Interactive Teaching Materials for pre-schools: Some Practical Guidelines

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ABSTRACT

This paper reports an ongoing study that determines guidelines for developing teaching materials. In preschools, teachers are not skillful and have problems in designing teaching materials, especially those that can capture children's attention. Hence, this study aims to assist them in their task, by formulating usable guidelines for their reference. User-centered Design (UCD) approach is utilized to achieve the objective. Students and teachers of preschools were involved in the UCD. In the end, a set of guidelines have been gathered.

Keywords: Teaching materials, usability, Multiple Intelligence.

I INTRODUCTION

The market has provided a lot of learning contents in the forms of courseware (offline) and Web sites (online). They contain contents in the books for childen to refer to and learn at thier own convenience. On top of that, some are available for download into gadgets. It has to be understood that those are all learning materials. They do not assist teachers in their teaching activities in classrooms.

The concept of teaching materials should not be similar to the learning materials. This is because the teaching materials are to be utilized by teachers, in teaching children, while learning materials are to be used by the children in their self-paced learning. Hence, in terms of the context, the teaching materials should map activities in classroom teaching. In digital environment, teachers just click appropriate buttons to execute teaching modules, which should involve various techniques to support various types of learning styles and intelligences.

As an analogy, fastfood restaurants (such as KFC, McDonalds, and Pizza Hut) allow everyone to be good cooks. The staffs are not expected to come out with recipies, but only to operate the system. They are just required to press buttons, and the meals are ready. Obviously the customers have been satisfied since many years.

A. The Problem that Commences This Study

In accordance, this study is proposed to assists teachers at pre-schools in their teaching and learning activities. In relation, children are exposed to technologies at home, so when they are in school, they are more attracted to technology-enhanced learning activities (Halimah et al., 2000). This requires pre-schools to provide electronic teaching materials for their teachers in suppports of children's needs (Jones & Jo, 1998).

When a survey was carried out, many pre-school teachers were found not sufficiently confident in teaching because they are not well-trained to teach. In fact, most of them do not have any teaching qualification, besides many are not sufficiently-educated. This is more obvious in teaching in English, especially because they themselves are not good at English.

Inline with that, many electronic learning materials in the form of courseware are available in the market, and some of them come with textbooks. However, the courseware is developed without studying the needs of teaching and instructional strategies. It can also be observed that children use the courseware on their own (Elsom-Cook, 2001), which in a way supports active learning (Faridah Hanim & Halimah, 2008). Unfortunately, the roles of teacher in this type of courseware are less, because the courseware are developed for students' self-paced learning (Regan & Sheppard, 1996).

Hence, there is a need for supporting teaching and learning in classroom, beyond the self-paced approach. The courseware should include various activities, as teachers can do with the conventional textbooks. This type of courseware requires teachers to operate in classroom. To be more specific, teacher can use the courseware as the instructor for the specific lesson, and children learn from and with the courseware (CTGV, 1993). In this case, the teachers' role is more on operating the courseware, and control the children in the classroom. In short, teachers' roles will focus more on social interaction in the classroom learning. This study calls the courseware as **EliteKids.** This leads to a question, *what are the guidelines for developing EliteKids*?

In solving the described problem, and to answer the research question, the following objectives have to be achieved.

1) to gather appropriate instructional requirements and elements in Multiple Intelligence Theory for electronic teaching materials.
2) to propose guidelines for electronic teaching materials based on the gathered princliples in (1) to teachers**.**

This section addresses the foundation of this study. In the remaining parts of the paper, the methods to achieve the

objectives are explained. It is followed with an extensive discussion about the outcomes of the methods including the findings in the form of guidelines.

II METHODS

Figure 1 illustrates the methods involved in achieving the objectives. Obviously there are two extensive phases: theoretical study and construction of guidelines.

A. Theoretical Study

This phase is aimed at understanding the instructional requirements and elements of Multiple Intelligence Theory for usable electronic teaching materials. It involved some interviews, document study, and observations in finding useful information.

Document study - This study first studied documents related to pre-schools. Syllabus is the main resource, in which schools use as their content guideline. That makes the standard for the curriculum at pre-schools. Besides, this study also put eyes on the books used in the pre-schools. It was found that most pre-schools follow the curriculum by the Kementerian Pelajaran Malaysia. Meanwhile in terms of practice, teachers use different books, with different other teaching and learning aids depending on their locations and students. However, the contents in the books are mostly similar.

Observation - Having gathered the information through the documents, this study observed the activities in the pre-schools. Selected schools in Kedah and Kuala Lumpur were visited. The selection of schools was made based on the criteria in the list below:

- Involving pre-schools in big cities and small towns
- Involving pre-schools with different nature and facilities
- Involving pre-schools with students of different family background

Based on the criteria, this study through social network managed to visit five pre-schools in Kedah and nine pre-schools in Kuala Lumpur.
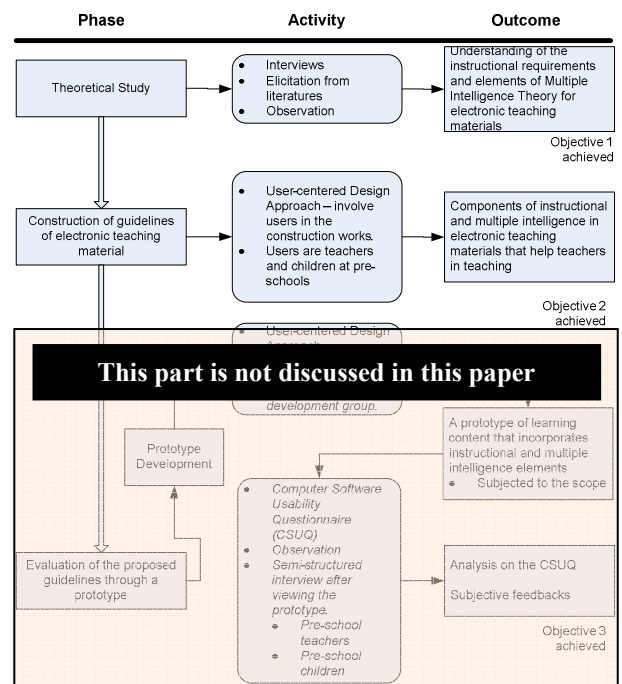

Figure 1: Summary of the methods.

It is more than sufficient for observing the teaching and learning activities, because the findings are similar after observing four to six pre-schools. Then, the remaining observations were confirming the gathered findings. Among the purpose of the visits was to understand the gap that this study could help eliminating. Another is to detail the possible solutions for overcoming the identified problem. In short, Figure 2 depicts two most common activities in pre-schools i.e. learning with books and computers. This is a good input to this study, which gives a clue that pre-schools prefer to make use of computer applications and books in delivering their contents.

Figure 2: Children learn with computer and books.

Interview - The observations were coupled with interviews at the end of each session. Teachers were asked questions on their career. Among the questions asked include:

- The most common challenge in teaching in pre-schools.
- Whether they are highly qualified to teach the courses.
- Whether the children respond well to them.
- Whether children accept well the use of computers.
- The way they approach their students
- The differences among the children

- The ability of children to participate in sessions
- (questions on classroom activities)

B. Construction of Guidelines of Teaching Materials

The findings in terms of clue and information gathered in Phase 1 were used in proposing the guidelines to teachers. Their feedbacks on the guidelines are very important. Hence, they were involved closely in this study in formulating the guidelines. Besides, children were also involved. This technique is called User-Centered Design (UCD) approach (Jesse, 2000).

In particular, in the UCD, users became part of the research team. A series of meetings were conducted. With reference to the experience in understanding the scenario in Phase 1; that four pre-schools could represent the majority; this study decided to involve only teachers of four pre-schools. Hence, two pre-schools were selected in Kedah, and two were selected in Kuala Lumpur. The meetings were held in Changlun and Petaling Jaya on different dates. There were six one-day workshops organized in each location, on three different dates, with the following aims:

- Workshop 1 – is aimed at gathering the instructional and multiple intelligence elements for usable teaching materials.
- Workshop 2 – is aimed at detailing the content dimension.
- Workshop 3 – is aimed at enriching the media elements dimension.
- Workshop 4 – is aimed at detailing the interactivity dimension.
- Workshop 5 – is aimed at detailing the language dimension.
- Workshop 6 – is aimed at detailing the method dimension.

After each workshop, the findings were analyzed and any possible questions were prepared for discussion and confirmation with the workshop participants. They were well-documented for future reference. On top of that, in each workshop, examples of existing applications were brought to the workshop. Users experienced the applications and fed back their experiences. Generally they addressed the good and bad elements they experienced while using the applications. The scenario in the workshops was very lively and under control. Everyone was sincere in addressing their ideas and opinions, making the UCD workshops very reliably in gathering data. Additionally, it was very lucky for this study, because the users (teachers) who participated in the workshop were very co-operative.

III   OUTCOME OF THE FIRST CYCLE

In the early observations and interviews (**Workshop 1**) with teachers and children, the objective was to identify the dimensions of instructional and Multiple Intelligences suitable for EliteKids. Hence, the observation and interviews were focused only for that. As a result, it was found that (1) contents, (2) media elements (specifically text, audio, and visual), (3) interactivity, and (4) language are important aspects that support for instructional purposes to be emphasized in the EliteKids. Meanwhile, the methods of addressing contents support the various competencies for supporting the Multiple Intelligences. Hence, this study deduced that they (contents, media elements, interactivity, language, and methods) should be specially considered for the users, particularly pre-school teachers and children, who are mostly not technology-literate.

IV   OUTCOME OF THE REFINING CYCLES

When further analyzed in consequent cycles of UCD seminars, each aspect was further analyzed. Each dimension identified in the first cycle was detailed out in separated seminar.

In **Workshop 2**, this study detailed the content dimension. Subjects of study were provided with a few books with different contents, some follow the syllabus and some were not. Additionally, some have long stories and some chunk the contents into smaller parts. On top of the books, digital storybooks (four samples are provided in Figure 3) were also provided, also in different formats of content representations.

Further, **Workshop 3** took place with the objective to enrich the media elements dimension. In this exercise, only digital storybooks were used as the tools for gathering feedback. Hence, the same digital storybooks were used again. Each digital storybook contains various media elements, but there are certain media elements (such as audio, video, and animation) not available in certain digital storybooks. It is purposely designed to identify the effects of different media elements.

Figure 3: Samples of digital storybook used to observe feedback.

During the observation, it was found that children were not really interested if the storybooks do not speak to them. Besides, storybooks that do not have any animated characters are also not preferred. Not only that, font is also playing roles in tackling children's interest. It was found that the fonts must be large enough, at least 18-point, the difference between the background and foreground is obvious, are clear, use sans serif, simple, use wide character-fonts such as *Bookman Old Style*, and there is no mistake. For the audio, the pronunciation must be clear, slowly, and right with emphasis, tone, and stress, the difference between the background audio, audio alert, and the content must be obvious, the important note should be repeating, and always under user control such as to listen or not. Meanwhile for graphics, animations should only be used when appropriate (avoid putting too much animation), involving multiple colors. On top of that, the visual elements must always be standard, and clear, involving multiple different characters, and are in proper metaphors.

It was followed with **Workshop 4**, which aimed at detailing the interactivity dimension. Using the same digital storybooks, the teachers were invited to experience the interactivity. This study observed the teachers' experience because they are going to operate the EliteKids in classrooms in the actual context, while children are the entity to view the contents. The way teachers experienced them were observed and analyzed. Obviously each digital storybook has different styles of interactivity. This gives rich feedbacks to this study.

At the end, it was gathered that maintaining the standard is very important. This reflects that every page in similar topic should be standard. All characters should be similar, in contextually similar metaphor, similar layout, and maintained theme. The sign post really helps users to be aware of their current location in the EliteKids. The sign post could come in the form of title name, unit name, or the like. On top of that, audio alert is very important. It notifies the users about their action. Further, it should be helped with visual alerts. The combination of audio and visual alerts ensures that users always know the differences of clickable and non-clickable items. However, the demand for user intervention has to be minimal. It is important to note that users tend to be tired if they have to continuously click the mouse. This eventually leads to rejection. The use of mouse or touch screen is necessary for EliteKids. In the application, buttons must be obvious. Users are not happy if they have to guess between buttons and other elements. Additionally, the buttons must also be standard. Without instruction, users are not confident to operate the EliteKids. Hence, the EliteKids must be provided with clear instructions. Most importantly, users must have freedom in navigating through the EliteKids. Hence, it should avoid hierarchy. This allows users to move from a point to any point at their convenience.

Then **Workshop 5** followed. It was aimed at detailing the language dimension. In teaching practice, using proper language is necessary, because children will imitate from their teacher and what they learn at school. Hence, this study believes that language influences the children greatly. Accordingly, the languages in the digital storybooks were used as the base to gather rich data from the children. It was found that the language affects their pleasure in interacting with the digital storybook. When in certain cases, they have to refer to their teacher, it slows them down. Meanwhile, it was also seen that they enjoy interacting with the storybook.

In short, this study found that EliteKids should use simple sentence structure. It was found that long structure makes children confused. Besides that, it should contain short sentences in conveying the contents. If the sentences are too long, children tend to feel bored, and lost in the reading. When there are purposeful and meaningful content, it is good to repeat. During the observation, it was found that when repeating the contents, the children learn more quickly, and memorize endlessly. Additionally, the EliteKids should convey the contents in written and audio forms, which means the sentences are narrated accordingly. When both are provided, children could grasp the contents correctly and confidently.

Finally, **Workshop 6** detailed the method dimension. It is important in supporting children with various learning intelligences. Based on the observation over the way the children interact with the provided digital storybook, they focus more through hearing. It was obviously seen that they got the contents even though they were under the table playing with peers or playing with toys at the back of the classrooms through what they listened. Besides, other children read the contents together, and then chat with peers on the contents. Those who were not able to read fluently asked assistance from their peers. Sometimes, they refer to their teachers. Nevertheless, children also move around with the contents in the digital storybook. The environment was very healthy with help of the digital storybook.

Based on the scenario described in the above paragraph, this study deduces that the EliteKids should be incorporating elements that support children learning intelligences. Hence, the written contents should be narrated nicely, using appropriate language and voice for the ultimate target audience, which in this study are children aged between five and six. Besides, the written contents should be designed in a way that children could read together. Hence, this study prefers to highlight the syllable being narrated, so that weak children could read together. The children would also map the contents with the behaviors of characters they see on the screen. This needs to be designed appropriately so that they learn through their observation. This could be very efficient in describing about abstract concepts. On top of that, many children learn well when they speak. Hence, the characters in the EliteKids should invite children to speak with them. This could be by answering questions or repeating contents. Also, the EliteKids should be utilized by the teachers to motivate the children to imitate the conversations, practicing among themselves, and consequently with their family members, neighbours, and the society when they are not in schools. In the EliteKids, elements that invite the children to move together must exist. This could be through clapping hands, imitating the characters dancing, and shifting from a point to another.

In short, the multiple intelligence part must involve in the methods for learning, particularly listen (verbal – linguistic – intrapersonal), read (verbal – linguistic), speak (interpersonal), witness (intrapersonal – spatial), and move (interpersonal – musical – bodily-kinaesthetic). This aspect should be incorporated in EliteKids in response to the various styles of learning among children. This allows every child learns as found by Ariffin (2009), Nurulnadwan, Nur-Hazwani, and Ariffin (2009), and Nurulnadwan, Nur-Hazwani, Erratul-Shela, and Ariffin (2010). The use of various media elements is important. This reflects the multiple intelligences, in which some children tend towards learning with text, some with animation, and some with movement. Hence, the EliteKids has to be developed very creatively. The differences between the contents and other elements such as audio and visual alerts, and background music or song must be clear so that the children are not confused (Nurulnadwan, Nur-Hazwani, & Ariffin, 2009; Nurulnadwan, Nur-Hazwani, Erratul-Shela, & Ariffin, 2010). On top of that, the language and interactivity must be simple, because children have little experience in both. Their vocabularies and experience in interaction are limited. Hence, everything should be obvious and within their existing knowledge. Having analyzed the requirements for EliteKids, this study forms a set of guidelines for the EliteKids. The guidelines are recommended for designing usable teaching materials for pre-school, in assisting teachers who are not confident in teaching English as found in the described problem. In accordance, Table 1 lists the guidelines, containing very straight-forward practical tips.

Table 1: Guidelines for teaching materials

Content	● Following a standard syllabus. ● Consist of a few chunks of topics, including exercise or quiz. ● Simple and map children's existing knowledge. ● Each topic is short. ● Arranged according to thematic, increasing level of complexity, sequences of process, and the like. ● Include elements within children's mental model.
Media elements **a. Text** **b. Audio**	● Use large fonts – such as 18-points. ● Make sure the difference between the background and foreground is obvious. ● Make sure the fonts are clear, use sans serif. ● The fonts must be simple, use wide character-fonts such as Bookman Old Style. ● Make sure there is no mistake.
c. Visual (graphic,	● Pronunciation must be clear, slowly, and right with emphasis, tone, and stress. ● Obvious difference between the background audio, audio alert, and the content. ● Good to be repetitive.

animation, images, video, etc..)	•User can control the audio.
	•Use of multiple colors.
	•Use only appropriate animation.
	•Make sure the visual elements are standard.
	•All graphics must be clear.
	•Provide multiple different characters.
	•Use suitable metaphors for children.
Interactivity	•Maintain the standard.
	•Provide sign post.
	•Provide audio alert.
	•Provide visual alert.
	•It has to be minimal.
	•Encourage the use of mouse or touch screen.
	•Buttons must be obvious.
	•Use clear instructions.
	•Avoid hierarchy.
Language	•Use simple sentence structure.
	•Use short sentences.
	•Good to repeat.
	•Provided in written and audio forms.
Methods	•Listen – allow children to listen to narration. **(A)**
	•Read – encourage children to read the texts on screen.
	•Witness / observe – Invite children to witness the characters in the learning material. **(V)**
	•Speak – invite children to speak-together, such as singing and count.
	•Move – encourage children to move their body, such as clap their hands, and nod their heads. **(K)**

It is important to note that the guidelines in Table 1 guide on the usability aspects, making the EliteKids usable in its context. They do not deal with aesthetical values. This study believes that designers when designing interactive electronic applications are good at aesthetical values already. In addition, the guidelines are made not complicated, ensuring that everyone could understand and incorporate them in the teaching material they develop.

V   DISCUSSION AND CONCLUSION

The UCD seminars were able to gather original and sincere data from the users. Hence, the findings in this study are highly reliable. The guidelines in Table 1 are generic, which could be applied for any course content. To make their teaching materials interesting, designers have to incorporate some creativity aspects. The appealing element is very important so support children's motivation (Ariffin, 2012; Ariffin & Cut, 2012). In fact, this is also applicable for hearing-impaired people (Norida, Nur Tahrina, & Ariffin, 2012; Ariffin, Syarifah Nadiya, & Sobihatun, 2012). This is hardly outlined in any form of guideline, because creativity is very abstract, and it gradually gets better when one keep practicing. This study believes that every teacher could develop their own teaching material when they have the desire.

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