Factors Affecting the usage of Multimedia Teaching Tools by Schoolteachers

Fariza Hanum, Nasaruddin, and Wan Faizatulshima. Ismayatim

Abstract—This study is carried out to investigate the level of acceptance of e-learning tools such as multimedia teaching tools among teachers in teaching and the factors that affect the use of multimedia teaching tools in the classroom. Questionnaires and interviews were used for gathering data from the teachers about their experiences focusing on opinion and reasons why the teachers seem to be reluctant to use and integrate multimedia teaching tools in classroom. The findings from the analysis indicate that factors that affect the use of multimedia tools in schools are many which include the design and technical functionality of the software itself. The findings from the interview gave some insight on technical issues faced by teachers in school.

Keywords—e-learning, multimedia teaching tools, limiting factors, technical constraints.

I. INTRODUCTION

In its aim to become a developed nation by 2020, the Malaysia Government has included in its Ninth Malaysia Plan (2006 – 2010), the integration of ICT in teaching and learning in Malaysian schools. Sufficient ICT equipments are supplied to all educational institutions, and Malaysia’s school curriculum has been revised to ensure that ICT becomes integrated nationwide. Schools are equipped with ICT tools such as computers and the latest information communication technology (ICT) resources including Teaching and Learning Courseware (TLC) to make the teaching and learning process more effective. For example, the new Science and Mathematics textbooks are published together with CD-ROMs as a package known as MyCD and are used to support teaching and learning of Mathematics and Science. Since all Malaysian schools are provided with ICT facilities which involved considerable amount of money and resources such as time, capital and effort, their usage by teachers are analysed to determine its usage and effectiveness.

In preliminary observations made by [1], it was found that teachers were not fully utilizing these facilities in their teaching. The frequency of their usage seemed to be limited and they do not appear to make effective use of multimedia teaching tools in their instruction. This scenario is supported by findings from Multimedia Development Corporation (MDEC) [2] which reported that most of teachers use multimedia teaching tools in classroom only a number of times a week. Some of them only use it twice in a month or only when they are being observed. There seems to be some limitations in using the lesson planning software and it is important to find out in more detail why the use of the TLC is limited.

This study is carried out to find out the frequency of usage of multimedia teaching tools by teachers and to investigate the reasons why the teachers seem to be reluctant to use and integrate multimedia teaching tools in classroom. It also examines what obstacles affect the usage of multimedia teaching tools and ICT in e-learning in schools; the limiting factors and the constraints. The objectives of this study are (i) to find out the frequency usage and opinion of multimedia teaching tools by teachers in school by providing questionnaires, (ii) to investigate the barriers and problems on usage of multimedia teaching tools in school by teachers by open ended questions and interview.

II. LITERATURE REVIEW

A. Related Works

The acceptance and usage of ICT and computer technologies by educators have been of interest to many researchers [3]–[5]. Many reported that the usage of computers by educators in developing countries is not yet at its fullest. In Turkey, the usage of technology by teachers are limited and almost always to support traditional methods of teaching [3]. Consistent with that, teachers’ readiness in Malaysia is at a moderate level and can be further encouraged [5]. The question is to find out what are the factors that discourage the use of computers and ICT in classrooms. This is the next topic that is discussed.

B. Factors Which Affects Usage of TLC

There have been researches to study the factors that affect educators’ usage of computer technology which include TLC. Factors which have been identified in various literatures include lack of pedagogical aspect, lack of adequate content, lack of technical information, lack of time, lack of training, and other barriers such as difficult access to equipments.
III. METHODOLOGY

The setting of this study is 13 secondary schools with identical ICT infrastructure and academic performance background in the Klang Valley area; WP Kuala Lumpur, Selangor and WP Putrajaya, in Malaysia in 2010. The schools selected in each location were chosen at random to acquire the wide-ranging overview results. Teachers from these schools are selected to participate on this study. From 76 participants, 84.2% are female while 15.8% are male. About 78.9% (62) of the respondents have been exposed to at least one ICT course organized by the Ministry of Education (MoE). In this sample, teachers with teaching experiences less than 10 years make up a high percentage consisting of 56.6% of the respondents. This is followed by respondents with 11 - 20 years of teaching experience (29.0%) and respondents with more than 20 years of teaching experience is the minority group involved in the survey. The biggest group of teachers is the group of those teaching Science subjects who have been teaching for less than 10 years, followed by Mathematics and English teachers who also have less than 10 years of teaching experience. The highest frequency group of respondents (23 teachers) belongs to age group 30-39 years old with less than 10 years of teaching experiences.

Data are collected via questionnaire. The questionnaire targeted Science, Mathematics and English subject school teachers in participating schools. The questionnaire are distributed to a sample n = 100 teachers in all 13 schools. A total of 76 teachers responded, mainly from WP Kuala Lumpur, and are analyzed using SPSS 17.0. This is followed by semi-structured interviews.

The questionnaire posts questions about the teachers’ opinion on the usage of ICT and multimedia teaching tools in schools. It comprises consistent fixed-response and open-ended questions and are analyzed using descriptive statistics and triangulated using the interviews. The questionnaire consists of two sections where Section 1 has nine questions detailing respondents’ personal information and teaching experiences. Section 2 has ten questions to elicit the following information:

- What is the level of usage of multimedia teaching tools by teachers in school?
- What are the factors that influence the usage of multimedia teaching tools?

Open-ended semi-structured interviews are used for gathering data from teachers to investigate the barriers and problems on usage of multimedia teaching tools in school. It is also to elicit information regarding their experiences in using multimedia in teaching and learning process in classrooms. Interviews are conducted based on availability basis of the respondents to elicit more information related to the research questions and previous findings.

To get information on the teachers’ opinion regarding multimedia teaching tools, ten questions from Section 2 of the questionnaires are analysed according to the curriculum aspect, pedagogical aspect and technical aspect (MDEC2007) as shown in Table I.

<table>
<thead>
<tr>
<th>FEATURES ASPECT</th>
<th>QUESTION NUMBER</th>
<th>QUESTION</th>
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</thead>
<tbody>
<tr>
<td>Curriculum Aspects</td>
<td>1</td>
<td>I like using courseware as it gives accurate facts on the content that is being discussed.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>I like teaching using the courseware as its content encompasses the curriculum.</td>
</tr>
<tr>
<td>Pedagogical Aspects</td>
<td>3</td>
<td>I feel it is easier teaching using courseware as it contains the aspect of learning evaluation, which helps improve students understanding.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>I believe that the courseware enables students to apply the knowledge they have obtained into new situations.</td>
</tr>
<tr>
<td>Technical Aspects</td>
<td>5</td>
<td>I like using the courseware because the feedback given by the courseware is fast.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>I like using courseware because its HELP function directory is complete. (content of instruction buttons)</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>I like using the courseware because the hyperlinks in the courseware are simple, easy to manage and function well.</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>I like using the courseware because the pictures/images in the courseware can be downloaded fast.</td>
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<tr>
<td></td>
<td>9</td>
<td>I like using the courseware as I can start and end the session in whichever section I like.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>I dislike using the courseware as it slows down my computer’s performance.</td>
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</tbody>
</table>

Respondents rate each of the questionnaire items on a Likert-scale 1 to 5 that indicate 5 as ‘strongly agree’, 4 ‘agree’, 3 ‘neither agree nor disagree’, 2 ‘disagree’ and 1 as ‘strongly disagree’. To ascertain an overall indication of disagreement and agreement, the two disagreement categories are added together as well as the two agreement categories. This is useful to get a general overview rather than a detailed picture.

IV. RESULTS

A. Frequency of usage

The first finding is the frequency of the usage of multimedia software by the teachers. Out of 76 respondents only 7 teachers (9%) claimed that they are regular users of multimedia courseware in school. 37% of the respondents utilize the courseware depending on the topic and 29% of the respondents use the courseware at least twice per year. This finding shows that majority of the respondents do not use the multimedia software regularly in their teaching which supports the report by MDEC (2007) and the literature review.

B. Curriculum, Pedagogical, and Technical Aspects

The next finding gives an idea regarding the teachers’ opinion regarding the multimedia teaching tools they have
been using in terms of curriculum, pedagogical, and technical aspects. The analysis of the questionnaire shows that the curriculum aspect does contribute to the usage of multimedia software. The majority of the respondents agree that the multimedia software which exists in schools provides precise information on the content taught in classroom and conforms to the National Curriculum Standard. Out of 76 respondents, 51.4% of the respondents agree that teaching is easier using courseware as it contains the aspect of learning evaluation, which helps improve students understanding of the content taught by teachers. More than half of the respondents (55.3%) agree that the courseware has the ability to enable students to apply the knowledge into new situation.

The findings also show that majority of teachers agree that the multimedia software used in the schools conform to the pedagogical features.

In term of technical aspects, Table II shows that only 35.6% of respondents agree that the courseware provide fast feedback. Besides the software's own technical features, the timing of feedback while using multimedia software depends on the nature of what is being learned and how it is being learned. The speed of the feedback is directly related to the structural, content and the pedagogical design of the courseware. As stated by [6], studies in which the environment of learning is similar to that of taking a multiple-choice test with feedback, delayed feedback shows a benefit. As compared to studies in which the nature of learning is more like a typical multimedia program, show an advantage for immediate feedback. As majority of the respondents involved in this survey are those who are teaching mathematics and science subjects that require more drill and practise, immediate feedback is more likely to be preferred to enhance the learning process.

More than half (55.2%) of the respondents agree that the hyperlinks in the courseware are simple, easy to manage and function well. Only 9.2% of the users do not like the courseware while majority of the users (54%) indicated that they can easily start and exit the courseware at anytime and anywhere in the courseware.

More than half of the users (51.4%) feel that the downloading of pictures/images in the courseware is not fast enough. It is worth noting that all content distributed to schools is accessible from CDs. Therefore, should future software enhancement place all content on the internet, file size of the pictures and images may have to be reconsidered.

Only 38.2% of the respondents agree that the HELP function directory is complete, the HELP features relating to usage, functionalities, technicalities should be incorporated in the courseware.

One-third of the respondents dislike using the courseware as it slows down the computer’s performance. This factor is related to the hardware and system supplied by the government to schools, thus improvement to the computer performance is highly dependent on the supplied hardware.

Findings from the open ended question of the questionnaires and interview show that there are other factors that act as barriers that hinders the usage of multimedia teaching tools in schools.

C. Other Barriers

As stated earlier, majority of the respondents seem reluctant to use multimedia software in their classroom. From the open-ended question of the questionnaires and during interview session, the following are additional factors identified as the barriers that affect their decision.

D. Time Constraint Norm

In accordance with literature review, time constraint is stated by this group of teachers as a key reason why they are hesitant to use multimedia courseware in teaching. The reasons provided are multimedia software slows down their teaching and as a result they don’t have enough time to cover the syllabus.

“The time is so limited. So I prefer to use own materials to shorten the period of teaching. I think the courseware should easy presentation, short duration and direct to the point…”

(SMK A, Mathematics)

E. Lack of Training Norm

Teachers need to be computer literate so as to become more confident and efficient ICT users. Even though majority of respondents (78.9%) have undergone at least one training session of ICT, teachers still believe themselves to have limited knowledge to fully employ and integrate multimedia software in teaching. They feel that the training provided does not provide troubleshooting skills. In many cases, they reported that due to lack of skill, when faced with software that “hangs”, many of them would restart their PC instead of restarting the software. 21.1% of the teachers have never undergone any training from any institution. This indicates that many teachers are still not familiar with the TLC and this is the factor identified as the one of the reason why they do not use the software in their teaching. As a result, this group of teachers prefers to use their own materials such as handouts and powerpoint slides as their teaching aids.
“Even though I have attended the ICT course, I am still facing the technical problem, because they never teach us how to troubleshoot the program. So, as a result, I have to restart my PC...”  
(SMK B, English)

**F. Age Factor Norm**

Throughout the interview, it is found that age background is also a factor limiting teachers to utilize the multimedia software in classroom. Teachers in the age group of more than 50 years have a lower ICT adoption rate in their teaching profession. A senior respondent finds it difficult to handle the software that requires her to study the features prior to the class. For this group of senior teachers, switching to traditional teaching mode is an option when dealing with technical problem. Younger teachers are found to have more positive attitudes towards integrating ICT and multimedia software in classroom as compared to their senior counterparts. As an alternative, some teachers combine the usage of powerpoint slides and manual demonstration of science experiments to make teaching and learning process more effective.

**G. Hardware Problem**

Hardware technical problem is identified as one of the factor that hinders teachers to use multimedia in classroom. When unable to resolve the technical problems, some teachers resort to their backup teaching materials. The reliability of any computer devices is a major determinant of its accessibility in the classroom. The unreliability of the computer and multimedia courseware system is cause by either hardware malfunctions or program error. For example, problem occurs when connection from laptop to LCD is very poor or the laptop fail to work. Among the problem cited by respondents regarding the software are “cannot be launched”, “not compatible with end-user machine” and “software ‘hangs’”.

**H. Poor Courseware Design**

Even though the teachers agree that curriculum aspect of the TLC contribute to teaching, several of them commented that the explanation of the concept is repeated many times, and the presentation of the concept is too long, which resulted in wasting of time which brings about the feeling of boredom. For example, for subject such as Mathematics, wordy explanations are not necessary.

“Mathematics is a subject that doesn’t need too wordy explanation. Diagrams and animations can help the students to visualize the concept for example in Trigonometry. Some part also doesn’t need to have narration...”  
(SMK C, Mathematics)

“The content is good but sometimes it explained too much, and the students started to get bored when we display the CD, I think it would be better if they reduce the number of slides in the courseware...”  
(SMK D, Science)

“I prefer the lessons are designed into smaller subunit and can be edited by teachers when necessary...”  
(SMK E, Science)

The design of the courseware must be simplified; presentation must be direct to the point, precise and presented in short duration. Therefore, to save time and to prevent boredom, teachers sometimes skip several modules and utilize only relevant diagrams and short animations in the courseware.

“Most of the explanation of the concept is too much and boring. Therefore I like to use only the animations and diagrams in the courseware. It makes my teaching live...”  
(SMK F, Science)

The teachers feel that they need to be in control of the lesson flow in the courseware. For example, some of the courseware do not provide PAUSE button, therefore, when the courseware is displayed; the teachers need to interrupt in order to provide further explanation to the students. They want the courseware to provide the flexibility for users to navigate to the next or previous activity, to repeat an instruction or activity, to pause an activity, to continue the paused activity and to end or exit the activity using suitable navigational icons.

“I need the courseware to be more easily access and manoeuvrability so it is easier and fast for teachers...”  
(SMK G, English)

“The multimedia software must provide more interactive buttons, easy features and fast feedback response.”  
(SMK H, Science)

Another problem raised by teachers is that the courseware has too many instructions on the screen which make students and teachers confused. Some of the teachers mentioned that the courseware is unnecessarily cluttered with too much text instruction and information in a page. They feel that the text should be positioned accordingly and the quantity of text on screen must be optimized to avoid confusion. Some part of the courseware does not need to have narration. Because the teachers believe that the multimedia software is not user friendly, this situation is forcing them to revert the teaching style to traditional mode; chalk and talk. In some cases, instead of using TLC as teaching aid, teachers simply project the courseware content in front of the classroom without additional explanation to the students. A few respondents prefer to download materials from internet and make their own PowerPoint as they feel that is much easier than spending time on the courseware.
V. Discussion

Many of the issues raised by teachers are outside factors and involve time management, government policies, personal motivation and hardware problem. The only factor that is directly related to the software itself is its poor design. Therefore, an improvement of existing courseware design definitely needed. Perhaps the elements to revise and upgrade the TLC can be further investigated and improved. The following are some suggestions:

- The design of the multimedia teaching tools must be user friendly and manoeuvrable so that it is easy and fast for teacher to access and navigate.
- The multimedia teaching tools must permit learners to control their interactions and moving content; provide them the freedom to select portion to suits their teaching requirements.
- The resources in the multimedia teaching tools must be broken into smaller sections that can be used independently during teaching and learning.
- Animations and diagram should be developed separately and placed in the database and in order to accommodate any level of users, searching options is essential for designing the multimedia teaching tools.
- The multimedia teaching tools must be kept in a database for easy retrieval, accessible through the internet and must be designed for device and platform independence.

VI. Conclusion

This study shows that 9% of respondents always use TLC in classroom. It proves that curriculum and pedagogical aspect of multimedia software are generally acceptable to this group of users as they agree that courseware gives accurate facts on the content and its content encompasses the curriculum.

However, it is clear that most of the respondents do not use multimedia software in their teaching instruction. Despite of curriculum and pedagogical aspect of TLC are generally acceptable to users, the technical aspect which includes the functionality of the system is identified as major hindrance of integration of TLC in teaching. Research shows that many of the issues raised by teachers are exterior factors and engage time management, government policies, personal motivation and hardware problem.

The emerging of the digital technologies is affecting the type of skills that teachers need in order to design and integrate the technology towards improving instructions. Therefore, to strengthen their teaching, teachers must be given support and appropriate training to use technology and how to integrate multimedia software use into the day-to-day teaching. Professional guidance such as that provided by the multimedia software producers can also assist teachers on effective ICT use. Teachers should also be given adequate time to develop new skills and to incorporate these new advancements to the improvement of technology-based instructions.

An improvement of existing courseware design is needed to ensure that teachers are capable of utilizing the multimedia software in teaching. To reflect this, courseware must be easy to maneuver, allows user to control the courseware and the content should be contain separately and placed in database to accommodate any level of users and searching option. The resources in the multimedia teaching tools must be broken into smaller sections that can be used independently during teaching and learning. The courseware must be linked to the database, accessible through in the internet and designed for device and platform independence.

From the finding, researcher concludes that lack of usage of multimedia software is affected by the similar factors mentioned in the literature, and also influenced by the design and technical functionality of the software itself.

REFERENCES


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