

## The Making of Malaysian Multiple Intelligences Stimulator

Nurulwahida Hj Azid, Mardzelah Makhsin and Aizan Yaacob  
School of Educational and Modern Languages, Universiti Utara Malaysia,  
10600 Sintok, Changlun, Malaysia

**Abstract:** The Malaysian Multiple Intelligences Stimulator (MMIS) was established to stimulate interests and raise the multiple intelligence profile of orphans aged 14 year old. The MMIS concept of Computer-Based Learning (CBL) which is built on the ADDIE Model is unique in a sense that it contains 28 interactive problem solving activities which can give an automatic scoring if a solution is made correctly. In fact the activities provided are also based on the Malaysian customs and culture. Nine intelligences are composed of verbal linguistic, logical-mathematical, visual-spatial, kinesthetic, musical, interpersonal, intrapersonal, naturalist and existential. Eight lecturers with expertise in three areas education technology, curriculum and multimedia were chosen to evaluate the MMIS before the true-experimental study was carried out and five orphans were interviewed. Interactive application assessment questionnaire was used to obtain quantitative research data whilst the interview was designed to obtain qualitative data. The mean average for each category of assessment is very good. The mean average based on information design category = 3.62, interaction design = 3.33 and design of the presentation are reported as follows (a general presentation = 3.96, graphic presentation = 3.58, font presentation = 3.76, color presentation = 3.88, audio performance = 3.71, video presentation = 3.92 and the button presentation = 3.91). We discovered that the MMIS stimulated and enhanced student's multiple intelligences. In conclusion, MMIS implies the following; it promotes teaching and learning techniques, induces potential of orphans in Malaysia and it contributes to the process of designing effective teaching.

**Key words:** Application development, orphan, Malaysian multiple intelligences stimulator, ADDIE Model, effective teaching

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### INTRODUCTION

Children who have lost one or both parents are defined as orphans (Stover *et al.*, 2007). There are over 140 million children under the age of 18 who reported not having a mother or father or both in sub-Saharan Africa. In fact, 43 million or 12% is made up of orphan children. This is alarming and the number is increasing daily. Orphans who are in a minority group should not be ignored by the world community. They need to be addressed so that they do not feel isolated and can survive without any feeling of inferiority complex. Orphans are often linked to low socio-economic status, lack of confidence and lack of attention (Melissa, 2008; Azid and Yaacob, 2016; Stover *et al.*, 2007). Orphans should be made aware of their potentials and capability in problem solving through nine types of intelligences. Organizations of orphans in Malaysia have assisted them especially in their education to ensure that they are not left behind. Thus the construction of learning tools is needed to support these children to improve their intelligences through various activities (Creswell, 2012). Advances in science and technology have created many tools or scientific methods to be applied in the education

system. Today's new technology offers a wide range of opportunities to renew the learning contents and teaching methods to widen its learning path (Vygotsky, 2006). This paper provides the processes involved in making the MMIS to stimulate student's multiple intelligences.

**The Malaysian multiple intelligence stimulator construction:** There are five phases of construction involved in developing the MMIS. Based on ADDIE Model the five-phase application involves analysis, design, development, implementation and evaluation. The goal of the construction of the MMIS is to stimulate the orphan's multiple intelligences through problem-solving activities. They are composed of boys and girls aged 14 year. Interactive elements focused upon improving the scores automatically which can be viewed by the respondents. Content analysis applications require details of content to fit the theory of multiple intelligences. Some examples of the verbal linguistic intelligence of all activities are the concept of words and language (i.e., insert words, complete words and idioms) and for logical mathematical intelligence features are based on problem-solving activities involving numbers (i.e., logical mind, cube number and arrange

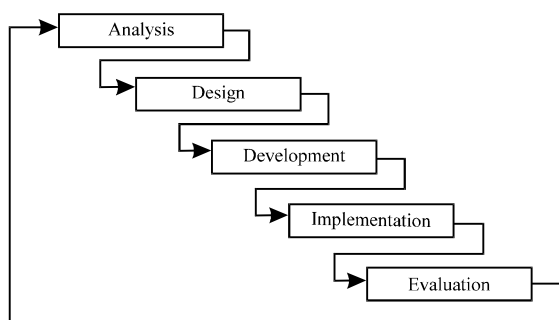


Fig. 1: MMIS development process using ADDIE Model

symbol). The softwares used to develop the MMIS are Adobe Flash CS6, video cutter, sound cutter and video converter (Fig. 1).

**Research objectives:** The objectives of this study are:

- To construct a CBL-based interactive learning module containing nine types of intelligence activities based on verbal linguistic, logical-mathematical, visual spatial, kinesthetic, musical, naturalist, interpersonal, intrapersonal and existential
- To identify the assessment score by experts of the MMIS design categories; information design, interaction design, presentation design and understanding of user about multiple intelligences activities
- To examine the views of orphans during prototype testing

## MATERIALS AND METHODS

This study applies a mixed method approach which is a combination of quantitative and qualitative. This study reports the results of the preliminary study assessing MMIS before the true-experimental study is carried out. Data were collected through a quantitative and qualitative approaches analyzed descriptively. The rationale for this descriptive study is to update and improve the quality of MMIS. In line with the claim made by Andy (2005) which stated that the study can give a descriptive information about a situation at a particular time. The assessment process was conducted simultaneously in a place agreed by all the experts. The travel cost was borne by the researchers. The evaluation process lasted for one day from 9:00-1:00 pm. On the other hand the qualitative research (interview) was carried out to obtain the views of orphans who were given the opportunity to use the MMIS. The semi-structured interviews were conducted with five orphans, aged 14 year. The rationale,

Table 1: Scores for item assessment questionnaire MMIS

Item	Scale
Very good	4
Good	3
Not good	2
Very bad	1

according to Merriam (2009) is that the semi-structured interview is flexible and it allows the respondents to explain their experiences to the researchers. The interview process took between 15-20 min and it was videotaped to get more detailed information and to analyze the respondent's non-verbal reactions such as body movement, facial expressions and the way they responded to the questions posed by the researchers. The data analysis process was carried out in three stages namely transcription, data reduction and coding (Merriam, 2009).

**The participants:** A total of eight experts from three areas namely information technology in education, curriculum and multimedia have been appointed. They are senior lecturers from three public universities in Malaysia. The selection was based on their expertise. The assessment was conducted using an assessment questionnaire modified from Danakorn(2011). While the interviews were conducted with 5 orphans aged 14 year who were randomly selected. According to Klave (1996) the number of samples to an interview depends on the purpose of the study. Therefore five of them were sufficient in view of the purpose to get feedback on their experiences with MMIS.

**Instrument:** To obtain quantitative data, MMIS assessment questionnaire adapted from Danakorn (2011) was used. This questionnaire has high reliability with alpha of 0.76. Scores for each response was given by 4 point Likert scale, ranges from 1-4 (Table 1). Assessors provided an assessment based on the MMIS design and user-friendliness. The assessment questionnaire includes five sections, namely.

**Part A-profile of expert evaluators:** This section contains general information about the profile of the respondents. The goal is to obtain the demographic data and to identify the respondents.

**Part B-information presentation:** This study contains items to get feedback in terms of the content used in the MMIS. For example content, accuracy, arrangement and language presentation.

**Part C-interaction design:** The purpose of this part of the item is to obtain information on the structure or pattern of

MMIS, for example the power of control over the MMIS assigned to the user and others. There are nine items presented in this study.

**Part D-presentation design:** This study contains items seeking information on the screen design, user interface, control icon buttons, text, graphics, audio, animation and so on. Part D contains eight items.

**Part e-User understanding about multiple intelligence activities:** The items contained in this study intended to obtain feedback from users regarding their understanding of the multiple intelligences activities in the MMIS. The interview protocol was developed by the researchers. There were five interview questions designed to obtain student's experiences in using the MMIS.

**RESULTS AND DISCUSSION**

Figure 2 shows some samples of the content in the MMIS. The first picture is the front page of the MMIS. In the second picture the multiple intelligences map is used as a symbol of the nine types of intelligences to explain to the respondents. There are interactive buttons that allow respondents to click on any icon to launch any intelligence activities. The third picture is an example of the interface for verbal linguistic intelligence and the last picture is an example of the interface for problem solving activities of the verbal linguistic intelligence. Table 2 shows the average mean scores for each assessment category rated by the experts. The mean scores obtained

for the information design category is high at 3.62. It shows that the expert evaluators believed that the MMIS is at a very good level for the category of information design. All the experts (n = 8) or 100% have given very good ratings for information design category as easy to understand and the language used is also easily understood by the users. While for the MMIS layout the six expert evaluators gave a score of very good (75.0%) while the rest (n = 2) or 25.0% evaluated it as good. There are seven items under the information design category. Overall item score evaluation was at good and very good levels only.

For the category of interaction design, MMIS received very good scores from an expert with an average mean = 3.33. Whereas all (n = 8) or 100% expert evaluators agreed that the item regarding the MMIS maneuverable was at very good. Furthermore there are three items that share the same mean score of 3.88. These include within easy reach of the desired section, representatives as easily identifiable icons functions and navigation system is consistent. For these items a total of 7 experts (87.5%) thought that it was very good while the rest (12.5%), rated

Table 2: Average mean for each category

Category of evaluation	Average mean
Information design	3.62
Interaction design	3.33
General presentation design	3.96
Graphic presentation design	3.96
Font presentation design	3.76
Colors presentation design	3.88
Audio presentation design	3.71
Video presentation design	3.92
Button presentation design	3.91
Understanding user about multiple intelligences activities	3.95



Fig. 2: MMIS interface, multiple intelligences map problem solving activities for verbal linguistic

it as good. Then there are two more items to obtain the same mean of 3.75. These include they users are not lost and it provides clear navigation. Frequency data showed that six experts (75.0%), gave very good score and two experts (25.0%) gave good score for both items. The third category evaluated by the experts is presentation design category. This category is divided into seven sub categories namely general presentation, graphic presentation, font presentation, colors presentation, audio presentation and button presentation. Data were analyzed using mean which indicated that expert evaluation of all sub categories of presentation design as very good score. The mean values are reported as follows (a general presentation = 3.96, graphic presentation = 3.58, font presentation = 3.76, colors presentation = 3.88, audio presentation = 3.71, video presentations = 3.92 and button presentation = 3.91). The last category evaluated by experts is the user's understanding of the multiple intelligences activities. Based on Table 2, the average mean for this category is 3.95 which is very good score. There are nine items that were assessed namely verbal linguistic, logical-mathematical, visual-spatial, kinesthetic, musical, interpersonal, intrapersonal, naturalist and existential. Four intelligences shared the mean value of 3.88 namely verbal linguistic intelligence, logical-mathematical intelligence, visual-spatial intelligence and kinesthetic intelligence. Frequency data indicates that a total of seven experts (87.5%) gave a very good score and one expert (12.5%) gave a good score for all four intelligences. Another four intelligences which are musical, interpersonal, intrapersonal, naturalist and existential intelligences each earned the mean value of 4.00. In general, this means that all the experts (n = 8), gave very good score for the MMIS.

In addition the interview findings revealed that all students agreed that the problem solving activities contained in the MMIS helped them to identify their potential through multiple intelligences. MMIS fosters thinking skills when solving problems. Here are some examples of the interview findings with two orphans (S1 and S5).

S1: "In my opinion, MMIS is very good and efficient as I can identify my strengths in specific areas such as the field of mathematical logic, music, visual, spirituality and so on. Besides, I can improve my other intelligences in the future. MMIS is not boring because there are many questions and the use of images, video, sound, text, color and attractive and orderly. MMIS also contains questions that test the level of thinking that requires me to think outside of the box"

S5: "After I tested the MMIS I find it can help to increase my level of thinking and intelligences. MMIS contains the use of graphics, images, video and audio that can attract my attention and be able to test my thinking"

The findings of the interview also revealed that the most eye-catching intelligence activities are kinesthetic, visual spatial, musical and interpersonal. This is because they are related to the student's own interests. In addition to thought-provoking questions the elements of audio and graphic icons also drew their attention. Here are some interview findings of the orphan's responses (S2 and S4):

S2: "Kinesthetic intelligence is the most interesting for me because I'm very interested in that field. The field is very exciting because it requires body movements that are primarily active in the field of sports and games. In addition, questions are provided in kinesthetic intelligence challenging my knowledge and add a new knowledge"

S4: "Activities that caught my attention was the music intelligence, visual spatial intelligence and interpersonal intelligence. I like musical intelligence activities because there are many challenging questions about my interest in music. It also contains sounds and icons that are attractive and not boring me. Activities in visual spatial intelligence also examine my views on something that is implied in a painting or drawing. It allows me to translate intentions or hidden information in an image. There are also interpersonal intelligence activities are interesting to me because they contain stories from exemplary"

Construction of teaching aids and interactive computer-based learning is seen as a new alternative to help improve the education of orphans in Malaysia and other developing countries. There are a variety of materials including electronic educational resources to improve student academic achievement. It is also recognized by Alessi and Trolip (2001) that the use of multimedia as a medium of teaching stimulates student's interest in learning. Students show interest in learning via interactive multimedia teaching materials compared to conventional medium such as text and lectures. According to Vygotsky (2006) a large number of students could not identify with writing due to the use of

conventional teaching techniques. The effect of this conventional teaching led to poor learning focus and cause demotivation to learn (Vygotsky, 2006). This is in line with the opinion by Mayer (2005) which stated that there are at least three factors that influence teaching and learning. First, impression of interactive multimedia provides an option for students to test their intelligence. Second, this platform connects them with the outside world. Third, student's knowledge will be enhanced based on the experience gained.

Apart from that individual differences can be detected through physical, mental and emotional intelligences (Stellwagen, 2001). In line with the opinion by Jantan and Razali (2004) each student differs in terms of behavior and thinking. As they grow older, their behaviour and thinking change. Similarly, Azid and Mokhtar (2014) stated that everyone has a different potential. Thus, this study takes into account aspects of intelligences among orphans. It coincided with the National Education Philosophy to respect and appreciate individual differences. MMIS contains a lot of problem solving activities based on nine different types of intelligence. It is clear that the various aspects of intelligence applied in the MMIS is one of the factors why this interactive application must be introduced to other students. MMIS provides opportunities for orphans and teachers to develop learning activities that can give confidence, stimulate new ideas and provide opportunities for students to undergo fun activities.

### **CONCLUSION**

In conclusion, MMIS is a learning tool that stimulates multiple intelligences among orphans. Problem solving activities help the process of thinking and all the students interviewed suggested that the MMIS is beneficial for four reasons, namely it helps them to recognize their ability it helps improve the performance through multiple intelligences activities it is fun because it contains various forms of questions, activities and it provides immediate feedback through automatic scoring.

The progress of a country is dependent upon its younger generations. In this context, education is seen as the best vehicle to foster a generation which is dynamic, progressive, brilliant, morally good and virtuous. The school system becomes an important element for the country in its effort to develop its community economically, politically and socially.

Orphans are a minority that can not be ignored. They are also the target group to realize the government's aspirations. Thus the construction of an interactive learning tool based on multimedia should be addressed accordingly by other developing countries with interest and concentration on orphans in their education.

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