

Online Learning for Fundamental Control System

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Abstract— IT-based online learning is the basis for the development of distance learning. Distance learning in terms of things quite profitable, as it saves cost, time, and resources. Learning 'basic knowledge of control systems' based content is very possible theory presented with distance learning strategies. This research aims to develop teaching materials and learning resources system with a basic knowledge of interactive distance learning methods. Research using 'research and development' that reveal the concept in aplikasi applied. The development of learning materials utilizing a web-based interactive media. Development of instructional methods of teaching materials using the method of Dick and Carey. Product validation is done against the wearer in small groups (30 respondents) in the Department of Electrical Engineering, Faculty of Engineering, State University of Malang (UM). Data validation was performed using an instrument of learning media in the form of a questionnaire given to respondents (students). 83.1% of respondents said teaching and learning resources is quite feasible to use.

Keywords— Learning, control systems, online, cognitive

I. INTRODUCTION

Enforcement of Law on National Education System No. 20 of 2003, Law No. 22, 1999 related to decentralization and local government regulation and Province as Autonomous Region [1], had an impact on the management of the system up to lectures at universities.

Management systems to the level of the Department or program of study at a higher education is expected to: (1) improve the quality and relevance of graduates, (2) develop additional capabilities life skills and entrepreneurship (Technopreneurship), (3) empowerment synergy financing between government, industry and community, and (4) improvement of the management system.

In order to improve the service in implementing the learning selike representation of the implementation of the formal curriculum to curriculum instructional, operational, dan experiential; then (1) the reformulation of the content of the course offerings of control systems; and (2) Developing access to the widest possible opportunity for Electrical Engineering Students who take courses FT UM control system

Online learning based on Information and Communication Technology is one of the backbone of distance learning as it saves cost, time, and resources [2]. Distance learning is also considerable potential for technology learning, through a variety of considerations in accordance with the philosophy of education. Therefore learning control system is based on highly theoretical content may be presented with distance learning strategies. Besides that, distance learning is also a supporter of education for all.

To optimize learning control system in FT UM Department of Electrical Engineering, instructional media needed to support interactive multimedia elements. Media support interactive learning has the strategic potential to motivate learners. Learning by developing interactive model on the basis of conventional learning are less able to meet the needs of learners in learning. The fact that there are in the class (Prodi D3 TE and S1 PTE) indicates that mshasiswa less motivated to learn because the approach used tend to be conventional. Motivation is very influential on academic achievement [3-6].

Referring to the existing problems, this study propose s learning application development Computer-aided (computer aided instruction/CAI) by utilizing the multimedia elements. CAI is able to improve learning for students because of the direct feedback [7]. According to Hall [8], the use of CAI is able to improve learning ability. This is because the CAI using various types of instruction in learning, such as drill and practice, strategy, game, and simulation. Using multimedia as demonstration and learning research makes it possible to improve the teaching and learning environment [9].

Development interactive multimedia based applications that optimize the potential of ICT services in order to improve the quality of learning. Utilization of ICT technologies have great potential in the equity of educational services widely because it can be accessed anytime and anywhere through the Internet network. Learning content development by utilizing multimedia elements capable of generating media interactive learning, inspiring, fun and motivating. Nonetheless, computer assisted learning should be used as a supplement, not to replace conventional learning.

The specific objective of this development research are: (1) produce teaching materials and accessories on-line basic theory of control systems that have relevance to the industry; (2) produce teaching materials and accessories that can be accessed by online students; (3) testing the results to ensure that the products developed are in accordance with the initial specifications and fit for use; and (4) The objective of this development is the result of students FT UM Department of Electrical Engineering courses are being programmed control system.

Interactive learning can be conceptualized as a learning process that involves some form of digital mediation between teachers and learners [10]. In the realm of application by online, Interactive learning allow visitors to communicate and interact directly with the application system. Thus, this study requires digital devices (such as computers) and at least a learner (learner). Actually, interactive learning has long been introduced, approximately 80s classic model proposed use of computers in education as a "tutor, tools, and tutee" by Taylor.

Learning by developing interactive model on the basis of conventional learning are less able to meet the needs of learners in learning. The fact that there are in the classroom showed that students are less motivated to learn because the approach used was conventional. Along with the development of information and communication technology, the use of digital devices in the learning widely used. In line with this, a lot more in-depth follow-up studies, one of which is computer assisted learning (computer aided instruction).

Interactive learning can not be separated from the use of multimedia clicking combine various unsurmedia such as video, sound, animation, text, and images that are packed in a container that is interactive, creative, and fun. These media types can be divided into two categories, namely: linear multimedia and interactive multimedia. Linear Multimedia is a multimedia that is not equipped with any control equipment that can be operated by the user. Multimedia is running sequential (sequential), for example: TV and movies. A multimedia interactive multimedia is equipped with a controller that can be operated by the user, so the user can choose what is desired for further processing. Examples of interactive multimedia is interactive learning, gaming applications, etc.

Utilization of CAI can improve learning ability. This is because the CAI using various types of instruction in learning, such as drill and practice, strategy, games, and simulations [5,8]. Multimedia is used as a demonstration and learning research makes it possible to improve the teaching and learning environment [8]. Nonetheless, CAI should be used as a supplement, not to replace conventional learning [11].

According to the Ministry of Education and Culture, Prof. M. Nuh, distance education is very important because Indonesia has a very large population. If only rely on conservative learning, hence the need for additional infrastructure incredible amount. In general, such a model of education is usually driven by the specific needs related to

public education, training, professional development or the needs of the group

Distance education can be organized on all lines, levels and types of education. Distance education function is to provide educational services to groups of people who can not attend face-to-face education or regular. Distance education organized in various forms, modes, and coverage facilities and services supported by learning and assessment system which ensures the quality of graduates in accordance with national education standards.

Distance education serves as a form of education for students who can not attend face-to-face education without reducing the quality of education. Distance education aimed at improving and expanding equitable access to quality education and relevant according to the needs. Distance education remotely open characteristics, self-learning, mastery learning, using technology information and communication, using technologies other educational and/ or learning Integrated college

Website is a collection of web pages, which are usually summarized in a domain or subdomain, whose place was in the world wide web (www) on the Internet. A Web page is a document written in the format HTML (Hyper Text Markup Language), which is almost always accessible via HTTP, A protocol that convey information from the website server to be displayed to the user via a web browser. All publicly accessible websites are able to form a very large information network.

Website or site can also be interpreted as a collection of pages that display information of text data, the data still images or motion, animation data, voice, video or a combination of these, whether they are static or dynamic that formed a series of interconnected buildings where each networks associated with the page (hyperlink). Static if the contents of the website information remains, rarely changed, and the contents of the information only in the direction of the website owner. If the contents are dynamic website information is always changing, and two-way interactive information content derived from the owners and users of the website. Examples of static websites is contains company profiles, while dynamic website is like Friendster, Multiply, etc. In the development, static website can only be updated by the owner only, while the dynamic website can be updated by the user or owner. In the website there is a supporting element of the domain name, Hosting, Programming Language Web including: Hyper Text Markup Language (HTML), Personal Home Page (PHP), Cascading Style Sheets (CSS), and JavaScript are used to make SIM-based web more dynamic and attractive ,

The scope of the material covered online is the basics of Yag control system includes: (1) system looping, (2) the basic elements of a control, (3) transmitter, and (4) controllers

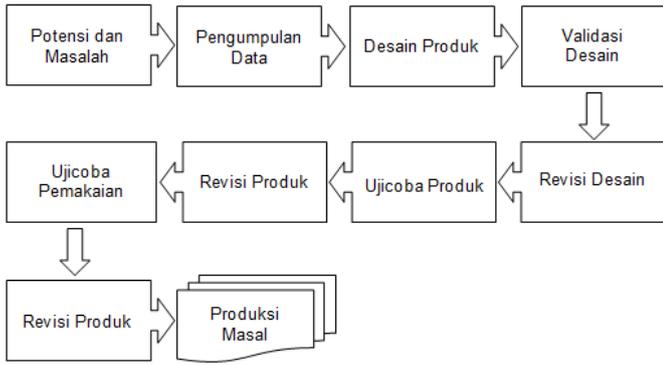


Fig. 1. Methods of Research and Development (R & D)

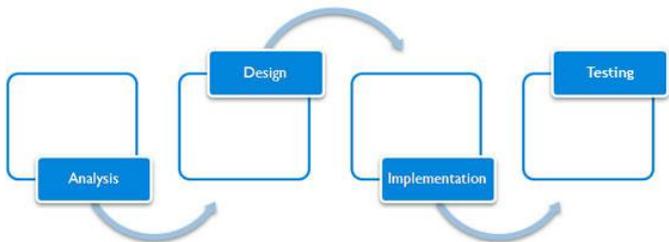


Fig. 2. Application Development Phase

II. METHODS

The design of the study is the development of research (or engineering) where the concept of the system is represented by the application or the application of the learning system to help improve distance education services. System development, followed by the manufacture of content in interactive multimedia-based learning.

Model development of instructional media used (Figure 1) refers to the method of Research and Development (R & D) as proposed by Sugiyono [12,13].

Development of software systems is done by reference to the rules and conventions of software engineering. Approach to software process model used is the waterfall (or so-called linear sequential model). The underlying reason is because the model selection software requirements specification to be developed is quite obvious [14]. Thus, the software development phase can be immediately implemented in phases, starting from the analysis, design, implementation, and testing of this can be checked in Figure 2.

Teaching materials will be packed into Moodle CMS based *on line*, Moodle is a software package that is useful for creating, conducting courses, Internet-based education. Moodle is open source software to do without the associated learning by time and place, or it can be said of e-learning software.

The expected product specification is the text and illustrations in pdf format. Preparation of Module using

Microsoft Office 2007 converter to PDF format using the open chief writer.

Based learning resources developed *on line* will contains 8 sections: (1) the index page, (2) Form login, (3) Page index (after login), (4) List the menu (course or the material), (5) Duty, (6) Exercise, (7) Menu Chat, and (8) Forum. Minimum target to number 6.

Validation is an important step to ensure that applications are developed in accordance with the specifications. There are two types of tests are generally performed on the validity of the study, namely: (1) Validation by the media experts carried out to determine the validity of instructional media so it can be valid whether or not the media; (2) the validity of the content carried out on the material realm, the realm of construction, and the realm of language used; and (3) the validation or test system implementation online application tested on students.

III. RESULT

First, successfully arranged Course material Content Control System consists of four parts: (1) The use of open and closed control systems, (2) open and closed diagram Controller, (3) transmitter, and (4) controllers.

Material successfully packaged into Moodle CMS can be accessed online. Moodle is a software package that is useful for creating, conducting courses, Internet-based education. Moodle is open source software to do without the associated learning by time and place, or it can be said of e-learning software.

The expected product specification is the text and illustrations in pdf format. Preparation of Module using Microsoft Office 2007 converter to PDF format using the open chief writer. Learning module consists of 8 pieces of the frame.

Learning resources are developed based on-line contains 8 sections: (1) the index page, (2) Form login, (3) Page index (after login), (4) List the menu (course or the material), (5) Duty, (6) Exercise, (7) Menu Chat, and (8) Forum. Minimum target to number 6.

Display of each part can be seen in Figure 3 to Figure 10. Figure 3 shows the initial page views during the first access learning resources.

Figure 4 shows the display page that contains a login form to the user (user) who wants to enter the course control system.

Figure 5. The display shows the initial index page or to the user (user) who has made the process of authenticating users on the login page. On this page will display a list of courses available to users.

Figure 6 shows the menu or list view course material available to users. On this page the user can choose a course that can be taken.

Figure 7 shows the display tasks for students are available to the material presented.

Figure 8 shows the page views to answer practice questions that exist in the material presented.

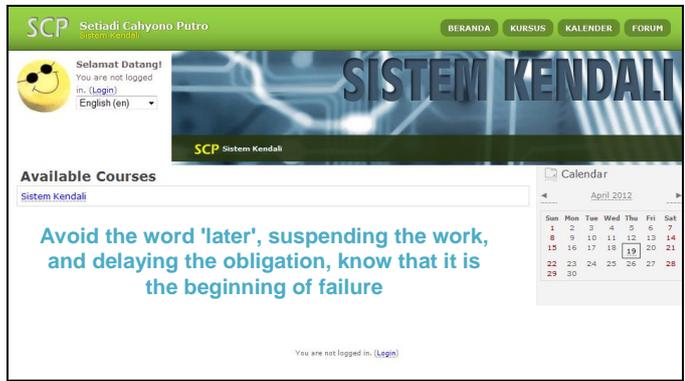


Fig. 3. Display Home (Index)

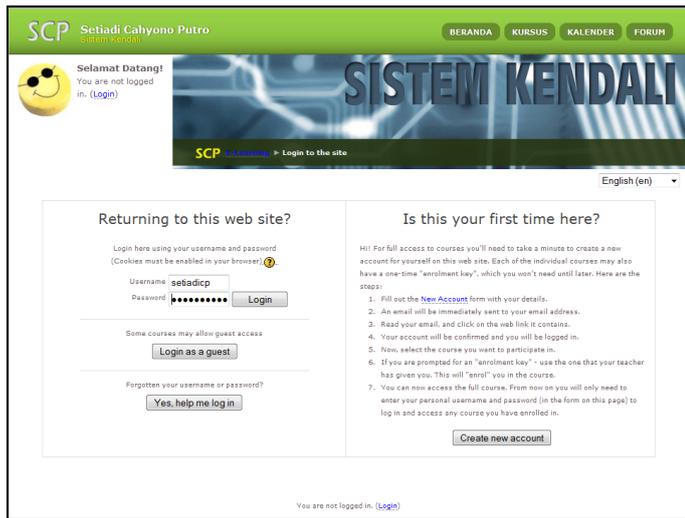


Fig. 4. .Tampilan Form Login Page



Fig. 5. Display Home Users



Fig. 6. List Menu Course



Fig. 7. List of Problem / Question



Fig. 8. List Problem / Question



Fig. 9. Display Upload and Download Task

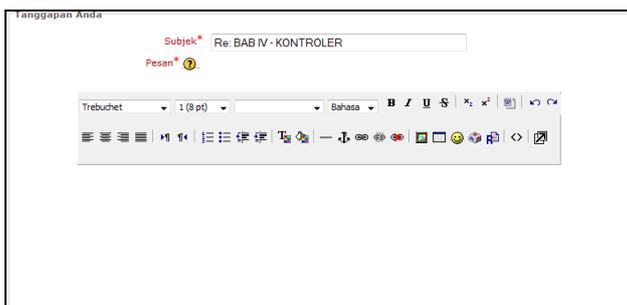


Fig. 10. Display Forum Chat and Discussion

Figure 9 shows the display page that can be used both by the instructor and students to download and upload documents, and includes articles, assignments and answers.

Figure 10 shows the display forum that can be used to chat and discuss the course material presented.

IV. CONCLUSION

Referring to the implementation and outcomes targeted research, conclusions can be described as follows:

- Product development outcomes-based learning media in the form of on-line learning resources on the subject of alternative control system for the students of the UM Department of Electrical Engineering FT pdf form contains material with drawings and explanations, and there are other facilities such as chat rooms, on-line exercises, and discussion forums.
- The development of instructional media control system based on-line can help improve distance education services. Media development based on-line learning allows broad access anytime and anywhere so it is very helpful for students majoring in Electrical Engineering, Faculty of Engineering, State University of Malang (UM).

V. SUGESTIONS

In the development of media-based learning on-line is good enough and meet the initial targets that have been planned, but there are still some kekuranganyang need to be refined again. In this connection, there are some suggestions that should be considered include:

- The need for widespread testing to determine the usefulness of learning media are developed. Testing should be done in groups and involves a lot more research subjects.
- Addition and content development in a sustainable manner considered very important to supplement the materials that already exist. Certainly through ongoing research, it is very likely to materialize.
- Learning online control system can be implemented is limited to learning the scale of knowledge (cognitive)
- In the technology learning on-line aspects of attitudes to behavior (learning soft skills) should be investigated further by involving other variables were significant.

REFERENCES

- [1] Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 tentang Sistem Pendidikan Nasional. Jakarta. 2004.
- [2] B. A. Pribadi, Ketersediaan dan Pemanfaatan Media dan Teknologi Pembelajaran di Perguruan Tinggi, *Jurnal Pendidikan*, 5(2), pp:145-156, 2004.
- [3] A. Tella, The Impact of Motivation on Student's Academic Achievement and Learning Outcomes in Mathematics among Secondary School Students in Nigeria, *Eurasia Journal of Mathematics, Science, & Technology Education*: 3(2), pp.: 149-156, 2007.
- [4] I C. Lee, The Effect of Learning Motivation, Total Quality Teaching and Peer-Assisted Learning on Study Achievement: Empirical Analysis from Vocational Universities or Colleges' students in Taiwan, *Journal of Human Resource ad Adult Learning* 6(2), pp.: 56-73, 2010.
- [5] Rusman, *Belajar dan Pembelajaran Berbasis Komputer Mengembangkan Profesionalisme Guru Abad 21*, Bandung: ALFABETA, 2012.
- [6] D. H. Schunk, *Learning Theories an Educati-onal Perspective*, Yogyakarta: Pustaka Pelajar, 2012.

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- [7] Access Center, Computer-Assisted Instruction and Writing (online) <http://www.Reading-rockets.org/article/22028>. 2008.
- [8] T. E. Hall, C. Hughes, and M. Filbert, *Computer Assisted Instruction in Reading for Students: A Research Synthesis*, The National Dissemination Center for Children with Disabilities, 2000.
- [9] C. A. Wissick, *Multimedia: Enhancing Instruction for Students with Learning Disabilities*, *Journal of Learning Disabilities*, vol. 29, no. 5, pp.: 494-503, 1996.
- [10] T. C. Reeves and J. G. Hedberg, *Interactive Learning Systems Evaluation*, Educational Technology Publications, Inc. USA, 2003.
- [11] D. Sudarwan, *Media Komunikasi Pendidikan*, Jakarta: Bumi Aksara, 2008.
- [12] Sugiyono, *Metode Penelitian Pendidikan*, Bandung : Penerbit Alfabeta. 2010.
- [13] P. Setyosari, *Metode Penelitian Pendidikan dan Pengembangan*, Kencana Prenada Media Group. Jakarta, 2010.
- [14] R. Pressman, *Software engineering: A practitioner's approach*, seventh edition, New York: McGraw-Hill, 2010.