

Blended learning media design using waterfall model for computer tools learning subject in college

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Abstract

The learning of computer tools is one of the most complicated subject for STEKOM (Advanced School of Economy and Computer) Semarang students because it requires a high degree of accuracy from the students, what it takes for the learning process so that it can run well is a learning media that can help students in digital media making tutorial, one of them is blended learning media. its use is that it is able to issue various Materials and tutorials that are good and interesting. The purpose of this research is to make a blended learning media using Waterfall Model. The specific targets to be achieved in this research is producing a valid blended learning media used in learning process of digital engineering courses on STEKOM students Semarang. While the model of blended learning media using waterfall model, with systematics as follows: (1) Requirements, (2) design, (3) Implementation, (4) Verification, (5) Maintenance, after the blended learning media design is then validated by experts Materials and media experts, it shows a rather good result with an average score of 86 and 88, meaning that blended media media media including the category is very suitable for use in the process of computer tools learning.

Keywords: learning, media blended, waterfall model, computer tools

1. Introduction

Globalization has changed various aspects on human life in all fields, such as education, communications, socio-cultural, trade and transportation. One of the triggers of the progress of globalization is the rapid development of information technology and allows unlimited access to information. Hence the challenge in this globalization era is to increase competitiveness and competitive advantage in all fields with creative and adaptive thinking patterns to all changes and developments that occur. Education plays an important role in preparing qualified human resources and able to compete in the development of science and technology. Therefore, education should be done as well as possible to obtain maximum results.

Computer Tool is one of the courses closely related to technology. Learning Computer Tools should be associated with its application in technology and life so that students can view Computer Tools as a basic science that must be mastered computer scholars. In the rapid development of the world, it is obligatory for lecturers to be able to print qualified students in global challenges, in accordance with the STEKOM Semarang plan and strategy (Renstra) in which a lecturer should be able to create interesting learning with ICT-based, therefore it is required for lecturers to make research research IT-based technology to teaching and learning.

Burphadeja, V., & Kumnuanta, J. (2011) ^[1] said that learning blended learning has advantages such as: (1) Flexibility, meaning that students can contribute in discussion at the time and place they choose individually. (2) Participation, meaning that all students can participate in the learning process because they can arrange the time and place to participate. (3) Learning has more time to be more careful in arguing and more in reflecting on its views and opinions.

Many software available blended learning media makers one of which is Word Press. Word press software can make learning online and offline more interesting and easy to apply. This software can be used to make presentation look more interesting with music effect, video that comes with SWF or EXE file, so that students can learn more fun. These files can also be inserted into TABLET (Large-display smartphone), so that they can be displayed in a more interesting way.

In order to support WordPress learning, a suitable learning model is needed, one of which is waterfall model, waterfall model is a special model applied in making IT-based media (Chou, A. Y., & Chou, D. C.: 2011) ^[2]. Waterfall model concept includes student activities, student involvement, and podcasting. In the waterfall model includes: (1) Requirements, (2) design, (3) Implementation, (4) Verification, (5) Maintenance, first done in designing and made the prototype to then validate it to an expert

One of the subjects studied in the computer tools course is a computer tool in which it discusses all material about all devices from outside devices and devices in the dll. Collins, P. T. (2011) ^[3] states that the purpose of learning computer software is to introduce the elements of computer tools in detail. Basically computer tools have a greater opportunity for students to understand compared to other material branches. This is because of ideas on how to use and how to get started in achieving proficiency in their use. However, the field evidence shows that the learning outcomes of computer software courses are still low. To overcome the difficulties in learning the courses of computer devices, the way that can be taken one of them is the application of learning blended learning with waterfall model that essentially learning packed actively in the online menu on the web that we make systematically in accordance with the characteristics of

students of Electric engineering courses in STEKOM Semarang

From the final examination result of semester of year 2015/2016 obtained 70% student of Electrical Engineering Program STEKOM Semarang in computer device subject get value under 60, this matter because of many obstacle as follows:

- a) The number of students who are weak in understanding the computer engineering material because they already feel understand generally about what computer devices is, though they know it on the surface only.
- b) The absence of web course material computer tools that can holistically help students self study equipped with learning videos of each material
- c) There is still very few reference books made by lecturer of STEKOM Semarang that discuss about computer material, so it is a must to find the appropriate literature

Then the relevant studies related to the development of renewable learning media are Er, E., Özden, M., & Arifoglu, A. (2009) [4] research on A blended e-learning environment: A model proposition for integration of asynchronous and synchronous e -learning which indicates that the student prefers the lecturer to use the media directly in accordance with the material being discussed. And then reinforced by Research conducted by Wijayanto and Ika Menari (2014) [16]

on Web Usage Mining Analysis with Association Rules to Know the Visit Pattern of Visitors of Higher Education Website shows that with web media usage mining makes campus very interested and enthusiastic in using the web media. This is in consistent with Koohang's research, A. (2009) that shows that with blended learning media via webquest, classroom learning becomes easier because students learn first at home via online web that has been created by the teacher. Then strengthened research of McGinnis, M. (2005) [15] Which shows that with learning strategies blended learning percentage of face to face can be reduced from 50% in the class, so that students are not monotonous in the classroom.

2. Methodology

Type of Research

In making this blended learning application, we use development method that is Waterfall Model. This model takes a systematic approach and sequence starting from the level of system capability to the analysis, design, coding, testing / verification, and maintenance. Called by the waterfall because the stage is to go have to wait for the completion of the previous stage and run in sequence. Examples of design examples must wait for the completion of the previous stage is phase requirements. Generally the stage in the waterfall model can be seen in the following figure:

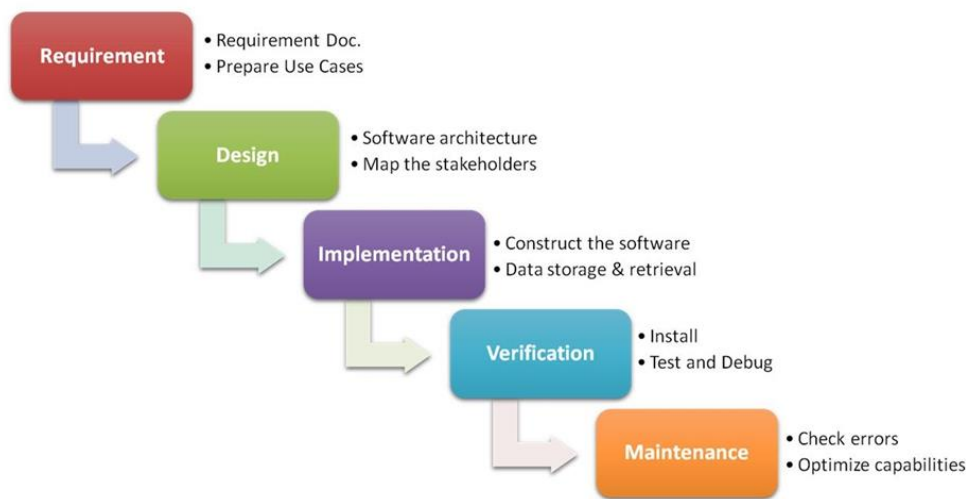


Fig 1: Waterfall Model Process

Below is an explanation of the steps taken in the waterfall model according to Pressman (2007):

- 1) Requirements. In this stage, the search process is intensified and focused on the needs of the software. To know the nature of the program to be made, the software engineer must understand the information domain of the software, for example, the functions needed, user interface, etc. This 2 activity (search the system requirements and software) must be documented and presented to the customer.
- 2) Design. This stage process is used to change the above necessities as a representation in the form of "blueprint" software before the coding begins. The design must be able to implement the requirements mentioned in the previous stage. Like the two previous activity, this process must also be documented as the configuration of the software.

- 3) Implementation. To be understood by the machine, in this case a computer, the design had to be transformed into a form that can be understood by machines, ie into the programming language through the coding process. This stage is the implementation of the technical design phase which will be done by the programmer.
- 4) Verification. As anything made must be tested first. Likewise with software. All software functions must be tested, so that the software is free from error, and results should be strictly in accordance with the needs that have been defined previously.
- 5) Maintenance. A software maintenance is required, including the development, because the software that being made are not always just like that. When it runs, it may still have some small errors that are not found before, or if there is the rise of the needs of an additional features that

did not exist in the software before. A Development is required when a change of external companies such as when there is a change on the operating system, or other device.

Reasons to Use Waterfall is its advantages of the method for the application of this model which is easy to use, also by using this model, when all the system requirements can be defined as a whole, explicit, and right at the beginning of the project, then the products can run well and without problems. Although the often needs of the system cannot be defined as explicitly as desired, but at least, the problem on the system requirements in the early project are more economical in terms of money (cheaper), effort, and time wasted when compared to the problems that arise at later stages ,

Subject to try

The subjects of this research are year 2015 class students of Electrical Engineering Study Program of STEKOM Semarang, in which among 100 students, 50 students were chosen as a random sampling.

Data collecting instrument

Instrument used on this research is questionnaire, observation and self-improved interviews with the objects

Data Analysis

The data collected through this research are about: (1) the attractiveness of the program for the students; (2) relevancy of the material being studied; (3) the usefulness of the media and materials being studied; and (4) the suitability of the materials studied with ease of accessing materials by students. (5) Questionnaire response by material experts and media experts on blended learning media.

3. Result and Discussion

The results of this study is relating to the manufacture of

blended learning media design in the course of computer devices suited to the steps of Waterfall Model that is:

3.1 Requirements

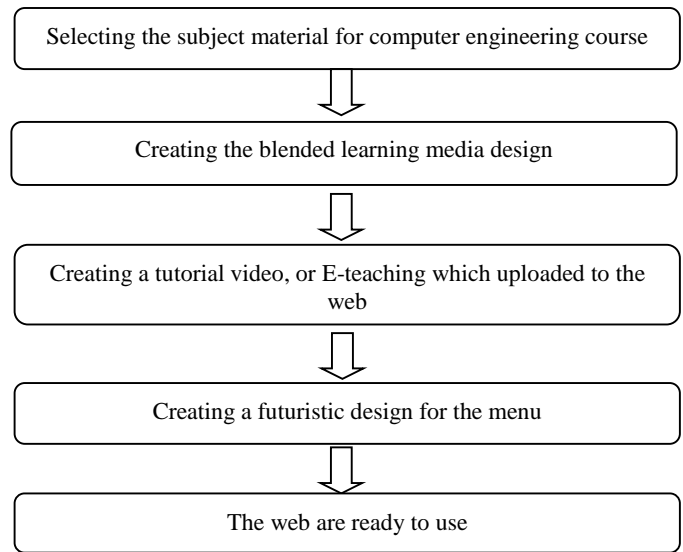


Fig 2: Blended Learning Media creation steps

To further support the making of this blended learning media using wordpress. The steps of making blended learning media as follows:

3.2 Design

In making the design is done systematically and validated by the material experts and learning media that is the professor and doctor in the field of mathematics and technology-based learning, so blended learning valid product is used in the learning process of computer courses as for the initial design as follows:

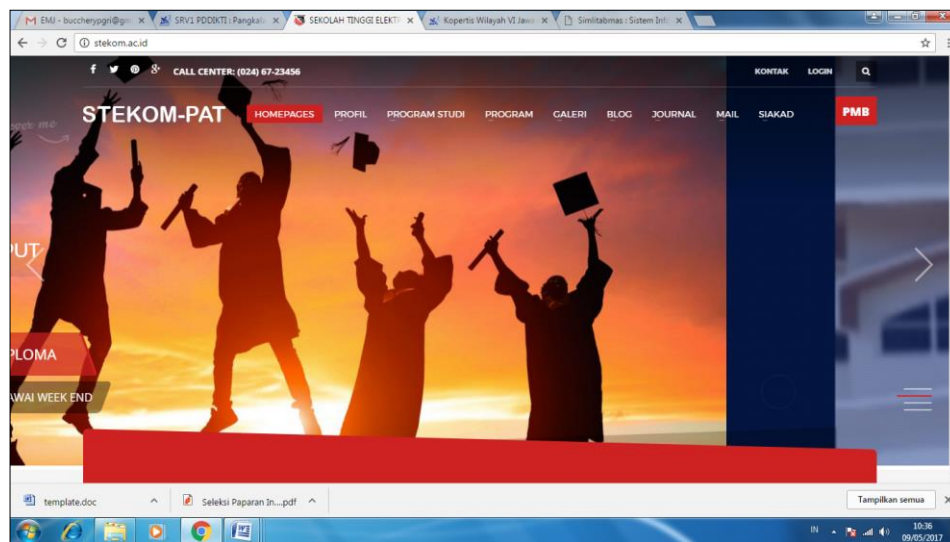


Fig 3: Picture of blended learning media design

Picture 3 describes the material of the computer, where the student is expected to describe the beginning of the computer device correctly, then the design is made with corel draw software to make the display more attractive and more elegant. Then validation of the product by experts in their field, from

the validation results obtained the results that the material expert gives a total value of 86 and the media expert gives the value 88 meaning that both experts declare that the product is worthy of good use in learning in the classroom, while the input from the expert is necessary to add music Instrumental

in the application of blended learning to make learning atmosphere more fun. Here are the results of the assessment of the following materials and media experts:

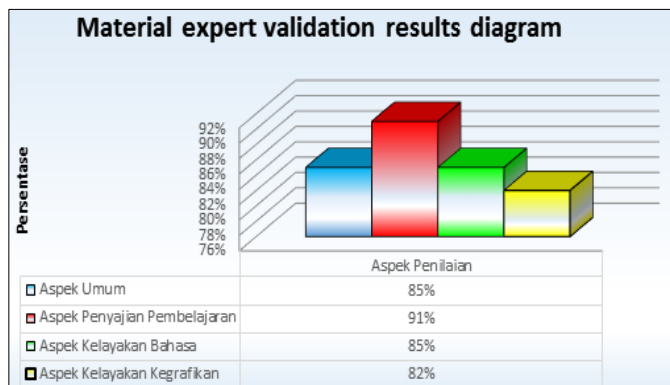


Fig 4: Material expert validation results in flowchart

The result of the material expert's judgment indicates that the material of computer presentation of the material is good, the language used is also good, while the picture on the material of the computer device is well arranged. As Martin, J. (2009) [13], explained about Developing course material for online adult instruction shows by creating online media then studying this model is very liked by students, and also Mason, R., Pegler, C., & Weller, M. (2004). E-portfolios: an assessment tool for online courses. Explain that online assessment is needed by students nowadays, because it is very helpful for lecturers and students in learning.

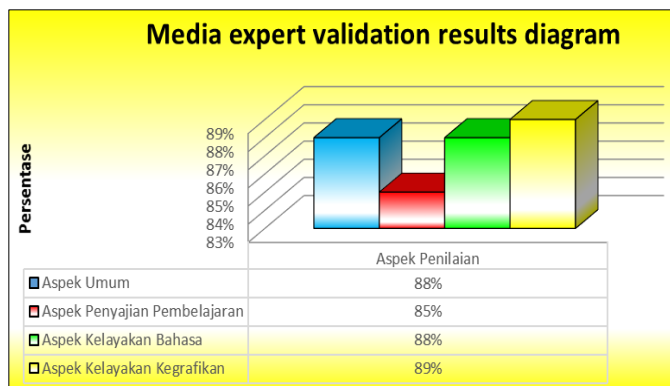


Fig 5: Media expert validation results in flowchart

From the results of media expert assessment shows that the design is good, color gradation is good, three-dimensional objects that appear on the web is also seen clearly, while that needs to be improved is the web design refined and given the instrumental music to be more interesting for students. This is in consistent with research conducted by Huang, E. Y., Lin, S. W., & Huang, T. K. (2012). About what type of learning style leads to online participation in the mixed mode e-learning environment? A study of software usage instruction. That online learning is needed in education, then as stated by Hrastinski, S. (2008) [9]. Asynchronous & synchronous e-learning. Then clarified by Kaymak, Z., & Horzum, M. (2013) [10]. Relationship between Online Learning Readiness and Structure and Interaction of Online Learning Students. Show that students with online learning can simplify their learning process anytime and anywhere they are.

3.3 Implementation

To be understood by smartphones and web, in this case is the mobile and web students, then the design had to be changed its form into html to be understandable and can be used by smartphone and web, that is into the programming language through the coding process. In the implementation of this blended learning media, lecturers provide technical means of using media in details, so that students can use it properly and correctly.

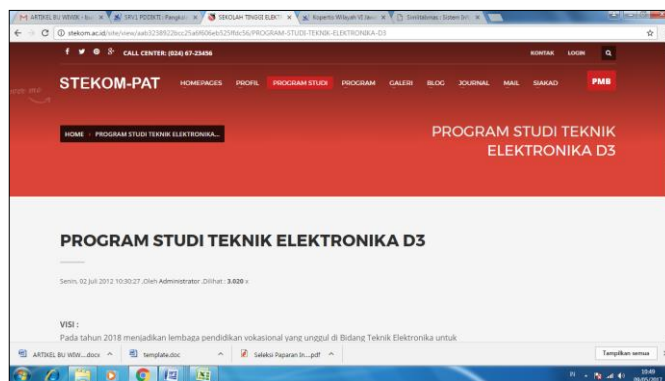


Fig 6: Blended Learning Media Tutorial

3.4 Verification

In the verification stage of the blended learning media product are done by observing the class and do an interview after the use of blended learning media, to know that all the blended learning functions is free from error, and the result is really in accordance with the needs that have been defined previously. From the results of verification of the product indicates that the blended learning media is feasible to be used in the learning process of computer software courses, it is indicated by the success of all smartphones that are used by students, all the support and students are easy to understand the intent of the objects that exist in the web and smartphone students.

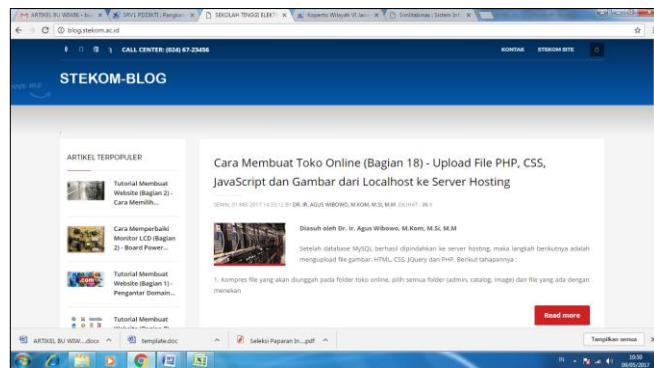


Fig 7: Blended Learning Media Interface

3.5 Maintenance

In the maintenance of an application stage require a check of blended learning media which is a necessity as it is to check the design and hosting that is used are still supporting the smartphone used, because if the features of blended learning media found an error then it needs an addition of features that does not exist before in the blended learning media.

4. Conclusion

From the results of the research related to the manufacture of

blended learning media design on the courses of computer devices, it shows that:

1. Blended learning products in the course of this computer device is feasible to be used in the learning process, especially in STEKOM Semarang, Indonesia
2. Improvements have been made to the more futuristic web interface
3. Already added instrumental music that show that it help students to make the learning atmosphere more interesting and more fun
4. Further development needs to be done so that this blended learning media product is feasible to be used in Indonesia in particular and in the world in general.

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