VALIDITY OF ELECTRONIC MODULE BASED ON TUTORIAL VIDEOS AUTOCAD 3 DIMENSION

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Abstract
This study aimed to produce electronic module based on a valid tutorial videos. Electronic module based on tutorial videos discuss AutoCAD 3 dimension. This study used Research and Development (RnD) method with 4D (Define, Design, Develop, and Disseminate) model. The study involved students from mechanical engineering Education of Sriwijaya University that enrolled in CAD/CAM course. The results of this study showed that the developed module was valid. This was shown by the assessment from expert of material with very good score as well as the assessment from expert of media with a good score.

INTRODUCTION
The learning process is the process of teacher-student interaction in an activity [1] which consists of several: educators, students, learning objectives and materials, learning methods and media, facilities and evaluation [2]. The learning components form a system, where each component forms a relationship that interacts and interacts actively and influences each other [3].

80% of lecturer time is used to transfer their knowledge conventionally[4]. Teacher Center Learning (TCL) is deemed unfit for use because it is considered to take away the learning rights of students. Student Center Learning (SCL) makes students as active and independent learners and responsible [5]. These changes lead to a shift in learning paradigms in 4 aspects[6], 1) Search for information from various sources on their own, 2) Quickly solve problems, 3) analytical thinking and 4) cooperation in solving problems.

Another factor that supports success in the learning process is the use of multimedia teaching media. Multimedia means consisting of several media combined into one media, for example a combination of media that is audio, visual and interactive. The task of educators is to plan the use of the media to be chosen. So that the learning objectives can be achieved. One of the multimedia teaching media is an electronic module.

Electronic modules are teaching materials that are displayed using electronic devices. The use of this learning media can be beneficial in terms of interactivity and accessibility and can increase students' active independence in learning [7]. In the electronic module will be embedded a video tutorial that contains guidelines that are academic for students. This aims to increase students' understanding. According to the results of research that has been proven, video tutorials can improve learning outcomes by 41% [8].
The electronic modules developed are related to CAD/CAM courses. The purpose of the Constitutional Court is that students are expected to be able to understand the basic concepts and procedures of AutoCAD applications and be able to create technical drawings both 2D and 3D assisted applications. Problems in the learning process of CAD / CAM courses found that students did not have standard learning resources. CAD / CAM teaching materials that have been developed are new 2D images, 3D images have not been developed. The learning center focuses on the explanation of educators, educators provide examples and students imitate. So that there is no critical thinking process for students. Because it focuses on educators so that the learning process tends to be one-way even though what is expected is two-way learning that involves students. Based on the background above this research was conducted to produce an electronic video tutorial tutorial based on CAD / CAM subjects on a valid 3-dimensional drawing subject in the Mechanical Engineering Education Departement FKIP Unsri.

RESEARCH METHODS

This type of research is Research and Development (R&D) using the 4D model which has 4 (four) stages as follows: Define, Design, Develop and Dissemination. In this study the development of an modul electronic based on video tutorial of CAD / CAM subjects 3-dimensional image subjects was carried out only to the validity stage, namely the material expert test and media expert test. Data collection techniques in the form of questionnaires given to the subject of research conducted in August, October 2018.

In the instrument sheet the assessment of data questionnaires obtained from the assessment of material experts, and media experts were analyzed using the trend categories of data based on the reference in [9] as follows:

<table>
<thead>
<tr>
<th>Interval</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>( (\bar{X}_i + 1,80 \text{ Sbi}) &lt; X )</td>
<td>Very good</td>
</tr>
<tr>
<td>( (\bar{X}_i + 0,60 \text{ Sbi} ) &lt; X \leq (\bar{X}_i + 1,80 \text{ Sbi}) )</td>
<td>Good</td>
</tr>
<tr>
<td>( (\bar{X}_i - 0,60 \text{ Sbi} ) &lt; X \leq (\bar{X}_i + 0,60 \text{ Sbi}) )</td>
<td>Pretty good</td>
</tr>
<tr>
<td>( (\bar{X}_i - 1,80 \text{ Sbi} ) &lt; X \leq (\bar{X}_i - 0,60 \text{ Sbi}) )</td>
<td>Less</td>
</tr>
<tr>
<td>( X \leq (\bar{X}_i - 0,80\text{ Sbi}) )</td>
<td>Very Less</td>
</tr>
</tbody>
</table>

Information:
\( \bar{X}_I = \frac{1}{2} \) (maximum score + minimum score)
\( \text{Sbi} = \frac{1}{6} \) (maximum score - minimum score)
\( X \) = Actual Score

RESULT

This study aims to produce an electronic module based on video tutorials on CAD/CAM subjects, which are valid subjects of 3-dimensional drawing in the Mechanical Engineering Education Departement of FKIP Unsri. An electronic module is created in a computer application that is 3D Pageflip Professional. Development of an electronic
video tutorial-based module using the 4D development model (Define, Design, Develop, Dissemination). These stages are adjusted according to research.

3.1 Define

The analysis carried out included (1) curriculum analysis, 3-dimensional material was chosen because this material was an advanced material to master AutoCAD as a whole. (2) Analysis of student characteristics, students are less skilled in the use of technology-based applications and students do not have standard learning resources. The learning center focuses on the explanation of educators, educators provide examples and then imitated. (3) Technology analysis, 3D Pageflip Professional is a program for creating e-books. Pageflip Professional's 3D advantages are: easy to use, e-book display has effects like flipbook that can be combined with audio and video, but using a little computer data memory. (4) Analysis of the use of computers as learning media. CAD/CAM learning using computers and lecturers using the demonstration method which is broadcast through infocus.

3.2 Design

The developer determines the specific competencies achieved by students, methods, teaching materials, learning strategies and learning media. The developer uses a video tutorial. Overall the video tutorial-based electronic module consists of parts arranged in such a way as to become a good electronic module. Preparation of electronic modules includes (a) Cover section, (b) Preface, (c) Table of contents, (d) Table list, (e) List of images.

The core part consists of 3 chapters, namely (1) Chapter 1 Introduction. Contains general descriptions, requirements, instructions for using modules, competencies and final learning objectives. (2) Chapter 2 Learning which consists of 9 Learning Activities that contain core material. Learning activities consist of sub-chapters (a) learning objectives, (b) theory, (c) summaries and (d) ability checks. Then Chapter 3 evaluation, exercise drawings, bibliography, answer keys, page notes and about the author,

3.3 Develop

The development of this stage is carried out by developing the cover of module titles, manuscripts and materials, editing media, and making products and assembling media elements such as text, images and illustrations. The development of the video tutorial-based electronic module follows the steps described in the design stage. Because at this stage of development an electronic module prototype was created.

The initial product that has been developed is first checked before being validated and tested for students. The validator provides an assessment to be revised until the product is considered feasible to be tested on students. Validation consists of validation of material experts and media experts. An expert assessment of the product being developed in the form of an assessment in the form of a questionnaire instrument and can provide remedial comments and suggestions submitted both orally and in writing.
3.3.1 Material Validity

Intended to know the aspects of truth and feasibility of the material. Expert material validation is used to determine the quality of products that are being developed as materials to make improvements or revise the first stage. The results of expert material validation are as follows:

Table 2. Results of Material Expert Validation

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Validator</th>
<th>Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Learning</td>
<td>67</td>
<td>4.467</td>
<td>Very Good</td>
</tr>
<tr>
<td>2</td>
<td>Content</td>
<td>65</td>
<td>4.3</td>
<td>Good</td>
</tr>
<tr>
<td>3</td>
<td>Assessment of the usefulness of the video</td>
<td>46</td>
<td>4.6</td>
<td>Very Good</td>
</tr>
<tr>
<td></td>
<td>tutorial-based electronic module</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>178</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on table 2 the accumulation of the total value of the validator is obtained total score of 178.

3.3.2 Media Validity

Media experts ask directly about matters relating to the product being developed and provide comments and suggestions on the assessment instruments that will be used as guidelines for product revisions.

Table 3. Results of Media Expert Validation

<table>
<thead>
<tr>
<th>No</th>
<th>Aspect</th>
<th>Validator</th>
<th>Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cover Design</td>
<td>20</td>
<td>4</td>
<td>Good</td>
</tr>
<tr>
<td>2</td>
<td>Modul Content Design</td>
<td>31</td>
<td>4.43</td>
<td>Good</td>
</tr>
<tr>
<td>3</td>
<td>Letter Quality</td>
<td>26</td>
<td>4.33</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>Image Quality</td>
<td>29</td>
<td>4.625</td>
<td>Good</td>
</tr>
<tr>
<td>5</td>
<td>Video Quality</td>
<td>15</td>
<td>3.75</td>
<td>Good</td>
</tr>
<tr>
<td>6</td>
<td>Video Sound Quality</td>
<td>6</td>
<td>3</td>
<td>Pretty Good</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>127</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on table 3 the accumulation of total validator scores obtained total score of 127.

DISCUSSION

The learning process in the Mechanical Engineering Study Program of FKIP Unsr is carried out in both theoretical and practical forms. Practice learning aims to improve students’ skills by using various methods systematically and directed. One practice learning is CAD / CAM. Noting the characteristics of a unique and comprehensive practice learning process, the development of electronic modules is
potential enough to meet the demands of learning. The video tutorial-based electronic module can support existing teaching materials and direct students to learn independently and systematically. The development model of the electronic module based on video tutorial is a 4D development model consisting of 4 main stages, namely, (Define, Design, Develop, Dissemination).

In the analysis phase several activities were carried out, namely: analysis of curriculum, students, technology and use of computers as learning media. This stage is carried out as a basis for developing a video tutorial-based electronic module on CAD / CAM subjects so that it can be used. After the defining phase, the electronic module protoripe is presented which presents 9 learning activities. Each topic is interrelated which will lead students to be able to make 3-dimensional images properly and correctly.

Furthermore, after the electronic module was developed, the validity test and practicality were completed. Teaching materials developed, can only be used in practical learning must first pass the validity test (Richey and Nelson (2001 in Endrya, 2010: 34)).

4.1 Material Validity

Trianto (2010: 269) is valid, meaning that it has provided accurate information about the developed teaching materials. Validation is carried out by validators who are experts in the field of study so that the validation results can be accounted for. The video tutorial-based electronic module developed has fulfilled the aspects of learning, content / material aspects, usefulness evaluation of video tutorial-based electronic modules that get a total score of material experts, namely 178.

The validator states that the video tutorial-based electronic module material is in accordance with the curriculum and learning objectives that must be achieved by students, including the suitability of the module content, clarity of instructions, preparation of materials, materials with learning media, pictures, video and audio with material, display of images and writing. The results of the material validation indicate that the video tutorial-based electronic module developed has been very suitable with the curriculum currently in use. The accumulation of the total value of the droikid is obtained by adding the number of validator values, amounting to 178. Based on the calculation of the tendency of the data for material expert validation in the range of 167.88 < X means the level of validity of the video tutorial-based electronic module is very good.

The validity of the module format is the suitability of the module components with the elements that have been determined. Based on the validity values obtained from the validator, it can be concluded that the tutorial video-based modules that have been developed are in accordance with the construction module requirements.

4.2 Media Validity

Validation carried out by media experts includes cover design aspects and content, quality of letters, video images, and sound has fulfilled the requirements of a good module that makes it easy for students to understand CAD learning especially in 3D material. Assessments conducted in the form of questionnaire instruments and assessments in the form of comments and suggestions both oral and written. The data obtained from the assessment of media experts obtained a total score of 127. Then the calculation of the tendency of the data for material expert validation was in the range of
108 < X < 134.4 meaning the level of validity of the video tutorial-based electronic module was good.

CONCLUSION

The conclusions of this study are a valid video tutorial based electronic module. The assessment of material experts is in a very good category and the assessment of media experts is in good category.

REFERENCES


