

# Video Animation as Teaching Aid for Engineering Drawing Course in Malaysia Vocational College

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**Abstract:** The rapid development of information and communications technology (ICT) today has given a new breath to use of computer in education. One of the increasingly popular nowadays is a multimedia technology that merges a variety of media such as text, graphics, animation, video and audio controlled by a computer. With this technology, a wide range of multimedia software can be developed to improve the quality of education. This study aims to develop a multimedia educational animated video based interactive teaching and learning theory and design appropriate for Engineering Drawing subject in the title of Orthographic Projection according to the syllabus of Malaysia Vocational College. This research involved 30 respondents from Industrial Machining students in Vocational College. The research design was conducted by simple survey to collect data from the respondents. The instruments used in the form of a questionnaire to obtain information. Data was collected and analyzed using SPSS (Statistical Package for the Social Sciences) version 24. The study found that the interactive multimedia materials that have visual graphics, text, audio, video and animation, capable of increasing the rate of their acceptance more than 30% compared to using traditional learning methods.

**Keywords:** *Product Development, Teaching Aid, Video Animation, Engineering Drawing, TVET*

## I. INTRODUCTION

The process of teaching and learning is an important element in ensuring that the students can follow the content of their subject. Teaching is an activity related to the diffusion of knowledge covering the planning, management, delivery, supervision and evaluation. The virtual learning has become a new method in the process of teaching and learning in order to facilitate the delivery of content. Virtual learning is learning by using electronic media and Internet usage. E-Learning is an acronym of Electronic Learning, it is a new way of teaching and learning using electronic media, especially the Internet as a learning system. Tasir & Harun (2003), said multimedia can be an effective medium of communication and positive for its ability to simultaneously combine different colors and styles of text, audio, video and animation to be displayed on the screen.

However, this situation can be delivered through other means such as the use of teaching aid. Teaching aid consumption in the process of learning appropriate so that students can master and understand well what is presented by the teacher. With the relevant teaching aid, it can help teachers explain the concept more clearly than with a verbal description such as the use of video animation. Directly, this creativity can help teachers make teaching and learning easily to deliver the content to students in certain subjects such as engineering drawing subject more on practical teaching or known as hands-on.

## II. BACKGROUND PROBLEM

Academic excellence and skills of students technical & vocational education and training (TVET) often associated with teaching methods by teachers and also students learning styles itself. Therefore, the core of excellence students may be located on the use of teaching aids by teachers. In line with advances in technology, internet usage priority to students currently and most students find information to supplement knowledge via the internet but information about teaching and learning related technical and vocational skills are still not enough.

In order to understand the content of practical lessons, students are required to perform tasks itself to the skills. Learning based on teacher impact that students only receive information presented by teachers and less in realizing education content on the subject is learned (In'am, Saad, & Ghani, 2012). Thus, to get good results, teachers need to be clever and creative in producing teaching aid like animated video production to help teachers deliver lessons with more content and be understood by students.

Bakar (2008) states that Ministry Education of Malaysia should provide a variety of infrastructure such as computer network to facilitate more subjects can be taught with the use of multimedia technology and teaching through a web site. Some importance of the use of teaching aid based e-learning identified to increase the ability competency of students and be able to perform the assessment of teaching and learning approach that is used by the teacher. In addition, it can help the teacher in explaining the content of the lesson and can reduce boredom and problems to no creed students when teaching and learning sessions.

According to Ishak, Kasa, Selamat, & Samah (2009), teaching traditionally involves the use of text books and normal lecture. Yahaya (2006) felt that the traditional teaching and learning methods is 'chalk and talk' or method using transparency at projector. Therefore, this strategy must be improved in order to create an active teaching and learning where students also thought to solve the problem. The requirements of ICT in teaching and learning for his role in improving the quality of presentation in the teaching and learning as well as help strengthen students understanding of a concept learned (Rusmini, 2003). Therefore, teachers must prepare themselves with various computer skills as one of the key elements to assist and facilitate the process of teaching and learning in the classroom (Yasin, Mustapha, Minghat, Jusoff, Ishar, Shamsudin, (2012).

Abd Rahman & Mohd Hashim (2011) view that teaching methods using wireless devices enabling learning to occur at any time, in particular in technical and vocational education. Menurut Azman, Azli, Mustapha, Balakrishnan, & Mohd Isa (2014), the more senses used increasingly effective a learning. Azman *et al.*, (2014) the view that the different

senses produce different responses. Each of the senses complement deficiencies and strengthen other senses.

Indeed, teaching aid plays an important role in the teaching and learning process of teachers including technical teachers. It is the responsibility of teachers to use them with best possible for help understanding his students about concepts and knowledge lessons to be served.

### III. PROBLEM STATEMENT

The problem that exists is the use of static media such as text coupled with the difficulty of the content of engineering drawing will improve students cognitive load (Baggott la Vella, Wishart, McFarlane, Brawn, & John, 2012). In view of the limited working memory capacity, students won't be able to focus on the content of education and the solution of a difficult assignment work simultaneously. Therefore, problems arise students understand the information presentation problem (Yap, 2012). Student understanding and learning is also closely related to the teaching methods used by teachers that makes the matter as an issue that should be settled. Yasin *et al.*, (2012), found that students often have difficulties in solving engineering drawing due to weak in visualization. Gani, Siarap, & Mustafa (2006), states that technological innovation in the classroom will hopefully be able to bring positive changes in students' academic achievement. According to Ishak *et al.*, (2009), teaching traditionally involves the use of textbooks and teaching methods in class only will result in students easily feel bored and has dampened the interest of students to learn.

### IV. OBJECTIVE

To achieve the purpose of the study, several objectives have been built as below:-

1. Designing video animation as teaching aid for Engineering Drawing subject.
2. Develop video animation as teaching aid for engineering drawing subject.
3. The functional use of maneuverability testing video animation to assist students in terms of understanding in enhancing the skills of visualization and imagination.

### V. RESEARCH QUESTION

This study aims to find answers for several questions of study as listed below:

1. What is design for Engineering Drawing animation video used?
2. How does the development of Engineering Drawing animation video is done?
3. Does the use of video animation work in assisting students in the learning process?

### VI. METHODOLOGY

This study is a quantitative approach. The study use a questionnaire as an instrument. Items in the questionnaire are based on past research and researchers have obtain certification specialist to ensure they are in accordance with the objectives and research question. All information and data collected will be analyzed in detail to ensure that the study was unable to achieve the objectives of the study.

### VII. RESEARCH DESIGN

The research design was conducted by simple survey to collect data from respondents which is in line with research problems

to be fixed. Design involves several aspects such as research problems, strategies and association reasons reviewed. The design will also set the units of analysis, population, sampling, the method of measurement, data collection and analysis (Sulaiman Masri, 2005). According to Kaprawi (2010) survey method is very useful when researchers want to collect related data in research. Survey method used to obtain related information. Data obtained from the response provided by the respondent through the information in the questionnaire.

### VIII. POPULATIONS AND SAMPLES

The population and sampling is based on Krejcie & Morgan 1970. Kolej Vokasional in Setapak, Kuala Lumpur was chosen and the study population consists of Industrial Machining students. Sampling is the process of selecting a number of subjects from a population to serve as respondents. Sampling is an important aspect of the study and research as the use of inappropriate samples will reduce the validity and reliability study (Piaw Chua Yan, 2006). The samples were as many as 30 students.

### IX. RESEARCH INSTRUMENT

For this purpose, the researchers felt the questionnaire method is best suited to get information immediately and the data from students because the respondents easily give response to aspects surveyed compared methods of interview. Researchers have taken the sample questionnaire of researchers-researchers past and modified as appropriate consultation with students and teachers of subjects of Engineering Drawing. The questionnaire consists of three parts, namely part A on student understanding of factors, part B concerning factors visualization and imagination of students and part C about functional factor of animation video on the teaching and learning process in vocational college.

### X. RELIABILITY AND VALIDITY

Reliability is a measurement instrument to determine the consistency of the scores for each item contained in the questionnaire. This is to maintain the accuracy of the instrument in questionnaires from having any problems and the data obtained was correct. To view the validity of the survey, a consistently method is used which is the Cronbach Alpha value. Based on the analysis that has been made, the Cronbach's alpha was 0.86 and is at a high level. Najib (2003) state that the value of Cronbach Alpha 0.8 and above showed high reliability. To ensure a questionnaire can be used, validity must be made in advance. The validity used in the study was content validity. Researchers have gained three experts to determine the validity of the questionnaire which have been constructed. Three experts is composed of one expert was in languages and two experts was expert in content.

### XI. DATA ANALYSIS

To answer the question, the researchers have analyzed the data using descriptive statistics. Researchers analyze and present data obtained using mean score, standard deviation, percentage and graph. All data obtained from questionnaires is analyzed using Statistical package for Social Sciences Version 24.0 (SPSS). The use of this software is more convenient, fast, simple and compact while analyzing data. The results that have been obtained by using SPSS v24 by constructs are as in Table 1 which included. All parts included in this questionnaire analyzed by making an assessment of the mean score for each item using Likert scale-based four degrees. Analysis refers to

the range of score mean like Table 1 to determine the extent of the respondent's stance against items in the review questions.

Table 1: Mean score analysis  
Resources (Mohd Yusoff, Osman, Shaari, & Ghazali, 2012)

Marks Score	Mean	Level
1.00 - 2.00		Low
2.01 - 3.00		Medium
3.01 - 4.00		High

The findings result from part A items up to part D of the questionnaire showed a majority of respondents strongly agree with the items given and found all items are within the high level. This shows the decision of the respondent involved giving a response to the questionnaire agreed that video animation able to give more understanding to the students. According to Zhang, Zhou, Briggs, & Nunamaker (2006) video-based learning and additional shows the effectiveness of the training system the same learning to face to face between teachers and students. The use of technology can help teachers improve their teaching effectiveness, especially in making a visual concept, and motivation (Cheung, Slavin, Kim, & Lake, 2015).

To assess the development of video animation in helping students to master and improve the ability of imagine the objects and their visual object on the drawing. The findings show the results of the respondents involved in providing answers and found that the mean value of the items is at an all-time high. The majority of respondents strongly agree on the items given and this shows the video animation is able to assist respondents in enhancing the imagination and visualization. Cheung *et al.*, (2015) has stated that the video could help students imagine object. According to Cahyani & Karyanto, (2016) the use of video can increase motivation and student learning outcomes. With the help of video learning can increase student learning activities and outcomes in learning (Setyosari & Malang, 2016).

The findings about the content in the video animation shows the results of the respondents is at high level. The majority of respondents indicated that they were very amenable to items given and showed video animations can help respondents in the process of learning. This indicates that respondents agree to the content in the video animation includes the contents of the subjects of engineering drawing and taking them into existing knowledge. Overall, video animation has fulfilled the syllabus subjects engineering drawing and was able to achieve the objectives of the subjects of engineering drawing and testing the existing knowledge of the respondent.

Table 2: Mean value and standard deviation for each item

Descriptive Statistics			
No.	Item	Mean	Std. Deviation
A1	'Font' used illegible.	3.67	0.479
A2	The text used illegible.	3.63	0.49
A3	The display text used clear.	3.73	0.45
A4	Text is easy to understand.	3.57	0.504
B1	Audio is clear.	3.73	0.45
B2	Tone used is appropriate.	3.8	0.407
B3	Audio used is suitable.	3.77	0.43

B4	Audio presentation is well structured.	3.6	0.498
C1	Animation easy to understand.	3.77	0.43
C2	Animation information delivery is well structured.	3.67	0.479
C3	Video animation can build understanding.	3.73	0.45
C4	Video animation can improve my concentration during teaching and learning processes.	3.77	0.43
D1	Graphics easier to read.	3.63	0.49
D2	Graphics fit the Engineering Drawing subjects.	3.57	0.504
D3	Presentation graphics easy to understand.	3.83	0.379
D4	Graphics help build understanding.	3.63	0.49
E1	This video animation can enhance visualization.	3.73	0.45
E2	This video animation can improve imagination.	3.77	0.43
E3	This video animated assist in the process implies the actual object structure.	3.77	0.43
F1	Video animation can achieve Engineering Drawing subject's objective.	3.6	0.498
F2	Video Animation content takes into the existing knowledge.	3.7	0.466
F3	Video Animation content fits syllabus Engineering Drawing subjects.	3.8	0.407

## DISCUSSION

As a result of analysis, researchers will discuss the findings based on the question of the study. The first discussion is related to the analysis of video animation design Engineering Drawing. Next is a discussion relating to the development of Engineering Drawing animation video. Last but not least is the discussion of test maneuverability of video animation Engineering Drawing.

Video animation that is developed must have attractive presentation design. The use of pictures, graphs, diagrams, videos and demonstrations is suitable for the student category of visual (Abdul Razak & Abdul Rahman, 2013). The use of multimedia like video animation can increase the motivation of students to master learning outcomes and enhance the understanding (Mohammad Noor *et al.*, 2012). With the use of this animation video, students are able to master the learning outcomes easier and more effective. Embong, (2005) noted that good animation enables students to learn something quickly, retain students longer memory, present a clearer and accelerate students understanding. This animated video design is attractive and has obtained the consent of the respondent on the basis of the results provided through the questionnaire which is at high level. The respondent has shown a high level of agreement on the video animation able to give a better understanding. Overall, the design of a presentation video animation was produced this is



appropriate with an average mean score is at a high level (Mohd Yusoff *et al.*, 2012). This shows the design presentation video animation already built this is appropriate to be used as ABM for subjects and Engineering Drawing indirectly has answered the first question of the study.

To ensure that the video was developed capable of helping in enhancing the imagination and visualization students, researchers have conducted an assessment of video animation by using two test which is tests alpha and beta testing. After the improvement of alpha test, video animation next assessment is beta testing. The beta test is carried out on a sample of respondents. The result of the beta test we found video animation is at high level. The findings of this beta testing show that this animation video appropriate and able to help students solve their imagination and visualization problem. Some improvements to the video animation done for usability of students after the beta test. Multimedia materials that have an interactive visual graphics, text, music, video and animation, able to increase the rate of acceptance of students of a materials taught up to 30% more than students who use traditional teaching methods (Hat, Sha'ari, & Abdul Hamid, 2013). According to Amin, Fadila, & Chiew (2010) the integration of multimedia elements to give a session of teaching and learning more interesting, creative, innovative and provide learning experience effectively to students. Findings from the development of video animation shows respondents strongly agree with video animation which video this animation is able to assist students in improving their imagination and visualization. According to Agustini & Kristiantari (2016), the use of video animation can improve their imagination and visualization.

Engineering Drawing video animation evaluated the level of maneuverability to help students in the learning process. The use of technology in teaching and learning processes is undeniable because its potential in improving the academic achievement of students (Zainal, 2004). Through the analysis of the study showed an animated video produced can function properly and are at a high level. It is shown that multimedia is able to create a learning environment that is more attractive than conventional methods just based on text books (Mohammad Noor *et al.*, 2012). Analysis has shown that video animations are able to assist students in improving the understanding during the learning process. The use of video animation is very different from the traditional learning. This is because the advantage in allowing a repeat topic that is not understood by the students can be carried out more easily with the use of video animation. According to Mohamad Mohsin & Hassan (2011) the use of animation is interesting and clearly give understanding to students in a very short time and can be repeated show for the purpose of strengthening the students understanding. Overall, it was found that this animation video is able to increase the understanding of the students in the learning process. In addition, the use of supplementary teaching materials by teachers during the process of learning and teaching will help improve the quality of cognitive and affective student (Abd Rashid, Kadiman, Zulkifli, Selamat, & Mohd Hashim, 2016).

### CONCLUSION

Overall, the results of analysis found video animation developed meet the objective of the study which shows video design animation can increase student understanding. Development of video animation can also enhance the student's imagination and visualization implies structural

workpiece or products to be drawn. This animated video able to assist students in understanding teacher learning with the help of text, graphics, animation, audio and video that are able to increase the motivation of students and make learning process more interesting. Aris (2002) in his book says that the selection of the media accurate and appropriate by the teacher are very closely related to the effectiveness of a process of teaching and learning. User friendly features found on the video animation that developed this can facilitate students to operate because the purpose of the development of video animation is to help students to increase imagination and visualization. Era technology nowadays will make students more savvy technology and makes it easier for students to use technology at school or at home. This situation caused the students prefer to use technology than text-module only.

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