The use of animation video in teaching to enhance the imagination and visualization of student in engineering drawing

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Abstract. The rapid development of information technology today has given a new breath toward usage 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 element can be developed to improve the quality of education. For that reason, this study aims to investigate the use of multimedia element based on animated video that was developed for Engineering Drawing subject according to the syllabus of Vocational College of Malaysia. The design for this study was a survey method using a quantitative approach and involved 30 respondents from Industrial Machining students. The instruments used in study is questionnaire with correlation coefficient value (0.83), calculated on Alpha-Cronbach. Data was collected and analyzed descriptive analyzed using SPSS. The study found that multimedia element for animation video was use significant have capable to increase imagination and visualization of student. The implications of this study provide information of use of multimedia element will student effect imagination and visualization. In general, these findings contribute to the formation of multimedia element of materials appropriate to enhance the quality of learning material for engineering drawing.

1. 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. Besides, electronic 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 [1].

However, this situation can be delivered through other means such as the use of teaching aids. The appropriate teaching aids usage in the process of learning make that students focus and understand well what is presented by the teacher [2]. With the relevant teaching aids, 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.
2. Problem Background

Academic excellence and skills of students technical and vocational 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 aid 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 [3]. Thus, to get good results, teachers need to be clever and creative in producing teaching aids like animated video production to help teachers deliver lessons with more content and be understood by students.

Most of secondary schools lack variety of infrastructure such as computer network to facilitate more subjects which is taught with the use of multimedia technology and teaching through a web site [4]. Some importance of the use of teaching aids 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 less focus in teaching and learning sessions [5].

According to [6], teaching traditionally involves the use of text books and teacher centered. [7] felt that the traditional teaching and learning methods is 'chalk and talk' will cause the students facing difficulty to construct knowledge independently. 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 [8]. 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 [9].

[10] view that teaching methods using wireless devices enabling learning to occur at any time, in particular in technical and vocational education. According to [11], the more senses used increasingly effect the learning. The view that the different senses produce different responses [11]. Each of the senses complement deficiencies and strengthen other senses.

Indeed, teaching aids 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.

3. 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 [12]. 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 [13]. 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. [9] found that students often have difficulties in solving engineering drawing due to weak in visualization. [14], states that technological innovation in the classroom will hopefully be able to bring positive changes in students’ academic achievement. According to [6], 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. Therefore, this study maneuverability testing video animation to assist students in terms of understanding in enhancing the skills of visualization and imagination.
4. Methodology

The research design for this study was a survey method using a quantitative approach. The advantage of a survey is the data can be collected directly from respondents and the results can be generalized to the population. The samples consisted of students from the Vocational College at Setapak. A total of 30 students from Industrial Machining courses were selected randomly as respondents. A survey questionnaire developed by the researchers was utilized to collect data in order to investigate the use of multimedia element for animated video in six elements, namely text, audio, animation, graphics, visualization and imagination. Then, the data collected were analyzed by using mean and standard deviation. A five point Likert scale was used (5= strongly agree – 1= strongly disagree) and was completed by the participants. A correlation coefficient value (0.83), calculated on Alpha-Cronbach, was used to test the internal reliability of the questionnaire and it showed an acceptable reliability value. Descriptive statistics were used to determine the use of multimedia element and describe students’ skills of visualization and imagination toward engineering drawing.

5. Data Analysis

In specifically, respondent of (N=30) students strongly agree that the use of multimedia element very important for video animation that can be show questionnaire item text (mean=3.67, standard deviation=0.47), audio (mean=3.72, standard deviation=0.45), animation (mean=3.63, standard deviation=0.49) and graphic (mean=3.68, standard deviation=0.46). Furthermore, there are several indicators in the survey (Table 1) related to describe students’ skills of visualization and imagination. The majority of respondents in this study confirmed the use of multimedia element will effect students’ skills of visualization (mean=3.76, standard deviation=0.44) and imagination (mean=3.70, standard deviation= 0.46). This shows the decision of the respondent involved giving a response to the questionnaire agreed that the use of video animation able to give more understanding to the students. According to [15], 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 [16].

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. [16] has stated that the video could help students imagine object. According to [17] 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 [18].

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 1: Elements of engineering drawing animated video that enhancing the skills of visualization and imagination

| Element    | Mean | Std. Deviation |
|------------|------|----------------|
| Text       | 3.67 | 0.47           |
| Audio      | 3.72 | 0.45           |
| Animation  | 3.63 | 0.49           |
| Graphic    | 3.68 | 0.46           |
| Visualization | 3.76 | 0.44           |
| Imagination| 3.70 | 0.46           |

6. Discussion

Video animation for the teaching which is developed must have attractive presentation design. The use of pictures, graphs, diagrams, videos and demonstrations is suitable for the student category of visual [19]. The use of multimedia like video animation can increase the motivation of students to master learning outcomes and enhance the understanding [20]. With the use of this animation video, students are able to master the learning outcomes easier and more effective. [21] 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 [22]. This shows the design presentation video animation already built this is appropriate to be used as teaching aids 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 [23]. 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 was found that 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 element that have an interactive visual graphics, text, music, video and animation, able to provide information of use of multimedia element will student effect imagination and visualization to who multimedia element in teaching methods [24]. According to [25], 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 [26], 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 [27]. 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 [20]. 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 [28], 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 [29].

7. 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 work piece 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. Moreover, 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. Beside reduce the student’s cognitive load the study contribute to the formation of multimedia element of materials appropriate to exchange quality of learning material. The 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 can provide alternative learning material for engineering drawing course.

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