

# Teachers' Understanding on the Role of Interactive Courseware in Facilitating Teaching and Learning

Assoc. Prof. Dr Norfadilah Kamaruddin

*Creative Visual Exchange Group, Faculty of Art & Design, UiTM Shah Alam*

## **Abstract**

The importance of technology use in education has been widely acknowledged. However in Malaysia, there are ongoing debates concerning the effectiveness used of the interactive courseware in classroom. In particular, the argument on the quality of the interface design performance within the interactive science courseware becomes as one of the factor contributed. Through a series of teachers' interviews conducted in Malaysia, this paper reports an empirical findings revealed regarding the interface design issue. The findings revealed that the limitation of the infrastructure, teachers experience and their participation in the development process of interface design production contributed to the level of courseware usage. Moreover the results established from the study will helping the interface designers' and the courseware developers in Malaysia improving the quality of interface design for future interactive science courseware.

Index Terms: Educational courseware, Interactive Interface design, Interaction design.

## 1. Introduction

During the past two decades, Information and Communication Technology (ICT) and multimedia-based learning have begun to play an important role in classrooms. The benefits of this technology have been noted by scholars who acknowledged that computer software and the Internet provide a great potential to make learning processes more accessible, more engaging [1], and more interesting [2], [3]. In line with this, interactive courseware has been adopted as an effective learning tool to motivate students to become active participants in the teaching and learning process [4] and to improve students' learning performance [5]. To take advantage of the potential that ICTs offer, many educators, including those in developing countries, have chosen to use interactive courseware in various levels of education (primary, secondary and tertiary).

Inspired by the understanding that computer technology and multimedia-based learning can improve the performance of teachers and offer pedagogical benefits as well as improving students' learning abilities, attitudes and achievements, the Malaysian Government has also incorporated ICTs into the Malaysian education system. 1998 saw the launch of the *Smart School Project* (locally known as the Sekolah Bestari), with 89 schools involved in a pilot program across the country. The explicit goal of this program is to provide interactive teaching and learning materials to enhance teaching performance and improve students' learning outcomes [6].

Under the *Smart School Project*, there are three different types of *Smart School*. The schools are categorised as a new *Smart School*, a state *Smart School*, or a remote Smart School. Categories depends on the school's background, facilities and infrastructure. Various types of interactive learning materials have been introduced into primary and secondary education classes in Malaysia as part of the *Smart School Project*. This includes stand-alone interactive courseware such as CD-ROMs; browser-based teaching and learning materials, such as online tutorials provided through a web portal called *BestariEd1*; and a joint program in collaboration with overseas schools called *My School Net2* [6], [7]. In line with this, many private companies in Malaysia have invested in collaborating with the government (through the Malaysian Ministry of Education) to produce stand-alone interactive courseware. Out of this collaboration, 1494 titles have been developed so far. Involving key learning domains, namely Bahasa Melayu (Malay language), Mathematics, Science and English, they have been distributed across the *Smart School Project* in Malaysia [8], [9]. After several years of producing interactive courseware, and implementing

it through the *Smart School Project*, evaluations of the level of uptake and utilisation were conducted between 2003 and 2008. Unfortunately, these researches indicated that the courseware are under-utilised. Several studies that have primarily focused on the effectiveness of the interactive courseware have also noted similar patterns of uptake and usage [10], [9], [8], [11]. These studies have evaluated teacher preferences, and the needs of students in the *Smart School Project* in Malaysia. The results indicated that a range of factors have impacted negatively on courseware uptake and use. This not only includes a lack of available technology [12], but also includes the attitudes of students and teachers, based on the perceived quality of the interactive courseware [6], [7], [8]. Indeed, a study by [13], which focused on the perceptions of teachers, concluded that some of the lessons in the courseware do not adequately meet the needs of end-users, especially teachers.

The results of the above-mentioned studies and the latest survey results by the Malaysian Ministry of Education suggested that the interactive courseware that has been developed for the *Smart School Project* in Malaysia often fails as a tool for teaching and learning. This failure is largely attributed to poor interface design. However, no study has yet been published that contains an empirical analysis that clearly explains the claims made about the deficiencies of the interface design, and details the reasons for them arising. Since the problems with the courseware have been largely attributed to deficiencies in the interface design, this research project has focused on that aspect of the courseware. It has sought to investigate the validity of claims surrounding the deficiencies in the interface design of the interactive courseware that has been developed for the Malaysian *Smart School Project* and to understand the reasons for them. In particular, the study looks on how do the users (school principals, teachers and students) of interactive Science courseware for the Malaysian *Smart School Project* interact with the courseware and perceive it. The main aim of the study has been to critically investigate how teachers perceive the courseware and further determine the strengths and weaknesses of interface design principles, characteristics and components in the existing courseware.

## 2. Methodology

In-depth interview was employed as a research method of information gathering that provides a way to explore more deeply of the participants' actions [14], and also provides opportunities for the participants to explain their perspectives on what the researcher has observed. The purpose of interview was to seek the participants' opinions and perceptions towards the interface design of interactive courseware that has been supplied.

Written permissions from the Ministry of Education, District Education Officer and School principals were obtained before interview took place. Prior to the interviews, the researchers visited six schools and obtained useful information pertaining infrastructure facilities, level of courseware usage, teachers teaching experiences and their views of interface design for the current existing interactive science courseware. The interviews were carried out using a set of open-ended questions. Each teacher was interviewed once in the national language with each session lasted approximately forty-five minutes, and been recorded on a tape recorder. The recorded interviews further were transcribed in detail and translated into English. The sampling respondents of this data were six science teachers (consisting 4 female and 2 male) from six primary schools of Malaysian Smart School Project across Malaysia.

### **3. Results And Discussion**

Five themes became visible from the responses given throughout the interviews tabulated in Table 1. It has been classified into four areas for further consideration. The details of the themes are explained in the following.

No.	Theme
1	Teaching experience and level of courseware usage
2	Infrastructure Facilities
3	Involvement in the development process
4	Teachers' view of interface design

**Table 1:** Tabulation of outcomes theme

#### *A. Teaching experience and different level of courseware usage*

Submit Throughout the interviews that had been conducted, it was discovered that most of the teachers involved in this research study, have a numerous range of years of teaching experience and different level of courseware usage. As per shown in Table 2, the range of the level of teaching experience that has been acknowledged by the science teachers participated in this research study varied from 8 years to 6 months.

Teachers	Years of experience	Frequency of courseware usage		
		High	Average	Low
T1	3 years	*		
T2	8 years	*		
T3	6 months			*
T4	8 years	*		
T5	5 years		*	
T6	5 years			*

**Table 2:** Profile of the teachers' years of experiences and the frequency of courseware usage

There is a good mixture of participants regards to the range of teaching experiences years. However, within these ranks of experiences, only one teacher (who has been teaching for eight years) acknowledged that she is frequently using the current interactive courseware. While, three (3) out of six (6) teachers who responded to the interviews indicated that they normally used the courseware on a regular basis. However, two (2) teachers claimed that they seldom used the courseware.

Teachers from the new *smart school* evidently acknowledged that they often used the current interactive courseware for once a week compare to the teachers of remote *Smart School* who used the courseware for only once a month. For instance, one of the respondents from a *Smart School* said: “*When I teach the lesson in my class, I always use the interactive courseware. I give a chance to my students to explore the CD. They can use and try it by themselves. That's why, at least once a week, I will make sure that each class that I teach will have a chance to use the courseware*” (Teacher Interview 4).

Consequently, one teacher from a remote *Smart School* claimed: “*Not too often. I just used it when I think it's must. It depends on the topic that I am going to teach. I more preferred to use the traditional method*” (Teacher Interview 3). Consistent with this, a closer analysis of the data also indicated that participants shown their awareness and favorable perception in using interactive courseware for teaching and learning process. It has been shown that most of the teachers' believed that their students will be more interested and focused in the class if interactive courseware are been implemented. As per one teacher explained: “*I believe that interactive tools will enhance the learning performance*” (Teacher Interview 2). Another teacher from School 3 stated that the interactive courseware could help her students to become more creative. She declared: “*I think that the usage of interactive courseware will enhance the creativity of my students*”. (Teacher Interview 1) Moreover, the teachers also indicated that they highly encouraged their

students to use interactive science courseware in classrooms. Supporting this, the data determined that majority of the teachers involved agreed that interactive courseware should be proposed for all subject and be used in school. Thus, all the responses highly indicated that all the teachers involved in the research have positive attitudes toward the use of interactive courseware in classroom.

#### B. *Infrastructure Facilities*

Almost all of the participants indicated that the computer laboratories in their school are inadequate. Presently, there was only one computer laboratory at each school that have been visited has been set up with a good networking facilities. This means that only one class can be carried out at one time. What is more distressing is the fact that only half out of the 30 desktop computers in each lab is in proper working condition. As two teachers stated: *"How can I used the courseware if every time I on the computers in the lab, it hangs and it takes a long time to come back to its normal operating mode."* (Teacher Interview 6) and *"Very often computers in this school laboratory do not function properly"* (Teacher Interview 3).

The success of interactive courseware use in teaching and learning activities to a large extent is dependent on the support given by the Ministry. Two thirds of the responses given noted a negative experiences in relation to support from the Ministry. One teacher comment: *"I think our Ministry is more concerned about the examination results rather than courseware implementation"* (Teacher Interview 3). Another teacher explained, *"Every time when I highlighted the issues in meeting, no one bothered on repairing the computers which are out of order"* (Teacher Interview 5).

#### C. *Teacher involvement in the interface design production, courseware development process and user testing*

The data gathered shown that only one of the teachers that has been interviewed had an experience being consulted by the courseware developers. Therefore, the interviews also presented that most of the teachers were very dedicated and willing to be involved in any courseware development. Three of the teachers had the interest in involving while another two teachers said that they will give their best contribution. It has also been acknowledged through the responds given that it would be best if they could also contribute some input for the systems. As claimed by one of the teacher: *"I am very happy if the Ministry asking for that. Perhaps, I can share some of the suggestions that I gathered from my students. Such as, students more prefers on the video presentation rather than still image"* (Teacher Interview 1). Similarly, another two teachers said: *"I like to be*

*part of the team if they asked. So far no one asked for that..." (Teacher Interview 2) and "I think I'm a lucky person if being asks to be in the project because I can get more information and can share my experience. I'm a pioneer. I think not everyone can get the opportunity" (Teacher Interview 4).*

In relation to this, correspondingly, another one of the participants from school 5 added: "*I can also see that it's a best way that can help in improving the quality of courseware*" (Teacher Interview 5). He further hoped that: "*I hope I can help the developer by giving my ideas, so that the courseware will be more interesting for my students*".

Further, numerous teachers gave their own responses by claiming that they are willing to be involved in the development process especially in the requirement analysis and testing phase. One of the main reasons given by most of the teachers is because they are more familiar with the learning activities and the learning environment. Since they are the direct persons in contact with students, they also have affluent knowledge to the subject. As one teacher said: "*I have been teaching science subject more than 8 years. I absolutely know what my students really wanted and the thing that best for my students. Do you think the developers know more than me..... By end of the day, me and my students are the one that will be using the courseware*" (Teacher Interview 2).

Since teachers are the knowledge experts in the domain of learning and teaching, this study indicated that most of the teachers suggested that focus group discussion is the best approach to be used when doing requirement analysis. They feel that their credibility as a subject expert could be better employed. This had been suggested by four out of six teachers through this claim: "*I think as a subject expert, I have ability to give more. So I think through the discussion, the developers or even the Ministry people can see what the real requirement is*" (Teacher Interview 2).

*"I think one of the good ways is group discussion among the developers and the teachers. Sometimes the developers also want the rough ideas about the subject. Do you realize that they (the developers) are not involved in teaching? So how can they know our difficulty?" (Teacher Interview 1)*

Thus, based on this awareness and concerns, the data shown that involvement of the teachers in the development process has a positive impact for the interface design production. With that involvement, it would provide teachers with some kind of channel to express their proposal which may include good ideas.

#### D. *The most attainable interface design components from teachers view*

From the view of the teachers, it has been revealed that video is the most attainable components. As per acknowledged by a teacher: "*I had been teaching more than 7 years. And I constantly use this interactive courseware in my class. What I been noticed is, when the video was provided in the courseware or been used in explaining some content, student become more focus. It's much easier!*" (Teacher Interview 4). Another teacher supported: "*In my class I always recognized that my student becomes more focus when the video was presented. I think they like it more. Indeed, I think it is very essential*" (Teacher Interview 5). In difference, one teacher claimed that animation is one of the component that make her students more focus in the classroom and enhances the teaching-learning process:. Apparently, this has been acknowledged with the claim: "*I think animation is more attractive. It is very helpful, with all the animation provided. It really enhances the teaching-learning process. For example, the introduction of a science concept can be explained easily with the animation assistance from the courseware*" (Teacher Interview 3).

Similarly, another teacher acknowledged: "*Students are not only more interested but actually comfortable using it. But then, when the animations are fun, students enjoy playing with that. For example, if the animation has the real look of a lab workbook.... meaning lots of detail such as presenting the specific physical subject matter or animal features. Or, maybe, the real science lab*" (Teacher Interview 1). One of the teacher further claimed that animation from the courseware provided helped the students to learn faster and understand better. She stated that the greatest impact was noted in that courseware when she had used. The animations were seen as a particularly an important way to capture students' attention and keep them on focus: "*It really, really helpful! To me the courseware provided is very colourful with animations and all. It captures the students' attention and helps them to understand the concept much easier. For example the element been used in the topic of magnet. It illustrates clearly how one pole attracts each other or not attract. Students have a better imagination compared to explaining on the board with chalks. It is too abstract. Now that I have the courseware, students learn faster and understand better*" (Teacher Interview 2). She also added that students showed more interest and involvement in lesson when courseware is in use. They enjoyed continuous access to the information available on the courseware. She observed that students were more motivated whenever she used the courseware in the classroom. The teacher also noticed the unconsistence of the colours used for the icons especially on the navigational button bar. This is noted clearly further by the following responses that has been extracted from the teachers' interview:

*"Initially, most of my students harder find play and exit button. But then, they will use these buttons when been asked or after I shown it"* (Teacher Interview 3). Another teacher also acknowledged the same problem and claimed that many students were confused with the icon of navigation bar: *"I like the style of the icons but then not all are functioning. Even some of the icons are not functional at all. Most of my students are confused with that"* (Teacher Interview 2).

A number of conclusions can be drawn from the outcomes from the interviews with the teachers. First, a positive attitude in using interactive resources (in principle) is common among teachers, and this is undoubtedly affects the level of interactive courseware use at some types of school. However, there are other factors that impact negatively upon uptake. Primarily, the results from all sets of interviews suggested that the use of interactive courseware at schools is highly dependent on the quality of courseware, including its content and interface design. In fact, there appears to be a strong correlation between the level of courseware use and the perception of the content, activities and interface design performance. In this regard, even though teachers acknowledged that students become more interested and focused in the classroom when courseware is used (due to its inclusion of rich media), it was established that inappropriate and incorrect content and problems with the interface design are the most obvious causes of the interactive courseware being less used than anticipated. Therefore, it can be concluded that teachers will often use the interactive courseware in the classroom if they consider it to be appropriate in terms of content and if it has an attractive and intuitive interface design. This finding bears out the claims made by international interaction design experts such as [15], as well as [16], and [17], that effective interface design contributes to the level of product use.

Most of the teachers cited that lack of infrastructure facilities in schools is the most common reason that slows down the implementation of interactive courseware. Computers in fact are available in school for teachers but the interview findings revealed that many of them are inoperative. Many new smart schools at this point of time have already been equipped with more than one laboratory. However, computer infrastructure facilities in remote smart schools are still at the minimum bare.

The level of courseware usage is also impacted by the level of technical support, and without such support the project can be abandoned. In addition, teachers who are new to the technology may need extra support and training to start using the interactive courseware more. Thus, to achieve a successful level of interactive courseware usage at school, an appropriate level of technical support and in-service training needs to be

considered, as well as the provision of the necessary infrastructure or a scheme to support schools to increase the level of courseware use.

Through teachers' interviews, it is clear that educators are willing to be involved in the development process and, indeed, think that it is essential to create their involvement towards the development of the courseware content. They feel that their credibility as a subject expert can be employed better, and by large suggested that group discussions would be the best approach when undertaking systems requirements and user need analysis. Such involvement of teachers in courseware design is clearly recommended in the literature, which acknowledges that the teacher is one of the knowledge experts in the domain of learning and teaching [18]. Moreover, as the key stakeholders, the teachers involved in this study also stated that they are willing to be involved in the analysis and testing phases, since they are in direct contact with students

#### **4. Conclusion**

This paper has presented the data that explain how the interface aspects of the interactive courseware are experienced and perceived by teachers in terms of facilitating their interaction and supporting the overall learning experience. The qualitative data obtained from interviews has established the usefulness of interactive courseware in schools and the willingness of teachers to employ it in principle. All teachers who participated in this research project agreed that when the interactive courseware is being used, increases their students' interest and they become more engaged in their learning process in the classroom. This confirmed previous studies on the use of interactive courseware in the classroom, which have consistently found that students commonly experience positive effects on their learning when using interactive courseware as a complement to the traditional methods. These results also supports the argument made by Stolterman (2008) and Sutcliffe, Kurniawan and Shin (2006) that the enjoyment offered by interactive courseware can increase learners' motivation and participation.

## References

- Beuschel, W., Gaiser, B., & Draheim, S. (2003). Communication Needs of Online Students. In A. K. Aggarwal, *Web-based education: Learning from experience* (pp. 203-222). Hershey: Idea Group.
- Flew, T. (2002). *New media: An introduction*. Melbourne: Oxford University Press.
- Gauss, B., & Urbas, L. (2003). Individual Differences in Navigation between Sharable Content Objects and Evaluation Study of a Learning Module Design. *British Journal of Educational Technology*, 34 (4), 499-509.
- Burgess, L. A. (2003). WebCT as an E-Learning Tool: A Study of Technology Students' Perceptions. *Journal of Technology Education*, 15 (1), 6-15.
- Raisinghani, M. S. (2003). Web-based Education in the 21st century: A Transnational Perspective. In A. K. Aggarwal, *Web-based Education: Learning from Experience* (pp. 71-88). Hershey: Idea Group.
- MOE (Ministry of Education Malaysia) 2006, "User Acceptance and Effectiveness of the Smart School Integrated Solution". *Educational Technology Division, Kuala Lumpur*.
- Azizah, J. 2005, "Developing and designing tool and methodology for an evaluation of education courseware". *PhD Thesis, Malaysian Ministry of Education library, printed material*.
- MOE (Ministry of Education Malaysia) 2008, *National Report: Education in Malaysia*. Kuala Lumpur: Ministry of Education.
- MDC (Multimedia Development Corporation) 2007, "Report of the Smart School Roadmap 2005-2020: An educational Odyssey". Retrieved May 1, 2014, from <http://www.scribd.com/doc/1030589/Malaysian-Smart-School-roadmap>
- Kamaruddin, Norfadilah, (2011). Practices of Interactive Courseware at Malaysia Primary Smart School: Usage Standing and Causes Attributing. *Design Principles and Practices: An International Journal*, 5 (2), pp.1-12.
- Shiong, Baharuddin, Maizah Hura, Mohamad Bilal Ali, Jamaludin & Zaidatun (2008). Learning "Goal Programming" using an Interactive Multimedia Courseware: Design Factors and Students' Preferences. *Journal of Educational Multimedia and Hypermedia*, 17(1), 59-79.
- Jowati J.B. (2005). A Step towards e-Learning: Some Pedagogical Issues. *International Journal of Pedagogies and Learning*, 1(1), 48-58.
- Zaitun, A. Bakar, (2006). The Utilization and Integration of ICT Tools in Promoting English Language Teaching and Learning: Reflections from English Option Teachers in Malaysia. *International Journal of Education and Development using ICT*, 2 (2), 4-14.
- Johnson, S. Anne (2005). *The Art of the Author Interview and Interviewing Creative People*. Hanover: University Press of New England.
- Preece, J., Rogers, Y., & Sharp, H. (2002). *Interaction Design: Beyond Human-Computer Interaction*.

*Interaction*. New York: John Wiley & Sons.

Balinsky, H. (2006). Evaluating Interface Aesthetics: A Measure of Symmetry. *Proceeding Paper for the International Conference of Society for Optical Engineering, San Jose, CA, 216 USA*. 60 (6), 52-63. Retrieved August 19, 2014 from [http://spiedigitallibrary.org/proceedings/resource/2/psisdg/6076/1/607608\\_1](http://spiedigitallibrary.org/proceedings/resource/2/psisdg/6076/1/607608_1)

Shield, L., and Kukulska-Hulme, A. (2006). Are Languages Learning Websites Special towards a Research Agenda for Discipline-Specific Usability? *Journal of Educational Multimedia and Hypermedia*, 15(3), 349-369

Andrewartha, G. & Wilmot, S. (2001). Can Multimedia Meet Tertiary Educational Needs Better than the Conventional Lecture: A Case Study. *Australian Journal of Educational Technology*, 17(1), 1-20.