

Motivating literacy through MEL: a multimedia based tutoring system

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This paper attempts to highlight the conceptual model of MEL (Multimedia in Education for Literacy) (1), a multimedia based tutoring system based on language learning and pedagogical approaches suitable for the learning and teaching of literacy and reading. The key modules as well as the design and development approaches of this multimedia based tutoring system have been designed to motivate literacy through a unique program. This program is designed to provide a dynamic and flexible teaching and learning module in the vernacular language, suitable for individualized and self-paced learning. It is hoped that this tutoring module for motivating literacy will be beneficial to beginning, emergent and reluctant readers alike and serve as a framework for future development of a multimedia tutoring system for motivating literacy.

INTRODUCTION

Until the summer of 1997 when the Asian region was affected by an economic crisis, Malaysia had been experiencing, for eight years, a steady GDP growth of 8.5%. However, it is expected that the next few years will again see a steady growth, of between 4-6%. Malaysia is certainly developing very fast and aspires to become a fully industrialized nation by the year 2020. By then it is hoped that Malaysia will have become fully developed not only economically, but also politically, socially, spiritually, psychologically and culturally. Malaysia's aspiration, which was voiced by the Prime Minister, Dr. Mahathir Mohamad in his inaugural speech at the Malaysian Business Council on 28 February 1991, now popularly known as Vision 2020, is to become a fully industrialized, and educated nation consisting of a well-informed and highly skilled populace. If Malaysia is to become a truly educated, informed and skilled society there will need to be a conscious effort made by the whole nation to help provide the necessary infrastructure and 'education' for a holistic approach to all human activities in society. To achieve this goal Malaysia has to ensure that its people are fully literate and that the country has achieved a literacy rate

of 100%. Today with a population of about 20 million, Malaysia has been shown, by a recent study, to have a 95% literacy rate. (2)

Various efforts have been made, one of which is the effort undertaken by the Software Development Group - a group of lecturers in the Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia (UKM) - through the Intensified Research on Priority Areas (IRPA), a grant given by the Ministry of Science and Technology, to develop a software called MEL (Multimedia in Education for Literacy). MEL is an on-going project that began in 1996 and expected to end in 2001.

Research on the best ways of motivating literacy has raised certain concerns about common practices in early childhood literacy instruction and an awareness of the need for change. Like the child's first steps, learning to read and write should be an exciting, fulfilling, and rewarding experience. Unfortunately, most times it is not. Teaching reading in Malaysia, has always been mechanical in its approach and thus, does not motivate literacy development in children. MEL has tried to incorporate an approach that will help motivate children to learn literacy through social activities and within their environment as well as through direct engagement with computers.

Computer Assisted Learning (CAL) and Computer Assisted Instruction (CAI) have evolved over the last forty years with the most recent innovations appearing in the field of multimedia. However, research has shown that attempts to integrate learning principles in the learning and instructional processes for effective use of the computer in the educational framework have not yet been effectively identified. CAL and CAI require that the roles of teachers and learners be redefined. (4) Redefining the teaching role is difficult mainly because it is almost impossible to describe a standard and comprehensive teaching behaviour that characterizes a majority of teachers. Likewise, it is difficult to define a normative learning style that typifies all learners. Thus, it is perhaps best to emphasize the course materials as a major factor to be taken into consideration when developing an effective CAL or CAI course rather than dwell on characteristics of teachers or learners.

MULTIMEDIA INTELLIGENT TUTORING SYSTEMS

Teaching materials developed should be dynamic in that they provide the learner with instruction that is more flexible as well as more individualized. (5) This has led to research and development in the field of intelligent CAL (ICAL) systems which are commonly now known as Intelligent Tutoring System (ITS). All Intelligent Tutoring Systems would incorporate three domains: Cognitive Science, Computer Science and Educational Psychology as in Figure 1. Generally, the aim of ITS is to adapt teaching strategies to meet the demands of the individual learner and to provide accurate responses to errors and correct answers made. (6, 7, 8, 9) Key modules in an ITS system providing flexible teaching are the tutoring and the student modules. The two main functions of the tutoring module are to tailor the exercises for each learner and to determine when to intercede in the program, using tutoring approaches, strategies and techniques incorporated in the system. The tutoring module is thus, an important component of any ITS that aims to provide structured tuition for the individual learner.

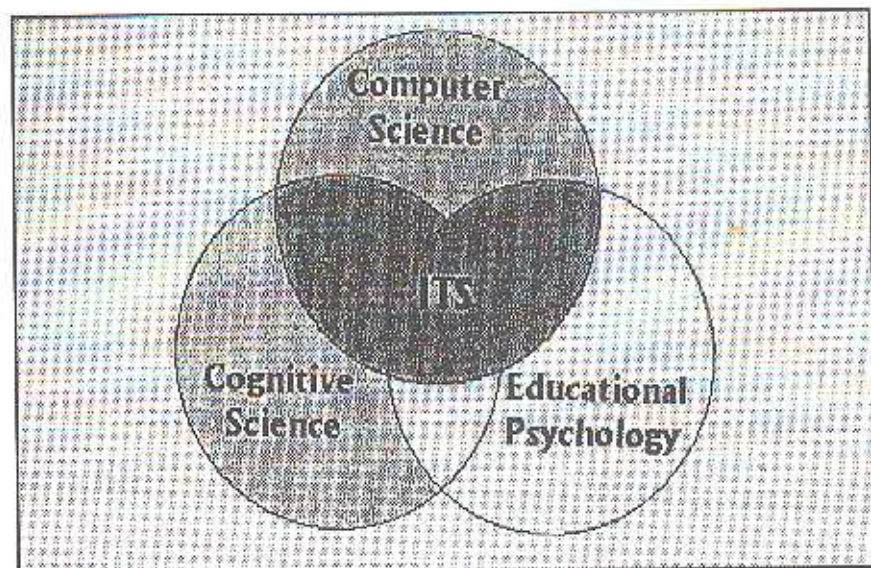


FIG. 1 *The Three Domains Integrated in the ITS Concept*

Irrespective of the method of tutoring used (CAI, or human tutoring), it is desirable that learners are motivated to learn. Some of the techniques

that may be employed in an ITS to motivate learning include facilities like on-line help, positive and timely feedback and hypertext links, as well as activities that are related to real life and are fun. The use of multimedia in an ITS is the plausible answer to enhancing motivation in learning. However, it should be borne in mind that this technological advancement is only beneficial if it is balanced by an equally strong pedagogical approach. For an ITS to be pedagogically effective, suitable learning and cognitive theories will have to be embedded and represented in the design and development model of the system.

TEACHING LITERACY AND READING

Teaching literacy and reading is fundamental for the growth and advancement of any nation. It is the duty of every nation to ensure that its citizens can read. In Malaysia, reading has generally been taught formally when a child starts school at the age of six. However, research has shown that learning of literacy and reading can begin at home. One of the ways that can be done now is the use of literacy and reading tutoring packages. These tools, however, are in English and not in the vernacular language, and thus do not have a local content, an important aspect to consider in learning - particularly in learning literacy and reading. Moreover, the packages available in English do not take advantage of the advances in CAL and CAI that look towards a design that is more adaptable and interactive. The teaching of literacy and reading have been undertaken using a combination of approaches:

- teaching literacy and reading as incorporated in the language lessons (either during the English or Bahasa Malaysia lessons)
- during library periods (sometimes storytelling sessions are conducted)
- through the teaching of other subjects, e.g. Mathematics or Science (i.e. teaching reading across the curriculum).

There is no subject specifically devoted to literacy and reading once the child enters the formal education system. The subject 'literacy and reading' is available only at the pre-school level (i.e. at kindergarten). Due to the fact that pre-school is not an automatic formal education level that every child undergoes, reading and literacy will only be most children's experience in the rather limited way that it is approached at the elementary school. Thus reading is a problem and initial research

shows that 30% of children in the city of Kuala Lumpur cannot read when they reach Grade Six (11-12 years old). There are many reasons for this bleak scenario but one of the main reasons is that children are not motivated to read based on the present approach to learning reading. This has instigated the researchers to develop a multimedia tutoring system called MEL (Multimedia in Education for Literacy) that will hopefully enhance motivation in literacy and reading among young children.

DEVELOPMENT OF MEL

MEL is intended as an intelligent multimedia based literacy and reading tutoring system, which has the capability of tutoring a range of users in acquiring literacy and reading skills. The conceptual model of *MEL* is as indicated in Figure 2. As can be observed from the model, *MEL* is based on the adapted concept of whole language philosophy, which supports the natural approaches to learning literacy and reading. Based on this philosophy, the model incorporates a number of elements.

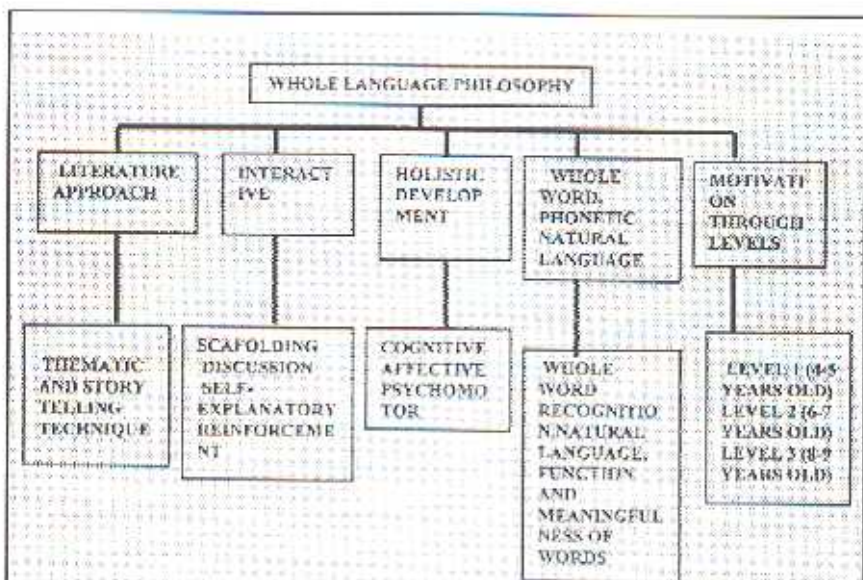


Figure 2: Conceptual Model of MEL

The first element is the *literature approach* and the *storytelling technique*. Literature here means local literature based on folktales or stories based on real events. Literature or stories are chosen because children can acquire new vocabulary, experience new genre and appreciate the beauty of the language. The storytelling technique is chosen because children love to listen to stories and to read stories and a lot of learning can be incorporated in the stories. The local content is important because learning becomes more effective when learners can identify themselves much more easily to the content presented in the course materials.

The second important element is the *interactive approach*. Children acquire language and learn reading more effectively when effective tutoring strategies like *scaffolding* (where the system asks learners to tell their experience through the activity modules in the system) and *self-explanation* (where the system shows the word with illustrations and a voice reads the word) is included to help learners understand meanings of words, sentences and stories better. The scaffolding is interspersed with the right reinforcement to motivate the learner and the scaffolding will generally fade in order that the child can practice literacy and reading without assistance. Through this component, the child learns literacy skills.

The third element in the model is the *holistic development* of the child. What is meant by the holistic approach is that the literacy experience of the child will assist in the cognitive, affective and psychomotor development of the child. The theme of the stories will contribute to these three aspects of the development of the child.

The fourth element is the *whole word and phonetics approach*. Based on these two approaches, children are taught to read not just phonetically but also by understanding the meaning of the word. Children will learn to discern the words through pattern recognition and then try to encode and decode the words. When the words are sounded by the system and children find them meaningful, they are able to remember the whole word better. The words chosen for the stories, which adopt the whole word and phonetics approach, are based on the natural language of children between the ages of 4 and 9.

The fifth important element in the model is the navigational approach

adopted in the system as can be observed in Figure 3. *MEL* adopts what the researchers termed the *perpetual navigation approach*. This means that the learner can go to the respective modules based on their ability and this is made easy by ensuring that only icons that effect navigation to the respective modules will be active while others will be inactive. All icons will remain on the screen to enable the learner to know where they are and where they can navigate next. This not only ensures that the learner does not get lost in the system, it also makes the learner feel that he/she is in control of his/her own learning.

The sixth important element in the model is the levels of literature prepared as reading materials in the course material. The course material is divided into three levels: Level 1 (children between 4-5 years old), Level 2 (children between 6-7 years old) and Level 3 (children between 8-9 years old).

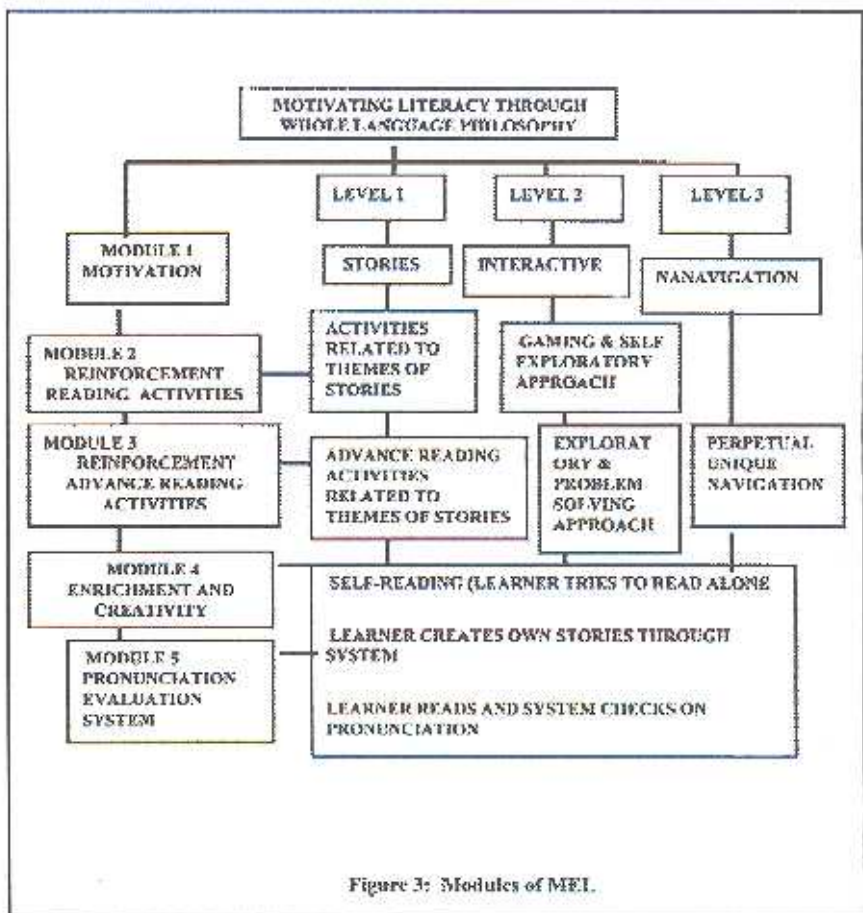
MODULES OF MEL

Figure 3 shows the details of the modules built into the model of this multimedia tutoring system. The key modules are divided into four: Module 1: *Penggalakan* or Motivation module; Module 2: *Pengukuhan dan Aktiviti Bacaan 1* or Reinforcement & Reading Activities module 1; Module 3: *Pengukuhan dan Aktiviti Lanjutan 2* or Reinforcement & Advance Reading Activities module 2; and Module 4: *Pengayaan dan Kreativiti* or Enrichment and Creativity module. A fifth module that has still to be developed is the *Pengurusan Arahkan* or Management Instruction module which is explained later in the paper. The researchers termed this model the *PPPPP* or *5 Ps* approach.

The *Penggalakan* or *Motivational* module is based on the 'whole language philosophy' that children learn literacy and reading more effectively through motivational literature or stories. Thus, this module introduces the child to various stories based on selected themes suitable for the development of the target group. This module is able to motivate the child due to the multimedia approach and also due to the tutoring strategies of scaffolding, self-explanation and hyperlinks provided in this module. The child can choose to 'read' or listen to suitable stories.

The *Pengukuhan & Aktiviti Lanjutan 1* or *Reinforcement & Related Activities 1* module. This module reinforces the child's literacy and reading skills through activities related to the theme of the stories in

module 1. The activities are fun, stimulating, motivating and interactive, for example; treasure hunt and jigsaw puzzles with animation and interactivity. In this module most of the difficult vocabulary as identified by the child will be reinforced and made meaningful to the child through graphics, sound, video and animation.



The *Penguahan & Aktiviti Lanjutan 2* or *Reinforcement & Related Activities 2* module is also a module to reinforce the child's literacy and reading skills through activities related to the themes of the stories in module 1. However, the activities in this module are more advanced and use the problem solving approach. It is in this module too that the child will have the first experience to try to follow and read with the system.

Like the *PAL 1* module, the *PAL 2* module also provides activities that are fun, stimulating, motivating and interactive.

The *Pengayaan dan Kreativiti or Enrichment and Creativity* module is developed with the aim of enriching the child's literacy experience through modules 1-3 and of motivating creativity in the child. In this module, the child can retrieve objects and vocabulary from the library and create its own stories. In fact further research is being done presently to integrate a tool, similar to a simple authoring tool, so that children can create their own graphics and text. This is an effective approach to motivate reading skills because writing enhances reading and skills development. Moreover, children love reading their own creations and the creations of other children. It is hoped that stories created by children can be kept in the database where other children and adults teaching literacy can share them.

The other module, which is yet to be developed, is the module that consists of a voice recognition mechanism where the learner learns to read by herself/himself and the system corrects the learner based on the pronunciation and intonation.

The last module that is also still being developed is the *Pengurusan Arahkan or Management Instruction* module. This module is to comprise such components as a database of students' records, students' performance in each module, students' performance on the whole program and the overall performance analysis of students in the class. This is certainly an important module in the system because teachers of literacy and reading can monitor children's progress more systematically.

MEL: THE PROTOTYPE

An initial prototype for *MEL* has been implemented, using Macromedia Authorware, Director and/or Java, and is now at the evaluation phase. *MEL* tutors on literacy and reading skills based on the whole language philosophy and its audience consists of the three age groups mentioned earlier. The main purpose of the prototype is to enhance further the process of learning about the needs of children. An iterative approach will be adopted in the development of further prototypes and regional experts and intended users (teachers and adults advocating literacy and

MEL : LEVEL 1

SEMBAHYANG



ABDULLAH



KELUAR

AYAH, EMAM, IREAN DAN ABDULLAH
SEDANG BERBINCANG



KANDUNGAN

FIG. 4 | Screen of MEL: Level 1

MEL : LEVEL 1



KELUAR

TAMAN BUNGA SUBANG AN-NUR
BANDAR BARU BANGI



BERMAIN

FIG. 5 | Screen of MEL: Level 1

reading as well as children) will be consulted for further improvements. Figures 4 and 5 show some of the screens of the prototype.

CONCLUSIONS

MEL is developed to motivate literacy among children between the ages 4-9 years old. The system consists of three levels: Level 1 comprises of materials suitable for children between the ages of 4 and 5 years old; Level 2 comprises of materials suitable for children between the ages 6 and 7 years old; Level 3 comprises of materials suitable for children between the ages 8 and 9 years old. All the content that has been developed is suitable for these target groups. Presently, tutoring is one on one but in the long term it is hoped that a collaborative approach to learning will be incorporated and that the system will eventually be able to run on the Internet. Collaborative learning has been proven to be more effective than one to one tutoring. (8) MEL has incorporated a variety of media items in the system to enhance the learning environment. The evaluation of MEL on all three levels is presently being done rigorously at a pre-school near the vicinity of UKM by a PhD. researcher. Data collected so far shows very positive indicators and with this, the researchers hope that MEL will be a practical tool to help children in Malaysia acquire literacy and reading skills in their own vernacular language.

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