Design of learning applications using the Rapid Application Development method

R Maulany*, B Hasan, A G Abdullah and D Rohendi
Program Studi Pendidikan Teknologi dan Kejuruan, Sekolah Pasca Sarjana, Universitas Pendidikan Indonesia, Bandung, Indonesia

*raymondmaulany@upi.edu

Abstract. Information and Communication Technology (ICT) in the current era of globalization has become a fundamental requirement in supporting the effectiveness and quality of the education process. Educational issues in Indonesia such as the quality and relevance of education, access and equity in education, geographical range, education management, autonomy and accountability, efficiency and productivity, budget and sustainability, cannot be overcome without the help of ICTs. ICT-based education is a means of interaction between management and administration of education, which can be used by both educators and education staff and students in improving the quality, productivity, effectiveness and access to education. The purpose of this study is to find out how to design e-learning applications in informal and non-formal education, as well as efforts to improve the use of e-learning in informal and non-formal education. So that the results of this study can be improved the quality of informal and non-formal education, and can facilitate the field of education in Indonesia by using information technology as an interactive learning medium. The method developed in designing e-learning applications is to use a method that is generally used in the development of information systems using Rapid Application Development. The system that has been built can provide information about distance learning in informal and normal education. In addition, the system built can facilitate users in learning and communicating with teachers when there is information needed / needed from the teacher.

1. Introduction
Technology provides many conveniences in everyday life in various fields. Technology can help in all fields, such as business, offices, government, health, education, and many more [1]. ICT-based education is a means of interaction between management and administration of education, which can be utilized by both educators and education staff and students in improving the quality, productivity, effectiveness and access to education [2].

The process of the development of non-formal and informal education requires development in the field of ICT or multimedia because especially in the world of non-formal education where every activity is organized and systematic, outside the schooling system which is carried out independently or is an important part of wider activities, which are intentionally carried out to serving students in achieving their learning goals. Whereas in informal education, the learning process that lasts for all ages so that everyone gains values, attitudes, skills, knowledge that comes from daily life experiences,
environmental influences including family life, relationships with neighbours, work environment and games, markets, library and mass media.

With a more personal approach and interaction, the tutor is notified of his progress, and is assisted in providing learning material and all the problems he faces. This will make tutors get adequate teaching material facilities so that learning citizens can get good learning. Then this service is supported by speed, rapid response to complaints and other tutor needs. Thus, the improvement of learning can be done as quickly as possible by tutors and managers of the institution.

According to Putranto's statement, Gautama, & Citra E-Learning is a way that enables the teaching and learning process to be easier and more flexible, using electronic media, such as computers and the internet, so that students can obtain material and knowledge actively and independently by the students themselves [3].

Distance learning (distance education) as we often hear is learning that prioritizes independence. Law of the Republic of Indonesia Number 20 of 2003 article 1 paragraph 15 states that distance education is education in which students are separated from educators and their learning uses various learning resources through communication technology, information, and other media. It can be interpreted that the teacher can deliver teaching material to students without having to meet face to face in the same room. This kind of learning can be done in the same time or in different times.

Distance learning has several benefits, namely:

- Equity in education can be improved
- Reducing the number of dropouts or college
- Can trigger competition that can open wider horizons
- Has an increase in time efficiency [4].

According to Article 1 paragraph 7, Law Number 20 Year 2003 concerning the National Education System, what is meant by the education pathway is a tool or means through which students learn to develop their potential in an educational process that is in line with educational goals. Various types of education paths in Indonesia as already contained in Article 13 paragraph 1, Law Number 20 Year 2003 concerning the National Education System, reads: The education path consists of formal, non-formal and informal education that can complement and enrich each other.

Based on Article 13 paragraph 1 it is clearly stated that the education pathway in Indonesia consists of 3 (three) types, the first is formal education, the second education path is non-formal education, and the third education path is informal education.

2. Methods
In this study using the RAD (Rapid Application Development) method as the basis for designing applications, in the following order:

- Requirements Planning
  In this phase, the user and analyser meet to identify the purpose of the application or system and identify the information requirements arising from that goal. The orientation in this phase is solving company problems. The design of the application will be built according to the description described and is useful by everyone.

- RAD Design Workshop (RAD Design Workshop)
  To design and improve what can be described as a workshop. Analysers and programmers can work to build and show visual representations of designs and work patterns to users.

- Implementation
  In this implementation phase, the analyst and user work intensely during the workshop and design the business and non-technical aspects of the company.
Based on the analysis that has been done, the problem that occurs is how the use of information technology can support Non-formal and Informal education to the maximum, where students easily obtain learning resources without being limited by distance, space and time, and providers of teaching materials can easily provide material learning and information about Non-formal and Informal education so that students will not miss new information and learning materials.

2.1. Use case diagram

A Use Case presents an interaction between actors and systems. Use Case Diagrams illustrate the expected functionality of a system. What is emphasized is what the system does and not how.

![Use Case Diagram]

**Figure 1.** Use case the system as a whole.

In the Uses Case diagram illustrates the interaction between the use of the existing system of modules that exist in the system as a whole, where the functions of each system are described how can be accessed by users and which are not accessible by users.

Based on Figure 1 the Use Case Diagram consists of:

- A system that includes E-learning activities.
- There are 2 actors in the system, namely admin, tutor.
- There are 8 Use Cases that can be carried out by these actors, namely the main page, login, admin main page, e-learning main page, material, quiz / assignment, consultation, and log out.
- There are 3 include, namely input material, input member list, write information / news.

2.2. Activity diagram

Activity Diagrams illustrate the various activity paths in the system that are being designed, how each flow starts, decisions that might occur, how they end. Activity Diagrams can also describe parallel processes that may occur in several executions.
Figure 2. Activity diagram of an ongoing teaching activity.

Based on Figure 2 Activity Diagram of teaching and learning activities that are currently running there can be:

- 1 initial node, object that starts.
- 15 action states of the system include, enter the main page, login, enter the main admin page and e-learning main page for students or tutors to give material, receive material, download material, consult, answer accept consultation, give an exam, take an exam, and logout.
- 1 final state object that is terminated.

2.3. Sequence diagram

From the information above, it can be illustrated by Sequence Diagrams. This diagram can illustrate the movement of an object and message that occurs in the learning system that runs at this time.

Figure 3. Sequence diagram of ongoing teaching and learning activities.

Based on Figure 3 Sequence Diagram of teaching and learning activities that are currently running are obtained.
• 2 actors who are doing activities, namely Admin, Tutor.
• 12 message specifications of communication between objects that contain information about activities that occur. Activities that are usually carried out by actors.
• 6 Life Line identifies the presence of objects at the last / last time.

In designing a good information system, it is necessary to design a database. From the design, 11 tables were formed to support the design of the running system.

3. Results

The appearance of the design of E-learning learning applications in Informal and Non-formal education in PP-PAUDNI Regional I Bandung is designed so that the learning process carried out becomes more effective and efficient in terms of distance, time, and convenience. This system has an interface section for admins who are in charge of processing student / tutor, teacher, exam data.

The interface in the E-learning learning application program in Informal and Non-formal education in PP-PAUDNI Regional I Bandung which is designed according to the needs of the admin, teacher and student / tutor.

![Figure 4. Initial display.](image)

The login page is the initial stage in the standard application interface. The login page is also a validation stage for users who are going to sign in. The Admin dashboard page is the initial display of the online exam system. Which contains a welcome display and a menu that can be accessed by the admin.

![Figure 5. Display system runs.](image)

Student data page is a page for admins who can see students' personal data and have the right to add, edit and delete student data. On the student data page there are 4 buttons namely add, edit, delete, courses, as shown. The exam result data page is a page for admins who can see the test result data of each student who has taken the exam for each subject taken by the student by selecting one of the courses. Where there is a button that is the view results button, to see more complete exam results one
must click the view results button and the exam results will automatically come out for each subject and students who have taken it and the largest and smallest order of the exam.

4. Conclusion
From the results of the design of e-learning learning applications in web-based informal and non-formal education the system that has been built can provide information about distance learning in informal and non-formal education. The system that has been built can facilitate the user in communicating with the teacher when there is information needed / needed from the teacher. The system built does not provide time and place restrictions making it easier for students / users to learn. The application of learning methods in e-learning is in accordance with the needs of students because e-learning learning methods can be easily understood.

References
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