

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 1 Data trend categories

Interval	Category
$(\bar{X}_i + 1,80 S_{bi}) < X$	Very good
$(\bar{X}_i + 0,60 S_{bi}) < X \leq (\bar{X}_i + 1,80 S_{bi})$	Good
$(\bar{X}_i - 0,60 S_{bi}) < X \leq (\bar{X}_i + 0,60 S_{bi})$	Pretty good
$(\bar{X}_i - 1,80 S_{bi}) < X \leq (\bar{X}_i - 0,60 S_{bi})$	Less
$X \leq (\bar{X}_i - 0,80 S_{bi})$	Very Less

Information:

$$\bar{X}_i = \frac{1}{2} (\text{maximum score} + \text{minimum score})$$

$$S_{bi} = \frac{1}{6} (\text{maximum score} - \text{minimum score})$$

$$X = \text{Actual Score}$$

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 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

No	Aspect	Validator	Average	Category
1	Learning	67	4.467	Very Good
2	Conten	65	4.3	Good
3	Assessment of the usefulness of the video tutorial-based electronic module	46	4,6	Very Good
Total		178		

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

No	Aspect	Validator	Average	Category
1	Cover Design	20	4	Good
2	Modul Content Design	31	4.43	Good
3	Letter Quality	26	4.33	Good
4	Image Quality	29	4.625	Good
5	Video Quality	15	3,75	Good
6	Video Sound Quality	6	3	Pretty Good
Total		127		

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 Unsri 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 prototype 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

- [1] Sudjana, N. (2011) *Dasar-Dasar Proses Belajar Mengajar*. Bandung: Sinar Baru Algensindo.
- [2] Uno, H. B. and Mohamad, N. (2011) *Belajar dengan Pendekatan PAILKEM*. Jakarta: Bumi Aksara.
- [3] Sopiatin, P. (2010) *Manajemen Belajar Berbasis Kepuasan Siswa*. Bandung: Ghalia.
- [4] Harsono (2008) 'Student-Centered Learning di Perguruan Tinggi', *Jurnal Pendidikan Kedokteran dan Profesi Kesehatan Indonesia*, 3(1), pp. 4–8.
- [5] Harsono (2006) 'Kearifan dalam Transformasi Pembelajaran : Dari Teacher-Centered ke Student-Centered Learning', *Jurnal Pendidikan Kedokteran dan Profesi Kesehatan Indonesia*, I(1).
- [6] Soenarto (2015) 'Reformasi Pendidikan Vokasi Menghadapi Masyarakat Ekonomi Asean', in *Prosiding Seminar Nasional Pendidikan Teknik Mesin FKIP Unsri*. Palembang, pp. 3–8.
- [7] Nurohman, S. (2011) 'Modul elektronik berbahasa inggris Menggunakan addie-model sebagai alat bantu pembelajaran Berbasis student-centered learning Pada kelas bertaraf internasional', in *Prosiding Seminar Nasional Penelitian, Pendidikan dan Penerapan MIPA, Fakultas MIPA, Universitas Negeri Yogyakarta*. Yogyakarta, pp. 85–95.
- [8] Efendi, A., Santosa, A. and Darlius (2015) 'Pengembangan Media Pembelajaran Video Tutorial Pada Kompetensi Tune Up Sepeda Motor Untuk Meningkatkan Hasil Belajar Pada Kelas XI TSM SMK Negeri 7 Palembang', in *Prosiding Seminar Nasional Pendidikan Teknik Mesin FKIP Unsri*. Palembang: Program Studi Pendidikan Teknik Mesin, FKIP Unsri, pp. 159–167.
- [9] Sukardjo (2008) *Buku Pegangan Kuliah Evaluasi Pembelajaran*. Yogyakarta: Program Pascasarjana UNY.