CHALLENGES OF MALAYSIAN DEVELOPERS IN CREATING GOOD INTERFACES FOR INTERACTIVE COURSEWARE

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ABSTRACT
There are many reasons why interface design for interactive courseware fails to support quality of learning experiences. The causes such as the level of interactivity, the availability of the interfaces to interact with the end users and a lack of deep knowledge about the role of interface design by the designers in the development process are most acknowledged. Related to this, as a creator for the interactive courseware, generally the developers expect the resources that they produced are effective, accurate and robust. However, rarely do the developers have the opportunity to create good interfaces with the emphasis on time consuming, money and skill. Thus, some challenges faces by them in the interface design development can't be underestimated as well. Therefore, their perspective of the interactive courseware is important to ensure the material and also the features of the interactive courseware can facilitate teaching and learning activity. Within this context in mind, this paper highlights the challenges that faces by the Malaysian developer from the ten face to face interviewed data gathered. It discusses from the Malaysian developer perspectives that involved in the development of interface design for interactive courseware for the *Smart School Project*. Particularly, in creating such a great interfaces, the highlights challenges will present within the constraints of time, curriculum demand, and competencies of the development team.
Keywords: Educational courseware; courseware development process; interface design; interaction design.

INTRODUCTION
In today's education, learning environments had been greatly changes through the emerging technologies such as multimedia and the internet. In the current Malaysian education context, particularly, the rapid advancement of this new technology was plays as one of the most important roles in classrooms as interactive courseware has been used in presenting learning content and information. Meanwhile, these new media approaches are expected to motivate students to learn and encourage them become as an active participator (Win et al., 2004).

Therefore, a broad literature shown, there is multiplied reaction and opinions regarding the effectiveness application of an interactive courseware in learning and teaching process. Overall views however, definite that there are two categories of idea exist in the process of evaluating the effectiveness of interactive courseware performance: Firstly, those who does situated that an interactive courseware is the solution for enhancing the quality teaching and learning performance (Bates, 2005; Boud & Prosser, 2001). Secondly, the others group considered that an interactive courseware it's just a tool in providing an entertainment material in teaching and learning process (McMillan & Schumacher, 2001; Mayer & Moreno, 2002). Although there are different views exist between these two outlooks, both of them are agreed that teaching and learning strategy and style should equivalent with the current digital demand.

On the other hand, Helen (2006) stated that a good values of the interactive courseware should be provide with the interfaces that can entertained the end user and available to enhance the level of understandings and experiences among the learner. He further claimed that an effective interactive courseware should be able to use by the different level of learners either for group collaboration or individual uptake and an effectives interface design can accommodating the learner needs as well. From this idea, it was found that in order to produce a good and an effective interactive courseware, it's required that every developers of this tool highly needs to know and be aware on the role of interface design that can enhance quality learning experiences.

Thus, with the availability of this new technology in today's education setting, many private companies in Malaysia have been ventured into courseware development. The main reason is to create an interactive learning material and online learning resource for the students use. According to Multimedia Development Corporation (MDC) (2007), however the existents of multiply choice of interactive courseware in Malaysia currently were make up a difficulty among the end user in choosing a good quality of interactive courseware. On the other hand, it was defined currently, that much of this interactive courseware have not meet with the level of success expected because many of the courseware developers had to outsource their work (in e.g. MOE, 2008; MDC, 2007; Kamariah, 2006; Neo, 2005). As a result, the instructional sessions at school continued to be based on printed textbooks, which are delivered by the teacher (Muda & Mohamed, 2006). Consequently, up to the recent review by the Malaysian Ministry of Education on this related interactive courseware, identified that a level of courseware acceptance is still at the average and it's was related to the lack of interfaces performance. Beside,

attitudes of the teachers and students towards this application (MOE, 2008) are influenced as well. However, in view of these outcomes, it's shown that more investigations related to the development of this interactive courseware need a further investigation.

Thus, relating to the effectiveness used of Malaysian interactive courseware in term of interface design performance, this paper addresses some misunderstanding and challenges faces by the developers particularly on the development of interface design. Within this context, this paper is organised in the following ways. Section 2, will discuss about the roles of interface design in courseware development followed by the discussion of some general misunderstanding about it and reflection among the Malaysian courseware developers in producing an effective's interactive courseware. Section 3 presents the various challenges that were faced in the development of interactive courseware particularly for interface design development. Finally, Section 4 concludes the paper by highlighting the factor that should take consideration for the future development of interface design and for an effective interactive courseware uptake as well.

The roles of interface design in the courseware development process.
Ideally, the interface design is the visible personality of software system with specific kind of design where the designer commonly will take information and organize it and presented in a meaningful ways (Galitz, 2002). Meanwhile, when applied into computer software, interface design is known as a graphical user interface which is refer to the surface of screen that facilitates certain interpretation of the medium on the way user perceives the communication process (Preece, Rogers and Sharp, 2002). Moreover, a type of this interactive communication is determined as a vehicle of interaction between machine and a human.

As a tool of communication between the users to interact with a system in delivery particular information, the term of interface design for an interactive multimedia application particularly, is not just simply refer a font size, a button placement or the images that the user sees and feels but including every element of a system such as screen layout (consist of the shape of buttons, the positioning of menus, the display of a warning message, the color applied) and selection modes of interaction (Borchers, 2001). In facts, an effective interface design of interactive multimedia material will allows the user to received the messages of multimedia material by find the information that they require and rewards the users with the maximum amount of information needed by them. Thus, as a crucial part of user's experience with any piece of courseware, interface design performance is significantly related to the effectiveness of learning experiences (Shneiderman, 1998).

The development of interface design requires the understanding of at least three things: (1) the user who interacts with the interface, (2) the system (the computer technology and its usability), and (3) the interaction between the user and the system (Galitz, 2002). Therefore, the ambitions of producing a good quality of interactive product is often lost among the courseware developers because a poor user interfaces design is the reason why so many interactive courseware are never used and cause lack of user interest as well as being visually unattractive. Besides, rarely do courseware developers have the opportunity to create such a great interfaces with the emphasis on time and money and much courseware developers comment that a good user interface design is just a common sense (Liu, Jones, and Hemstreet, 1998).

Even though every courseware development has different needs or requirements, the objective of any courseware developer should be to design and implemented a quality of user interfaces in any interactive products. With this objective, interface design should be design to match the skill, experience and expectations of its anticipated users but courseware developers commonly have a different view of the product, a different skill set of teams, and often enforces their own desires rather than those of the end users (Preece, Rogers and Sharp, 2002). Consequently, most of the interactive courseware failed to provide an interface design that can accommodating the end user need.

Meanwhile, it is not easy to design the interactive learning material, as it should not be limited to just content and should include other components to enhance teaching and learning process. The problem can be mapped in producing a good interface design of multimedia courseware is to understand what users require from a product and how to provide effective engagement. In terms of media organization, interface design needs to consider carefully on graphic visual and navigation that engage learners in meaningful authentic tasks (Wilson, Jonassen, and Cole, 1993; Wilson and Cole, 1991). However, from a courseware development point of view, interface design means how to provide a learning environment that encourages and motivates learners to recognize the important concepts of meaningful learning. On the other hand, simply knowing basic interface design concepts will not be helpful to courseware developer for the creation of effective learning courseware and the facilitation of learning in electronic environment.

Consequently, the ambitious to produce a good quality of interactive learning material often happened among the courseware developers. Therefore, rarely do courseware developers have the opportunity to create a great interface with the emphasis on time consuming, money and skill (Helen, 2006). However, as a creator of the products, generally the courseware developers who developed this interactive teaching material expect the resources that they developed to be effective, accurate and robust. Thus, some crucial challenges faces by the development team in the interface design development can't be underestimated by us.

METHODOLOGY
This paper is based on the data gathered from research study that was conducted as an exploratory research in investigating the development of interface design particularly looking at interactive courseware development process. By focusing on the development of interactive science courseware in the Malaysia *Smart School Project* as a sample of study, a face to face semi structured interviews were conducted among the courseware developers that were participated in the development of the existing interactive courseware in May 2009 across Klang Valley in Malaysia. This semi structured interviews had been conducted through open ended question consisted of ten main questions. A guiding research questions for this interview have been identified and designed by the authors to be answered by the project leader of courseware development team. All interviews session had been recorded and transcribed by the author followed by comprehensive analysis.

The main aims of this interview are to determine the level of developers understanding about the role of interface design for interactive courseware and the challenges that had been faced by them in presenting a good quality of interface design for an effective interactive courseware in fulfilled the expectations of the end user.

FINDINGS AND DISCUSSION
Based on ten different courseware developers that were interviewed, in summary, it was defined that a general development process of the existing Malaysian *Smart School* interactive courseware is still similar to the generic water fall model of development process identified in the worldwide literature. Correspondingly, they went through process of analysis, design, development, evaluation and implementation. The development of these existing interactive courseware begins with the government provided the content and instructional guideline to the developers appointed. Based on the content and instructional guideline provided, the developers will develop a prototype. They further create the potential interface design for an interactive courseware as requested. This interactive courseware therefore will be implemented by the student after getting approval from the government.

In addition, from the interviews conducted, some of the general misunderstandings about the role of interface design in courseware development and the challenges faces by the developers are identified as well. Within these misunderstandings, the author believes that this is the first step towards the successful of interactive courseware development for Malaysian perspective.

1. **The general misunderstandings about the role of interface design in Malaysian courseware development:**

   • **Converting learning modules from print into electronic format:** Analysis of the face-to-face interviews with ten developers shows, most of the developers assume that the development of the interface design of interactive courseware simply involves an improvement phase from a printed version of content material into an electronic format. For example, one informant responded,
   "Sometime we just convert the sample test from the current existing textbook into the interactive courseware. It's easier, rather than spending a long time on analysis." (Developer 2)

   However, another participant showed an understanding of the differences between digital applications when giving this response:
   "Designing interfaces for the computer screen is different from the printed design. You can not simply prepare the interfaces without have some understanding about the overall concept". (Developer 3)

   Conversely, most respondents also underestimated the role of interactive learning, where courseware development is not merely a simple process of converting a printed learning module with exercises into an electronic format (e.g. Norhayati and Siew, 2004). That is, it is important for the developers to not ignore the function of interface design in the development process if they are to produce quality interactive courseware.

   • **The Concept of Interactive Learning:** The accomplishment of learning outcomes from the interactive courseware relies on the quality of the courseware itself (Preece, Rogers and Sharp, 2002). Thus it requires the effective development of the interactive courseware, which in turn relies on the developer having some

understanding of interactive learning concepts. However, most of the developers who participated in the study showed that they did not have in-depth knowledge of interactive learning concepts, but only relied on more general principles for courseware design. This was illustrated by one project manager's response,

"There is not much difference when you are preparing digital learning material. The difference is just a platform of delivery. But at the end of the day, it depends on the user. Either they like to use it or not."
(Developer 4)

Another project manager answered:
"You should have your own initiative when you are designing this interactive courseware. We just develop it based on our previous experience." (Developer 2)

However, most of the members in their production team have been involved with different types of interactive material development, including preparing corporate videos and other multimedia presentations. Therefore, developing interactive courseware is totally different. Thus, while most of the developers tried to produce the courseware to fulfil the guidelines of the Ministry of Education, most of them depended on their previous experience only, rather than researching pedagogical approaches.

2. **Challenges faced by Malaysian developers in the development of interface design for interactive courseware.**
   More recently, interactive courseware has emerged as an instructional technology with the potential to overcome the limitations of traditional media in supporting the prospect to provide learning environments with strong visual elements. Realistically, in improving the quality of interface design for an interactive courseware, the important challenges for the Malaysian courseware developers defined from the interviewed is how to provide the high quality of interface design by reducing the courseware development cost and time consumption. In this regard, there are a few issues and challenges that can be highlighted from the interview data so far. These are presented below:

   • **Team expertise and the basic pedagogical knowledge of the interface designer:** One of the biggest challenges' faced by the development team is most of their interface designers do not have basic knowledge of pedagogy. Moreover, most of the courseware developers do not have a specific content expert on the subject on which they are working. Currently, before the development of interface design begins, all the developers involved will received the content of the potential courseware and instructional design from the content expert those are not in their production team. The content experts are usually teachers who are in the government team. Frequently, during this early stage of design, if the interface designer or graphic designer had difficulty understanding of some specific concept, they will pose their questions to the content expert in the government team.

   Unfortunately most of the developers have found that the content expert in the government team assumes that interface designers in the development team already knows the fundamental pedagogical concept in producing interactive learning material, yet this is not the case. One of the project managers claimed that,
   "It is not easy to fulfil their requirements because no one in our team is a teacher. Ministry have a content expert and we need to work with them. But they are expecting our designer knows everything. That is the problem."
   (Developer 2)

   He further claimed that this contributes to the level of effectiveness of the interface design performance during the implementation. He stated,
   "Even though we had followed the requirement in the tender document, ... As a developer we just prepared it according to what they required in order to get an approval. We don't border what will happen later; though we worry it will affect the effectiveness of the courseware."
   (Developer 2)

   Thus, while the developers carefully consider what medium will be used, a basic understanding of pedagogical knowledge among the production team members is required in order to design and produce quality interactive courseware.

   • **Skill constraint and availability of the team:** Courseware development teams generally require input from many disciplines into the interface design. For example, instructional designers establish the learning objectives, content experts will provide the teachable know and how of the subject and graphic designers will

be responsible for enhancing the media performance. Each of these experts plays a different role in the development process.

On the other hand, the Malaysian Ministry also requires that the interface design of the potential courseware is multi-media rich. In order to fulfil this requirement, all courseware developers must to produce appropriate interactive animations or simulations. For example, one project manager referred to his experience designing interactive science courseware, where it is required that a real-life simulation of an actual experiment or situation be provided for the user,
"Ministry always request non-static designs for their project. Which means the entire courseware must be presented as fully interactive. They prefer real life simulations. They also need every single part of the courseware to become active." (Developer 4)

Therefore, courseware development requires a range of specialized skills workers, such as programmers, interaction designers, writers, language editors, visualisers, voice talent, animators and illustrators. However, in the Malaysian context, the teams are limited and most of the developers involved claimed that their production team does not have the capacity to achieve this. The preliminary analysis also identified that the numbers of team members involved were very limited and most of the developers tried to make their team members become multitasking workers.

Moreover, it often requires aspects of the interface design to be outsourced to third parties. As claimed by one participant,
"If we do not have enough of a workforce, especially skilled workers, the task will be outsourced to others. And frequently, we outsource the job of preparing the interface design to a freelance designer who is also a friend to our designer. But then, it is based on our designer's recommendations."
(Developer 1)

When this happens, it involves more implications such as the increase of cost and development time. Further, while the development team is already fractured between the software companies and the Ministry, it is then fractured further. The disintegration of the production team disconnects them from a common understanding of the learning objectives, pedagogical principles and user needs.

- **Curriculum demands:** In Malaysia, the Ministry of Education requires interactive courseware must present particular aspects of cultural and moral values that can be guided by criteria in the curriculum. For instance, the design of a particular characteristic of interface such as layout, images, buttons, and colours must signify or reflect Malaysian looks without having any bias regarding ethnicity or religion. This is because of the diversity of a complex mixture of multicultural society in Malaysia. As such, visual symbolism for the 3 mains Malaysian ethnic groups (Malay, Indian and Chinese) must be considered.

However, the interface design of the interactive courseware cannot display specific elements which preference one group of users. By way of example, the developer cannot use a swine picture because swine can be an indication of an ethnic symbol of the Chinese. In term of colour usage, colour can also represent different meanings in different cultural groups. For example, red is significant in the images of Chinese culture and green corresponds with the Malays. Chinese believed on red is a symbol of good wishes and good fortune. The Malays believe green is a symbol of religion. Developers must therefore realise that green or red in this context are a form of communication through visual representation. Because of these restrictions, the developers of interactive courseware cannot simply use copies of the visuals or images from other countries. Developers therefore claim that they have to spend much time preparing the interface design components for the courseware.

CONCLUSION
Based on the findings presented previously, in conclusion, the misunderstandings experienced by the existing courseware developers in Malaysian are clearly associated with their challenges. However, the developers who developed this interactive teaching and learning material normally do expect the resources that had been developed by them to be effective, accurate and robust. And yet, rarely do developers have the opportunity to create a great interface with the emphasis on time consuming, money and skill.

Even though it is widely agreed that interactive teaching and learning material has immense potential for educational setting, as a creator of the products, the Malaysian courseware developers also need to have a sound knowledge of pedagogical principles in producing an effective interface design that can accommodate the end user need. They furthermore should have a right understanding about the role of interface design in the

development of effective interactive educational courseware and critical demands on how interface design can be utilised to make learning experience among the end user highly achievable. Moreover, developing a quality interface design for educational applications also requires understandings of the interactive learning concepts by the team production. In this analysis, it is revealed that many Malaysian developers assume that developing the interface design is just a simple task. Thus, to fulfil this mission successfully, they must understand what had been generated these barriers or challenges for the application of interactive courseware in education. In opposition, the objective of this paper is to verify the challenges of developing interface design for interactive courseware and to gain better understanding of developers are achieved.

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