 marks would be expected to have the ability to cope with similar questions up to that level of difficulty.

The other two scales, the Mathematics and Science Literacy Assessment scales, were constructed along corresponding conceptual underpinnings. The tasks on Mathematics and Science Literacy Assessment scales were validated with the help of Mathematics and Science teachers from secondary schools. Similar to the Reading Literacy Assessment scale, both the mathematics and science scales also contain five bands with total scores of 100 marks divided between each band. Therefore, a student with a score of 0 marks would be placed in the lowest band (Band 1) whereas one with a score of between 75-100 marks on the highest band (Band 5).

Table 1
The Literacy Band Scale

Band	**Marks**
5 Advanced	75-100
4 Competent	50-74
3 Basic	25-49
2 Prerequisite	1-24
1 None	0

The reading, mathematical, and scientific problems in the test contain text and task types that 16 year-old Form-Four level students would have the ability and skill to perform. However, the problems become progressively more complex and require more demanding information processing skills and strategies as they move up on the scale. The difficulty of the problems is not only determined by the structure and complexity of the text but also by what the student is required to do with the text.

Each level on the scale not only represents the requisite skills and knowledge but also allows an interpretation of the level of proficiency of the students. As each level on the scale represents a progression of proficiencies, students at a particular level not only demonstrate the knowledge and skills associated with that level but with those of the lower levels too. Therefore, it is expected that a student who is placed at Band 4 on the scales will be proficient not only at that particular level but also for Band 3 and Band 2 tasks as well.

Results

Reading Literacy Assessment

An analysis of the reading literacy assessment scores indicate that 47.6% of the students participating in the test scored between 1-24 marks and were placed at the Band 2 (Prerequisite Level) proficiency level; 38.1% scored between 25-49 marks at Band 3 (Basic Level), 13.1% scored between 50-74 marks at Band 4 (Competent Level), and 1.2% scored between 75-100 marks at Band 5 (Advanced Level). The indicators of performance are illustrated in Table 2.

The majority of students in the study (85.72%) were placed in the prerequisite to basic levels according to their total scores achieved in this section of the test. Although the skills assessed were focused on reading comprehension and thus related to school-based reading achievement, the skills tested were more strongly associated with out-of-school, functional literacy needs such as following procedures and directions, locating specific items on a schedule, and other applied tasks. The results, therefore, indicate that the majority of the students possess the prerequisite skills to locate and apply information in simple but authentic situations and also to form judgments by relating text information to background knowledge.

Mathematics Literacy Assessment

The mathematics literacy assessment scores showed that 50% of the students participating in the test scored between 1-24 marks and were placed at the Band 2 (Basic Level) proficiency level; 35.7% scored between 25-49 marks at Band 3 (Moderate Level); 13.1% scored between 50-74 marks at Band 4 (Competent Level); and 1.2% scored between 75-100 marks at Band 5 (Advanced Level). The indicators of performance are illustrated in the Table 3.

Table 2

Reading Literacy Scale

(Adapted from OECD 2002, p. 29)

Level	***Indicators*** *(Students should demonstrate one or a combination of the following skills at the levels depending on the type of text and question.)*
5 Advanced	Locate, sequence, or combine information which may be embedded or outside the main text. Demonstrate full understanding of a text, recognise nuances and shades of meaning and make inferences from the text. Use of everyday and specialized knowledge to understand and evaluate a text.
4 Competent	Locate and recognise the relationship between pieces of information. Integrate parts of a text to identify a main idea and infer meaning of word or phrase from context. Demonstrate understanding of a text by comparing and contrasting and drawing on everyday knowledge and also on less familiar knowledge.
3 Basic	Locate less clearly stated information, Identify main idea in a text and apply low level inference skills, Make connection between text and real-life situations, explain answers by drawing on personal experience.
2 Prerequisite	Locate explicitly stated information, Recognize main theme/intention of writer, Make connection between text and daily life applications.
1 None	No Reading Skills.

Table 3

Mathematics Literacy Scale

(Adapted from OECD 2002, p. 29)

Band	***Indicators*** (*Students should demonstrate one or a combination of the following skills at the levels depending on the type of text and questions.*)
5 Advanced	Well versed in mathematical principles, able to manipulate and interpret multi-step problems. Solve problems that require from two or more to multiple operations. Engage logical reasoning.
4 Competent	Possess a good grasp of the mathematical principles. Interpret and solve problems involving a small number of processing steps. Apply key terms to solve word problems, transitivity relations, or inequality exercises.
3 Basic	Complete problems involving simple steps. Recognize and use "part-to-whole" analogies in measurements of time, weight, size, or volume.
2 Prerequisite	Interpret straight forward problems involving simple mathematical operations. Relate simple mathematical operations to daily encounters. Establish basic skills of Mathematics.
1 None	No Mathematics skills.

In this category, the results were almost similar to what was attained in the previous category with the majority of the students (85.7%) being placed in the prerequisite to basic levels according to their scores. As it is essential that mental and informal mathematical tasks be part of the assessment, the categories being assessed here are not focused on school-based mathematics skills. Therefore, school-based assessments may not accurately indicate the level of literacy as the young adults may have developed through informal ways to deal with real-life situations. The results therefore reveal that the majority of the young adults in this study possess the prerequisite levels of mathematical literacy that will enable them to engage in out-of-school situations which require some mental calculations and mathematical operations using formal and informal techniques to handle everyday mathematical tasks.

Science Literacy Assessment

The analysis of the science literacy assessment scores indicate that 41.7% of the students participating in the test scored between 1-24 marks and were placed at the Band 2 (Prerequisite Level) proficiency level; 48.8% scored between 25-49 marks at Band 3 (Basic Level); 8.3% scored between 50-74 marks at Band 4 (Competent Level); and 1.2% scored between 75-100 marks at Band 5 (Advanced Level). The indicators of performance are illustrated in the Table 4.

In the science literacy category, the majority of the students were again placed in the prerequisite to basic levels (90.5%). The results indicate that the young adults are equipped with the prerequisite science literacy skills that will enable them to function effectively in their social environment by using and applying scientific concepts to solve real-life problems in out-of-school situations. It also indicates that the students have the necessary abilities to use the formal scientific knowledge that is learned at school by drawing simple conclusions, correlating text information with existing knowledge, and applying it to situations that are relevant to them in everyday contexts.

Conclusion

Despite the limitations of the study (such as small sample size and the samples were exclusively arts students), a few implications can be drawn, which provide avenues for further research. First, the results indicate that all the young adults tested in the MLA have functional literacy skills, with the majority of them placed in the prerequisite and basic levels which are entry-level skills required in training for future employment, and for meeting real-life economic, social, and health related needs. Second, as the MLA shares similar concepts to PISA, the results also provide an indication of how well students who have completed compulsory education in secondary school are able to extend their knowledge and skills across a range of tasks and competencies that are commonly associated with general and everyday situations within and outside the school context.

Table 4

Science Literacy Scale

(Adapted from OECD 2002, p. 29)

Band	**Indicators** (*Students should demonstrate one or a combination of the following skills at the levels depending on the text, graphs, tables and question.*)
5 Advanced	Use conceptual models in order to make predictions. Demonstrate full understanding of a text, graph or table by giving explanations or their scientific findings. Analyse the design of an experiment and identify the idea tested. Compare data in order to describe results in detail accurately and precisely.
4 Competent	Able to recall the simple facts of the scientific concepts involved (e.g. terminology, names of important items, simple concepts). Use common scientific knowledge in order to derive at simple conclusions that relate to the information given from the text, graphs, and tables.
3 Basic	Identify the main idea of the scientific concepts, not necessarily the end results. Correlate some of relevant information between the text, tables and graphs. Draw basic conclusions based on the evidence given as well as their own knowledge. Make simple computations if necessary.
2 Prerequisite	Draw simple conclusions on examination of the scientific evidence presented. Recognize the main idea of the scientific concepts. Make connection between the text and daily life applications.
1 None	No science skills.

Finally, the results also indicate that the general achievement of students in the three areas tested was well-balanced as students attained almost equal levels of competency across all the three domains of reading, mathematics, and science literacies without any particular domain being dominant.

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