

## **Learning Instructional Design of eLearning system Data Structure for courses at the University of Widyatama Bandung**

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Science is now very numerous and widespread to be accessible or easily accessible. Of course, one thing that was instrumental in the spread of this knowledge is the role of information technology. Information technology has been able to provide opportunities and opportunities for users to be able to collaborate on activities that benefit information (knowledge) required. In the world of education also have so much interest in utilizing information technology for the benefit of the learning process which is the main business processes in education. One of the rapidly growing use of technology in education today namely eLearning. Development not only in the elucidation of the use of information exchange through technology, but can be built based on the needs of system administration is often done in education. That is, the learning process is part of the activities in the eLearning system of educational administration as a sub, so the ease of interaction and learning about the needs of the search will be archived as well. At the college is also a central issue of the application of eLearning, but others fail in implementing it. A number of trials conducted for eLearning system can run optimally at a college, one of the resulting model is the implementation of eLearning are represented in learning instructional design of eLearning at the University Widyatama.

**Keywords:** the process of learning, digital media, elearning system, model implementation elearning, elearning instructional design

### **Background**

Universities in the world has a lot to make efforts to utilize technology to find various information according to the needs of learning. As UNESCO declared that the world today needs to change the direction of education, the inequality of information that can be obtained by the educators and learners through technology, this needs to be done by all nations in the world to have the opportunity and equal opportunity to obtain or develop a knowledge. One of the universities in Indonesia, Universitas Widyatama, has not had a guideline that can be used as a reference in developing eLearning systems,

thus Studies Program Information System which is one part of the Faculty of Engineering, The University Widyatama contribute to the implementation of an eLearning system. The problem that arises is the Data Structures course, which is the core courses of the Information Systems Program, students often experience difficulties in the learning process, such as searching for references on the topic presented each week; trouble getting a case for comparison; difficulty to interact with faculty / students to review the topics that have been discussed in the class and there are many other things concerning the learning process needs to be improved.

Right now the trend of students to exchange information using a variety of digital media is increasing. This is not surprising since the development of information technology has been able to provide the need to share information and interact with a variety of individuals everywhere. Information technology is evolving with a variety of digital media facility which has, as eLearning. eLearning facility can be used as a means or medium of learning in the educational process in college, the problem that the learning process should be carried out based on the curriculum of every study program. The curriculum is a guideline which directs all activities of faculty and students that must be done every semester, including the learning process that occurs between faculty and students must have rules and regulations in terms of the curriculum. eLearning can be defined as the process of learning using digital media, but must be able to meet the criteria of a curriculum to be used as a companion (blended learning) of the conventional learning (face to face in the classroom). Furthermore eLearning needs to be developed into a learning instructional design in order to support the objectives of the course curriculum.

### **Instructional Media**

The learning process is currently in desperate need of role teknologi information applied in the form of information media / digital media, this is not another to a more open insight for students to quickly grasp the learning that takes place. Digital media is also very instrumental in maintaining the events that have taken place, so that students can always review or repeat learning activities ever learned before.

Digital media have also been able to design activities with faculty and students perform a number of innovation and creativity to support the success of the learning process. As revealed by Munir (2013) says, that digital media can provide benefits to the delivery and receipt of information, among others :

- (1) More communicative, information using images and animations more easily understood by the user than information created by other means. Information obtained by reading sometimes difficult to understand, so it must be read over and over again. Additionally, to read should provide an especially difficult time because of busy acquired.
- (2) Easy to do the changes. The development of the organization, the environment, science technology, etc. affect the information. Information becomes irrelevant to the circumstances that exist, so it needs to be updated as the need exists. In multimedia, all the information stored in the computer. That information can be added modified, developed, or used to fit the needs.
- (3) Interactive. The use of such interactive applications for presentation, the economy, education and others. Interactive so that the user can direct his wish could be fulfilled. This can not be done on the information presented by other means such as print media.
- (4) More freely pour creativity. Multimedia developer or multimedia designer or author can pour their creativity, so that information can be more communicative, aesthetic, and economical as needed. This can be done because it provides a multimedia software tools and programming language, allowing the creation of applications that creative .

Although the application of eLearning systems is quite varied at this time, but it is based on a view that eLearning system, as a means of information delivery and distribution of teaching materials through electronic media, so that students can better understand the information given by the lecturer. As noted by (Gilbert & Jones, 2001, p.66-82) about eLearning “delivery of learning material through an electronic medium such as the Internet, intranet / extranet, satellite broadcast, audio / video tape, interactive TV, CD-ROMs, and computer-based training (CBT)”. Similarly The eLearning Action Plan (2001), the definition of eLearning in The eLearning Action Plan explains ". eLearning, defined as the use of new multimedia technologies and the Internet to improve the

quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration ".

### **Strategy eLearning**

In the process of learning in the curriculum, of course, can not be separated from the presentation of the material strategies, including the use of information technology support.

According Johnsos (Ana & Rita, 2011, p. 6) says "key elements of engaged learning in an online environment include the following" :

- (1) Students establishing their own learning goals
- (2) Studnets working together in groups
- (3) Exploring appropriate resources to answer meaningful questions
- (4) Tasks that are multidisciplinary and authentic, with connections to the real world
- (5) Assesment that is ongoing and performance-based
- (6) Products that are shared with an audience beyond the classroom so students are able to add value outside of the learning environment

Rozahi (2010) says, "in the context of the implementation of eLearning introduced models developed in conventional teaching or otherwise conventional learning models adopted into eLearning at the University Widyatama". Seen in Figure 1. that the mixture of learning (blended learning) is a way to use information technology can be combined with conventional learning activities (in the classroom). It is behind the selection of blended learning models due to current technological developments is sufficient to use and easy to install system. One of the main problems is thought to be a college is, the extent to which all human resources in the college to support the achievement of the application of blended learning. In this case the strategic management needs to be done so that these problems can be readily solved.

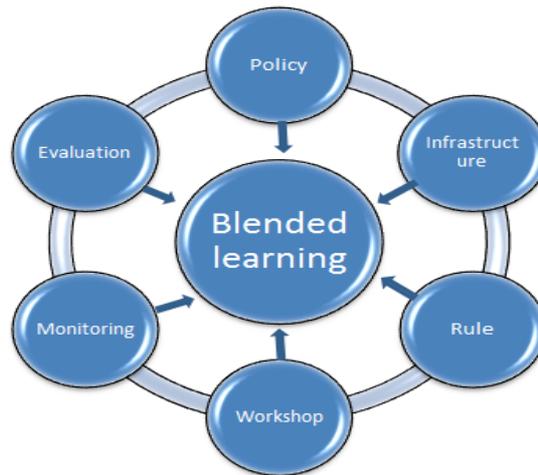


Figure 1. Model Implementation of eLearning

In Figure 1, seen a number of components that are interrelated with each other in carrying out the activities of eLearning. The descriptions of these components can be described as follows :

- (1) Blended learning : conventional learning process and eLearning conducted between teacher and students
- (2) Policy : Implementation of eLearning can be implemented if it fulfills the educational provision that applies to a country, so it will be a legal framework to support the blended learning.
- (3) Infrastructure : The availability of infrastructure facilities, including the availability of classroom and eLearning system software (software / hardware / brainware) adapted to needs the blended learning
- (4) Rules : Technical lecture meeting following the implementation of the obligations of teacher and students need to be set so that learning can be accomplished either mix
- (5) Workshop : Behavior involvement of teacher and students need to adjust the blended learning to support by conducting workshops
- (6) Monitoring : All the blended learning activities need to be monitored to see specific planning done.
- (7) Evaluation : All activities need to be assessed on the blended learning to conducted by teacher and students

## Instructional eLearning Design

In the development of an eLearning system should refer to factors that support the success of eLearning itself. Models such as the implementation of eLearning that have been described previously, the importance of each component to interact with each other.

As the implementation of eLearning models, appears a blended learning component is the core of the learning activities to be performed by parties involved in learning, the teacher and students. Thus, in this context there needs to be an instructional design that will guide process running of blended learning. Judith V. Boettcher, Rita-Marie Conrad (2010) says “The learning component such as the implementation of eLearning in the model will be represented in instructional design can be divided into four stages, as shown below” :



Figure 2. Blended learning of Instructional Design

Further instructional design can be described by the following sequence of steps:

Table 1. Starting Courses

| Stage one: Starting courses |  |
|-----------------------------|--|
| Students                    | Posting personal information of students, including uploading a recent photo. The purpose of this activity so that lecturers and other students to know the background of each student. Ensure that all access to all resources can be run as a command that appears on the eLearning system. Besides, it can also use any information technology devices owned by students, as well as knowing the obligations which must be done every week. |
| Teacher                     | Introduce yourself and explain the rules of the online lectures. Lecturers also explains the general competence of what to expect after attending this course. Designing and making clear and explicit   |

|                   |   |
|-------------------|---|
|                   | program, as well as giving encouragement to the students to be active in each activity per week. Beside that also teacher need to be acquainted with the student to create an atmosphere of intimacy and trust. |
| Content Knowledge | Every week should be prepared in a number of activities to be performed by students   |
| Environment       | Tools designed for the learning experience and students everywhere know how consumer.   |

Phase one is a preliminary activity that must be performed by faculty and students to be able to begin classes that will use the eLearning system. At this stage needs to be agreed upon the terms of the detailed activities for faculty interaction with students.

Table 2. Maintain Routine Activities

|  |   |
|--|---|
| Stage two: Maintain routine activities |   |
| Students                               | Weekly activities such as reading, posting, working together with other students, at least a fellow student in a community college; discuss the content of lectures and assignment problems; involved in the discussion forum.  |
| Teachers                               | Continuing the planned teaching, learning process from small to large problems, and discuss various theories that support the weekly material, fully engaged in the discussion forum, actively make innovations in providing link resources learning materials, and supporting exploration and testing of theories obtained students. |
| Content Knowledge                      | Students and teachers actively explore and identify which content more resources, as well as directing students and teachers to interact in discussion forums.  |
| Environment                            | Discussion forums have become a routine in using a number of tools to collaborate, cooperate, and learn.  |

Phase two began to be directed to understanding the duties / obligations of faculty and students to interact using the eLearning system

Table 3. Towards Strengthening

| Stage three: Towards strengthening |  |
|------------------------------------|--|
| Students                           | Explore the concept of weekly material and its application in a scenario, identify patterns and relationships, collaboration and creative in solving complex problems of fellow students.  |
| Teachers                           | Maintaining way better delivery of content, discussion forums and question responses as a controller, also set a time of progress quizzes, individual and group assignments, and provide feedback on assignments or quizzes are given to the students. |
| Content Knowledge                  | Teachers respond to various issues concerning materials and assignments and can be shared with other students in wikis, blogs, or other media.   |
| Environment                        | Students actively use digital media in the learning process, and can expand its information to share experiences in the discussion forum.  |

At the third stage towards strengthening, students began to focus on specific case studies or scenarios with different ways of accessing the tools in the learning process.

Table 4. Summary and Packaging

| Stage four: Summary and packaging |   |
|-----------------------------------|---|
| Students                          | Digging deeper into the materials and resources to support the learning process is more complex and complete assignments, learners are actively reviewing the matter and help provide a learning experience to fellow students; discuss the results and discuss their personal experiences in the discussion forum. |
| Teachers                          | Increasing innovation in the delivery of engineering resources, directing individual and group assignments students lectures, support and clarify the following weekly activities competence requirements, summarizes the experience of managing the packaging as well as provide feedback and assessment.          |
| Content                           | Content resources used by the students to go beyond the basic   |

|             |   |
|-------------|---|
| Knowledge   | competencies that must be met and adapted to the tasks they perform as intended in a course curriculum.         |
| Environment | Students can use any digital media that best suits their ability to solve their problem of activity assignment. |

The fourth stage encapsulate behavior and goals which are competencies that must be acquired / owned by students in the courses, as well as a good learning experience in identifying the knowledge and skills they have acquired.

### **Rule System eLearning**

Instructional design have been described previously will be a guide in the rule making in the eLearning system. This rule will be enforced guidelines in the learning process, as required in the curriculum.

The following detailed description of the rules imposed on the eLearning system Widyatama University in Information Systems Program Studies for Data structure subjects, namely :

#### ***Preparation of a blended learning***

- (1) Data structures course will use a mixed pattern (blended learning), which is 5 times face to face in class and 9 times face to face online .
- (2) Teachers are required to attend workshop eLearning before the beginning courses of each semester at the start, to test the competence of teachers in the use of eLearning systems .
- (3) Teachers must attend every class on a face to face meeting in the week :
  - 1st introductions between students and teachers, informing subjects passwords, how to perform the learning activities, explain the general rules that apply in the courses including the division of the group and describes the general scope of the courses.
  - 2nd discussion of the material in the classroom .
  - 7th review teaching materials that have been done on previous online meetings and describes a new topic, as well as the preparation of mid test.
  - The 11 reviewing online materials before and describes a new topic.

- The 15 reviewing online materials before and explain new topics and preparation final exams.

(4) Teachers are required to meet the criteria of eLearning meeting every week, for one semester to the meeting to : 3 , 4 , 5 , 6 , 9 , 10 , 12 , 13 , 14. The criteria that are considered present for the teachers concerned must meet all the following requirements :

- Upload teaching materials each week meeting with the format applicable to the eLearning system.
- Create one or more trend topic in a forum for discussion, making it easier for teacher to focus on the questions / comments of students that must be addressed in the eLearning system.
- Students are required to enter into a discussion forum at least four times, according the weight of the data structures course for 4 credits and teachers are required to provide a response in the discussion forum.
- Teachers make assignment by 4 (four) times in each semester are conducted in eLearning systems, namely : i) two times before the mid test at the meeting of the 4th and 6th , and ii) two times before the final exams at the meeting of the 12th and 14th .
- The period of execution of assignment for students is set and only applies in the week, since the task given .
- Quiz material for refresher weekly, for 12 sessions conducted online (system), which is on every week as scheduled meetings and working time during the week, the meeting of : 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15
- Teachers should check the assignments and quizzes according to the schedule in the weeks assignments and quizzes, so students can see the progress assessment.

(5) Teachers have the full authority to manage the class in eLearning systems, both in creating activities to assessment, such as :

- Create a group discussion / group (optional), including the method of evaluation in the discussion forum .
- Making specific percentage for eLearning activity assessment parameters.

- Monitor the activity of each student, so that they can be reminded when a student does not perform an activity.

***The detailed rules of technical learning activities in eLearning systems, namely :***

*Introduction Day One*

- (1) Install the latest photo (closeup) and a common identity (full name, address, phone number), so that students get to know the identity of the teachers concerned.
- (2) Introducing the general rules and special lectures will be implemented, including the assignment and assessment.
- (3) Explains how to use eLearning system to students.
- (4) Teachers tell the password for the corresponding courses to students who will take the course.
- (5) Checking students taking related subjects, based on the attendance list.

*Terms presence Activities*

Fulfillment of the presence of the following, refers to the general provisions above, while the presence of activities that qualify based eLearning system, namely :

- (1) Write down a description of the courses on the course name .
- (2) Write down a description of the competence of each topic of the weekly meetings .
- (3) Upload teaching materials weekly every Monday range (00.00 am) as of Tuesday (24.00 pm). Outside these hours of eLearning system will not record the presence of a lecturer, so it is considered not present. So is the obligation of students to download teaching material that was recorded in the eLearning system.
- (4) In a discussion forum, a lecturer should give the first topic to be discussed together. Activity begins after uploading teaching materials, to Sunday (24.00 pm). The system will record the presence of the lecturer if it is in the duration .
- (5) Assignment should be carried out according to schedule weekly meetings, preferably after a discussion forum run until Friday (24.00 hours). The system will record the presence of teachers, if it is in the duration .

- (6) Implementation of the quiz can be done according to schedule weekly meetings between Friday (00:00 am) until Saturday (24.00 pm). The system will record the presence of the teachers if it is in the duration .
- (7) Assignment of student assessment to Sunday (23:00 pm). The system will record the presence of the teachers if it is in the duration .
- (8) Assessment quiz if not made in automation, the manual assessment will be recorded through Sunday (23:00 pm). The system will record the presence of the teachers if it is in the duration .
- (9) Other provisions made by the teachers on the activity of the students during the discussion forum that can be given assessment .

### **Conclusion**

Elearning system of rules that refer to the eLearning instructional design should be able to give an order in the learning process that uses eLearning, that the preparation of a course of study in using the eLearning system can run as a rule in an educational curriculum. Rules are made can also be developed further, given the way in the delivery of information and material content may vary according to the needs of the existing curriculum for a course at any college.

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