Interactive Multimedia Courseware in Digital Drawing and Colouring Skills Design Incorporating Technogogy: Teachers’ View

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Abstract: - This study was conducted to evaluate the effectiveness of the i-VTeC via technogogy to ascertain the considerations of the components of technology, pedagogy and content in the design of the multimedia courseware. The courseware was designed to help teachers in building up their digital drawing and colouring animated characters skills. The 4 open-ended set of question based on multimedia elements, the content, the learning activities, interactivity and technical aspect of the courseware was included in the evaluation questionnaire. The findings showed all teachers (n=21) agreed that the multimedia elements in the courseware served as an effective tool in supporting the teaching process. This research concluded that the i-VTeC courseware gave a positive impact in building up the digital drawing and colouring animated characters skills among teachers.

Key-Words: - Multimedia Courseware, Digital Drawing, Technogogy, Animation, Teaching, Pedagogy

1 Introduction
In the education world, ICT development has played a major role in the overall policy implementation with the current needs and development. This existence of the small schools has made the country’s educational system more advance. The education system in Malaysia has changed towards technology-based education to create a knowledgeable society [1].

According to Biggs & Telfer [2], linear and structural pattern of teaching delivery has failed to create an interest and motivate the student during the teaching and learning process. The learning environment was unable to give the students an opportunity to actively participate in class. However, there were also reports that the successfulness of a student in class is due to the active participation of the student during the teaching and learning process [3]. Various innovations based on technology, have been created to fulfil the competitive edge in the education system. The ‘chalk and talk’ pedagogy concept is not the most appropriate nor is an effective strategy in the class teaching and learning environment and using digital equipments prevalent and much preferable presently. Students who utilize the computer based on the digital technology are able to uplift their confident level, improve their communication skills and increase their positive attitude towards learning [4][5].

White [6] emphasised that the practice of technology in teaching and learning are able to provide opportunities to students in enhancing the capability to solve problem and are able to think creatively and critically. However, teaching and learning do not improve because of improved technology [7]. Specifically, content is meaningless without context. Context is not created by sitting in front of a computer reading content. Learning is improved when it is grounded in practical learning theory. By itself, more technology will not make education more efficient. For these reasons, it is imperative that the learning environment of the digital era is developed or the present environment be redesigned so that it is relevant to the power, potential and versatility of the gamut of educational technology available today [8].

Different students have different learning styles and this occur in a wide variety of ways, including the types of instruction to which they respond best, the ways they approach their individual studies (strategies to studying and learning approaches), and their perception and attitudes about the nature of knowledge and their role in constructing it (cognitive levels).

2 Background of the Study
Based on the aims of education in Malaysia, the demand for technical and vocational skill workers
especially the skill and medium-skill workers are increasing rapidly. The vocational subject, previously known as Industry Technical skills was put forward by the Ministry of Education (MOE) and approved by the Cabinet on 23 June 1999. The vocational subject formerly offered at secondary school level is intended to give the opportunity to the students that have the potential in hand craft to choose vocational subjects as one of their study options [9].

The offered subject can be accessed extensively and can increase the equity that includes students and vocational and technical fields required by the nation nowadays. Besides, the Vocational subject is the extension of the Integrated Living Skill subject for Form 1 to 3 in lower secondary schools. The vocational subject is an element of the subject components that are based on skill at form 4 and form 5 levels. It is an alternative subject for the Sijil Pelajaran Malaysia (SPM) examination. It is equivalent to other elective subjects to be chosen in SPM.

3 Statement of the Problem
The Vocational subject is one of the subjects that implemented in several secondary schools in Malaysia. The implementation of the vocational subject is based on the requirements for Form 4 and Form 5 students and was included as one of the subjects for the SPM level. There are 2 vocational subjects that use the usage of computer which are the Multimedia Production and the Computer Graphic Animation. In order to fulfil the vocational requirements, students are required to complete the task according to the specific criteria, for instance, drawing and colouring digitally using several softwares such as Adobe Photoshop.

The significant problem arose where the teacher lacks skill in handling the digital drawing and colouring equipment. This is due to the reason that some of the vocational subject teachers did not study computer as a subject option. Vocational subject requires teachers who are highly skill in that area in order to handle and conduct classes using the Adobe PhotoShop software. This subject is not a “chalk and talk” subject. It needs hands-on and practical tasks by the students. From observation, the majority of teachers are still using the traditional teaching methods and seldom use the ICT facilities to attract students towards the lesson.

According to statistics, some of the teachers did not have special training to develop software and even to do the evaluation in the electronic equipments. Since 1996 to 2000, only 30% of all the teachers have attended the relevant computer training courses. From the numbers involved, only a few of them are capable to integrate the electronic facilities in their teaching and learning. There are still many teachers who are not able to develop specific courseware and this has resulted the teaching of the effective ICT in Form 4 and 5 to be limited to only a few secondary schools which have yet to offer the MPV subject.

4 Objectives
To gather feedback from the students who are enrolled in the vocational subjects, Multimedia Production and Computer Graphic Animation on how the i-VTeC multimedia interactive software could be of assistance to them in their learning process.

5 Research Questions
To achieve the study objective several questions of the study have been constructed as below:

5.1 Is the multimedia element in i-VTeC able to assist them in the Production Multimedia and Computer Graphic Animation learning process?

5.2 Are the multimedia content in the i-VTeC able to assist them in the Production Multimedia and Computer Graphic Animation learning process?

5.3 Are the multimedia activities in the i-VteC able to assist them in the Production Multimedia and Computer Graphic Animation learning process?

5.4 Are the interactivity in the multimedia interactive software able to assist them in the Production Multimedia and Computer Graphic Animation learning process?

6 Literature Review
Many developed country have materialised ICT and following its development. Malaysia itself is following the ICT development especially in education in creating effective and interesting ways in teaching and learning process. The usage of computer assisted Learning (CAL) and multimedia in the teaching and learning process in schools and higher institutions has become rapidly [10]. Through interactive multimedia, the teaching and learning process have more interesting with texts, audio, animation, graphics and videos which involve all human sensitivities
According to Noor Azliza & Lilia [11], an interactive multimedia is able to create an interesting environment with the use of the elements that could attract the human sense such as the text, audio, graphic, video and animation.

Khoo and Lou emphasised that the use of computer in teaching and learning is able to reinforce the students individual learning process. The computer is able to stimulate and sharpen the student analytical skill [12].

Idrus [13] defined technology as the convergence of technology, pedagogy and content in transformative use of technology to foster learning. The power of multimedia computing makes it possible for technology to cater for the needs of pedagogical elements that can be viewed from the standpoint of technology. Innovations in interactive technologies afford us the levelling of field in the education of the young and the adult, each benefiting from the elements of the other. Technology will allow for a continuum from the young to the adult in a way that addresses both learning needs and activities [13][14]. According to the Curriculum Development Centre, teaching strategy based on multimedia or Information Communication and Technology (ICT) is a teaching strategy that benefited from the computer as the instructor and learner in extending the teaching and learning activities.

7 Conceptual Framework

Effective design model has been constructed based on the learning theory. The instructional model is a systematic process that includes all aspects in instructional model such as concept development, design, production, evaluation and teaching approach with the aim to improve teaching [15]. Instructional design is referred to the systematic process in interpreting the teaching and learning principles to learning material, activities, information resources and evaluation [16]. According to Seels, et al. [17], instructional design is a process to resolve teaching and learning problems by systematic analysis. The design is based to the teaching and learning theory and the theory that is associated with communication and technology. Instructional design is used in analysis phase of development methodology.

In the instruction design model, elements consist of text, graphic, animation, audio and video constitutes as the resources in multimedia. All these elements are integrated in an interactive digital environment that uses authoring tools such as Macromedia Flash MX’ besides the additional software such as ‘Adobe Photoshop CS’, ‘SwishMX’ and ‘SoundForge 10’. The approach used for the software development is ADDIE model.

The selection of this model is because ADDIE model is an appropriate model to design a learning software and can be the foundation to other instruction model design. This model consists of five phases which are the analysis, design, development, implementation and evaluation. According to Baharuddin [10], the process to develop a multimedia software especially the one with education and training concept is a long-drawn-out process and require continuous appropriate study that involved information transfer process.

From the definition of technology, the convergence of technology, pedagogy and content (learner focused) in the transformative use of technology to foster learning is depicted in the form of a three-dimensional relationship (Fig. 1) that will give rise to the depth and volume in the creation of learning objects. The different points seen in the 'cube' are different learning objects based on the deliberations of technology, pedagogy and content.

![Fig. 1 The technology cube (Idrus, 2007)](image)

According to Figure 1, the technology element refers to an interactive multimedia material which was used through the application of i-VTeC software CD-ROM by the teachers. The software has been developed by the researcher taking into consideration pedagogy elements that consists of hands-on activities which enabled teachers to draw and colour the animation characters digitally. Teachers will experiment on their drawing and colouring of the product through various activities that has been prepared where the students are able to understand the step by step drawing technique clearly and accurately.
This courseware has been developed based on Technology Framework containing the elements of technology, content, pedagogy and student learning styles (TCPL). All of these elements are blend together to produce/develop the courseware that is used in this study. This courseware also incorporates a model VARK (Visual, Auditory, Reading-writing, Kinesthetic) learning styles that give students the opportunity to select the desired style of learning. According to the VARK model, student learn from four major styles. Each student tends to show one of these four styles as his/her primary inbuilt learning method and some of the other styles may occur in some children as secondary learning styles and used by courseware developed.

The software consists of focus contents towards drawing and colouring animation character topics via the usage of multimedia elements texts, graphics, video, animation and audio. The implementation of multimedia elements will enable the students and teachers choose their appropriate learning style. For example, if the students or teachers are more interested towards visualization object, they can learn to draw and colour the animation character through video and animation activities in the i-VTeC software. All the facilities for different learning styles have been developed by the researcher through the software which consists of specific topics.

8 Methodology

This research is using a quantitative approach which attempts to distinguish the relationship of the existing variables.

8.1 Design - The study conducted by the researcher employed the quantitative research strategy using descriptive survey to observe the interactive multimedia software in assisting the teachers teaching process.

8.2 Pilot Study - There are 10 teachers involved in the pilot study who had attended the computer literacy short course (n=10).

8.3 Sampling - The sample teachers consist of 21 teachers teaching various subject (n=21). The selected teachers have attended the computer literacy short courses or any ICT courses at the various Institute of Teachers Education (ITE’s) or any related agencies. There are 10 teachers from SMK Syed Ahmad Al Bukhary and 11 teachers from SMK Mergong involved in the study (n=21). Both schools are from Kota Setar district of Kedah Darul Aman.

8.4 Instrument - Survey questionnaires were constructed and distributed to the samples. The questionnaires forms distributed to the student and teachers were aimed at observing the extent of assistance of the interactive multimedia software in the teaching and learning process.

8.5 Data Collecting Procedure - The researcher implemented data collecting procedure using four phases. In the First phase, the researcher conducted a discussion with the schools administrators involving the School Principal, Computer Lab Coordinator and the Multimedia Production and Computer Graphic Animation subject teachers. The discussion was held to identify the procedure required to accomplish the study.

After the installation process has been completed, the Second phase involved the data collection. The researcher gathered the respondents according to the number of computers in the lab. Then a briefing and explanation has been conducted to inform the respondents regarding the study purposes.

In the Third phase, each respondent is allowed to use the i-VTeC software self-phased within the time allocated. They are free to explore the software according to their own understanding and capability. After the time allocated ended, the researcher distributed the questionnaires forms to each of the respondent in order to get some software evaluation feedbacks.

During the Fourth phase, the respondents are required to fill in the questionnaire form according to the exploration that they did using the i-VTeC software. The forms were directly submitted to the researcher right after the students have completed filling the forms.

9 Software Evaluation

The research findings were collected, processed and transformed into descriptive statistic analysis format. The data collected from the questionnaire was analysed using Likert Scale score from 1 to 5. The Likert scale consists of Highly Disagree(HD), Disagree(D), Not Sure(NS), Agree(A) and Highly Agree(HA).

Table 1 Distribution Of Respondents According To Percentage, Mean And Standard Deviation To Measure The Multimedia Courseware Component Among Teachers.
Almost all teachers studied mentioned that the multimedia education software is appropriate for teaching and learning process using computers and it benefits the development and software image technical criteria and its own specialisation. The respondents admitted that there was a considerable change and help in additional teaching and learning multimedia software base.

An objective of education should thus help students build their skills in both their preferred and less preferred modes of learning. The learning theories provide good frameworks for designing instruction with the desired breadth. The goal is to make sure that the learning needs of students in each model category are met at least part of the time. When mismatches exist between learning styles of most students in a class and the teaching style of the teacher, the students will ‘disengage’ from the educational environment.

This was collaborated by the works of Ulieru et al [18] when they determined the range of learning styles of the first year of Electrical Engineering and Materials Engineering, Mechatronics, and Robot Equipments students from Valahia University of Targoviste in 2007 and found that they corresponded to six learning styles of participative, collaborative, active, reflective, field-dependent, and field-independent.

Table 2 Distribution Of Respondents According To Percentage, Mean And Standard Deviation To Measure The Multimedia Courseware Content Among Teachers.

<table>
<thead>
<tr>
<th>Statement (MM Component)</th>
<th>HD %</th>
<th>D %</th>
<th>NS %</th>
<th>A %</th>
<th>HA %</th>
<th>T %</th>
<th>Mean</th>
<th>SD</th>
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<tbody>
<tr>
<td>1. The trees in i-Lect are easy to understand</td>
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<td>2. The graphics in i-Lect are attractive</td>
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<td>3. The videos in i-Lect are interesting</td>
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<td>4. The animations are suitable</td>
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<td>2</td>
<td>14</td>
<td>4</td>
<td>21</td>
<td>21</td>
<td>4.47</td>
<td>0.51</td>
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<tr>
<td>5. The audio is suitable</td>
<td>4.8</td>
<td>9.3</td>
<td>66.2</td>
<td>19.0</td>
<td>100</td>
<td>4.00</td>
<td>0.76</td>
<td>0.50</td>
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Table 4 Distribution Of Respondents According To Percentage, Mean And Standard Deviation To Measure The Multimedia Courseware Learning Activities Among Teachers.

<table>
<thead>
<tr>
<th>Statement (MM Content)</th>
<th>HD %</th>
<th>D %</th>
<th>NS %</th>
<th>A %</th>
<th>HA %</th>
<th>T %</th>
<th>Mean</th>
<th>SD</th>
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</thead>
<tbody>
<tr>
<td>1. It is easy to understand the content for the drawing of the digital animated characters</td>
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<td>2. It is easy to understand the content for the colouring the digital animated characters</td>
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<td>3. The colours applied to the animated character are suitable</td>
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<td>4. It is easy to draw the digital animated character by following the demonstration in the courseware</td>
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<td>5. It is easy to follow the steps in the demonstration for drawing the digital animated character</td>
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Table 5 Distribution Of Respondents According To Percentage, Mean And Standard Deviation To Measure The Interactivity Component Among Teachers.

<table>
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<tr>
<th>Statement (MM Interactivity)</th>
<th>HD %</th>
<th>D %</th>
<th>NS %</th>
<th>A %</th>
<th>HA %</th>
<th>T %</th>
<th>Mean</th>
<th>SD</th>
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</thead>
<tbody>
<tr>
<td>1. i-Lect courseware is easy for students to handle</td>
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<td>2. The time to handle the i-Lect courseware is acceptable for the ability of the students</td>
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<tr>
<td>3. Feel is easy to feel</td>
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<td>4. The button in i-Lect courseware interface is suitable</td>
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Table 6 Distribution Of Respondents According To Percentage, Mean And Standard Deviation To Measure The Multimedia Technical Component Among Teachers.

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<tr>
<th>Statement (MM Technical)</th>
<th>HD %</th>
<th>D %</th>
<th>NS %</th>
<th>A %</th>
<th>HA %</th>
<th>T %</th>
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<tbody>
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<td>1. i-Lect courseware is easy for students to handle</td>
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<td>2. The time to handle the i-Lect courseware is acceptable for the ability of the students</td>
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<td>3. Feel is easy to feel</td>
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collaborative, competitive, retractile, independent and dependent as the main learning style of each student. The mission of the teacher was to help students in realizing their own learning style and to adopt adequate teaching strategies.

Technology can be applied in any area or discipline as it forces the consideration of the three components in the design of the lesson plan and subsequently enrich the learning environment with more specific learning objects the subjects taught. Technology was also illustrated in action in engineering education in order to strengthen the unique needs of engineering students and the design for their instruction.

10 Conclusion
In accomplishing the study, the researcher has designed an instruction model after referring to several existing instruction model design. Then researcher has built the flow chart and story board, therefore the education multimedia software able to be developed systematically and put in order. The biggest challenge to the researcher is to design an instruction model and develop the multimedia interactive software that fits the requirement of the students, hence the application and incorporation of technology.

References: