

Designing E-Learning Application

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Abstract. The purpose of this research is to design a system that can support effective and efficient online learning system in time and cost. The method used in this research is a descriptive method by making a system about facts which refer to the research object, collecting primary data through interviews and observations about the learning system, and collecting secondary data through a research related to learning systems. The result of this research is the creation of e-learning application that can facilitate all education level especially from elementary to high school level in the understanding of verbal learning materials that can be accessed anytime via internet, as well as the creation of non-monotonous e-learning applications to one party only, but both teacher and student can interact with each other. In addition, users (student) can evaluate themselves on the subject they understand by writing or orally through the video.

1. Introduction

E-learning is a new phenomenon in modern educational systems with a major strategy for improving the teaching/learning process [1-2]. While Magdalene et al e-learning is a learning that can be accessed only by using mobile devices and internet connections [3], as well as Cheng et al explains that e-learning is the application of information and communication technology (ICT) that can facilitate the educational process to be accessible whenever and wherever with no physical interaction [4].

Those are supported by Lau et al's research which explains that e-learning technology is a virtual class on the Web, where the communication between teacher with students, students, given material subject and student assessment are conducted online, thereby giving students greater control over the learning schedule, the speed of understanding the lesson, and matching the desired learning style so that learning can increase its effectiveness [5].

Research conducted by Tibaná et al found that scientific production in e-learning averaged an increase of 16% each year, with the number of students coming from different regions of the world, so e-learning is considered a very profitable prospect [6], and regarding teacher's responses to the use of e-learning in the learning process received a good response because the learning system with e-learning is easy to use [7].

The Critical Success Factors (CSFs) from the success of e-learning model based on research conducted by Eom et al saw from the success of e-learning model is the quality of course design quality, instructor, motivation, student-student dialog, student-instructor dialog, and self-regulated learning) and perceived learning outcomes. [8]. As well as before applying e-learning at a university, research conducted by Edumadze et al explains that it must first analyze readiness among stakeholders-lecturers, administrators and students in order to derive maximum benefit. [9]. Related research one systems - learning conducted by Özpolat and Akar explains that the characteristics of the e-learning system



expected from its users are the e-learning system can to provide the learner the most appropriate information based on his requirements and preferences [10].

From the previous researcher related to e-learning, it has not been explained about what factors should be considered when designing e-learning application system. Using descriptive research method and primary and secondary data collection, the result of this research is to know the factors that must be considered when designing e-learning application so that teachers and students can interact and students can evaluate the subject matter they have received.

2. Method

The method used in this research is a descriptive method by making a systematic description about facts referring to the object of research and collecting data conducted primarily through field research with interviews to respondents i.e. students and teachers, and collecting secondary data through journals, learning materials, and curriculum data.

3. Results and Discussion

3.1. Analysis of data and information needs

The data required to create e-learning applications are data learning materials, learning about the matter of data, value data, and the data about the discussion. While the information needs to be generated is information about learning materials, about learning problems session, and information about the exercise.

3.2. Actor Analysis

There are 2 actors required in this e-learning system, an admin who log in to the system then manage the user data, manage material, questions, and discussion, and General users or users accessing the learning materials, exercises, discussion of problems and download learning materials in e-learning applications.

3.3. Use Case of User Diagram

Use Case diagram illustrates the activities performed by the user of the system to produce the information about the access rights of each user (See Figure 1).

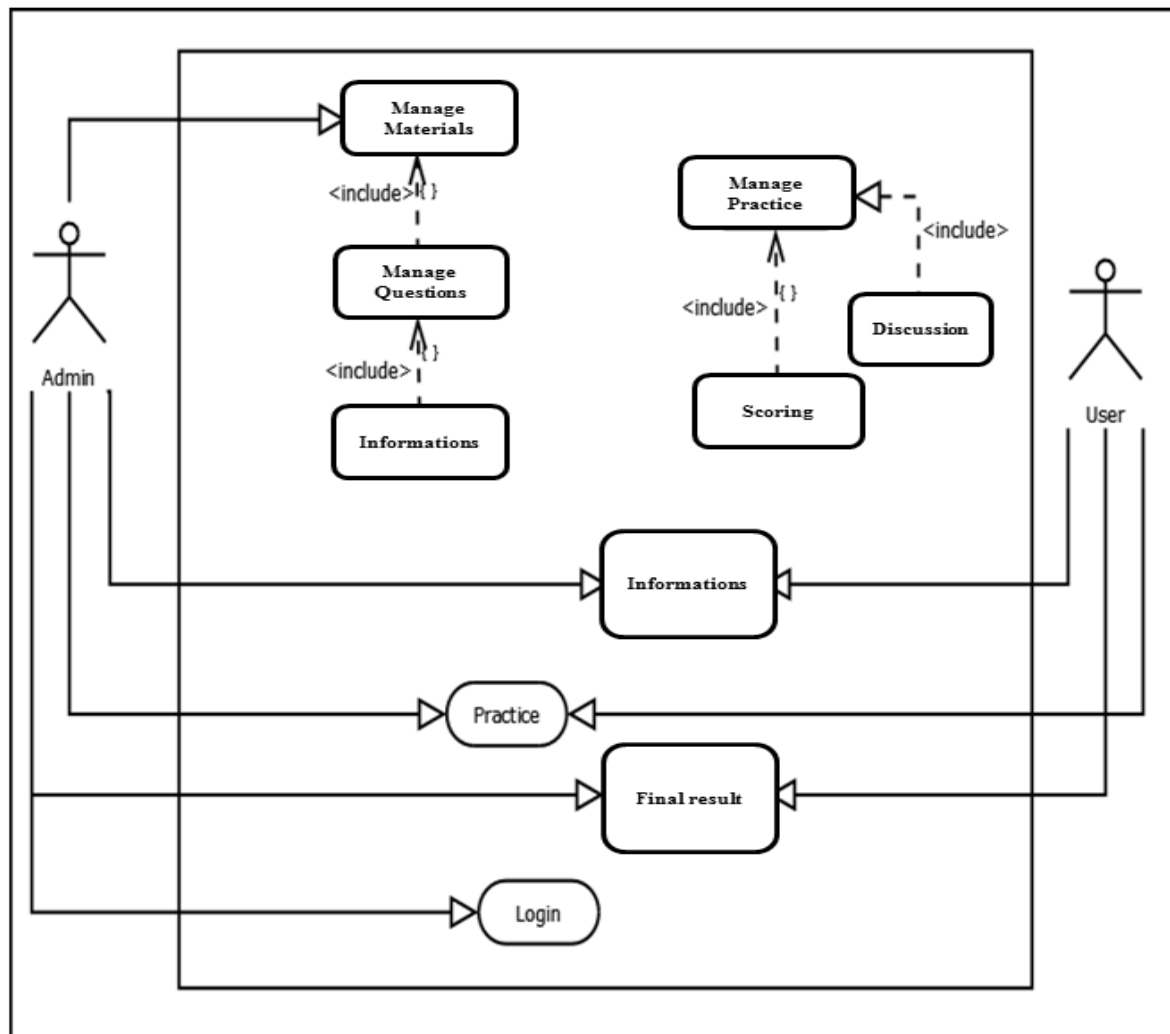


Figure 1. Use case of user diagram

After designing the user use case diagram, the next step is to design the class diagram. The results for the class diagram are as follows:

- User Class is a class created based on the use case of user management. This class has several attributes including UserID and Password.
- Login Class is a class created based on login class. This class has several attributes including Username and Password.
- Practice Class is a class created based on the usage of material management. This class has several attributes such as id_practice, question, answer A, answer B, answer C and answer D.
- Material Class is a class created based on the usage of material management. This class has several attributes such as id_materi, material
- Score Class is classes created based on the use case of practices governance. This class has several attributes including id_nilai, name, class, and correct or wrong of the answer.

From the class generated by the use case diagram, the next step of each class will be relayed into the class diagram, this is to determine the relationship or relevance of each component in e-learning (See Figure 2).

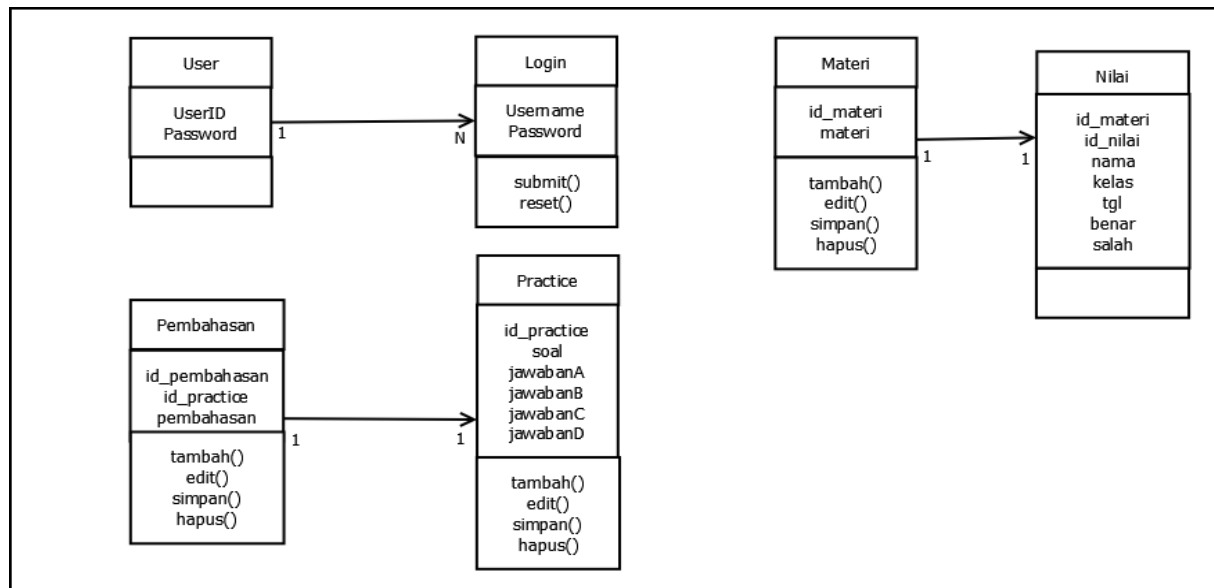


Figure 2. Class Diagram of e-learning component.

Once the classes are formed, the next step is to design the database design, with the following structure:

1. Admin Table

Table 1. Admin Table

Field	Type	Length	Explanation
UserId	Varchar	25	Username
Password	Varchar	20	User Password

2. Material Table

Table 2. Material Table

Field	Type	Length	Explanation
Id_materi	Integer	10	Material Code
Materi	Varchar	10	Learning Material

3. Explanation Table

Table 3. Explanation Table

Field	Type	Length	Explanation
Id_pembahasan	Integer	10	Explanation Code
Id_practice	Integer	10	Question Code
Pembahasan	Text		Problem Discussion

4. Practice Table

Table 4. Practice Table

Field	Type	Length	Explanation
Id_practice	Integer	5	Practice Code
Soal	Varchar	100	Questions
Jawaban A	Varchar	70	Answer
Jawaban B	Varchar	70	Answer
Jawaban C	Varchar	70	Answer
Jawaban D	Varchar	70	Answer

5. Score Table

Table 5. Score Table

Field	Type	Length	Explanation
Id_materi	Integer	10	Learning Material
Id_nilai	Integer	10	Code Value
Nama	Varchar	15	Student Name
Kelas	Varchar	15	Grade
Tgl	Date/time		Date
Benar	Varchar	10	Total of the correct answer
Salah	Varchar	10	Total of the incorrect answer

The next step in designing the database system is to design to facilitate the creation of an e-learning application (see Figure 3).

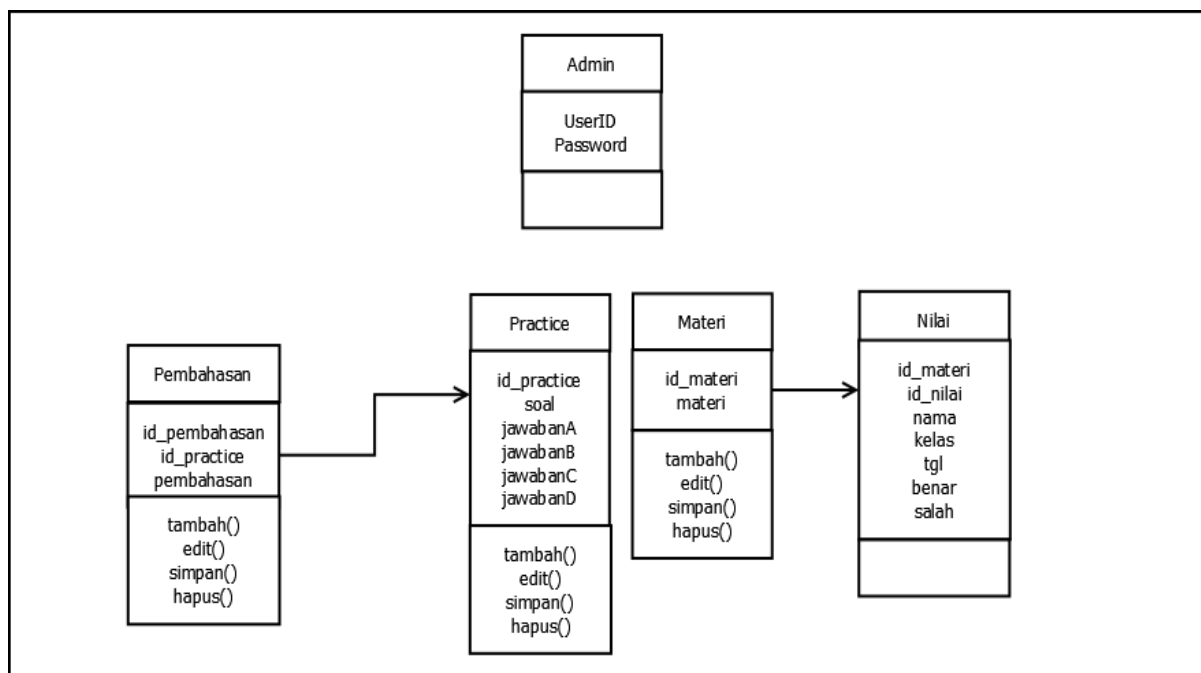


Figure 3. Table Connection

3.4. Forum Interface

The main form or the front page of the e-learning application is the main page for the admin in granting access rights to the teacher as well as to the students. For teacher access rights, teachers can make the process of uploading material, uploading questions and tasks in accordance with the learning curriculum. While the access rights for the students can only download the material and fill out the subject matter for each subject given by the teacher. (See Figure 4).

The Main Form of the E-Learning system features a header with a search bar and buttons for 'Beranda', 'MyProject', and 'Artikel'. Below the header is a large banner that reads 'WELCOME TO E-LEARNING'. The main content area is divided into three sections: a login section on the left with fields for 'User ID' and 'Password', a central section for 'LOGO SEKOLAH' and a list of projects (*Project 1 through *Project 6), and a right section with a calendar for January 2018. The calendar shows the 19th as the current date.

Figure 4. Main Form

After entering the main form, teachers and students interaction in e-learning system can only access in accordance with the material uploaded by the teacher. The material outside the teacher uploaded cannot be downloaded by the students. The subject material to be uploaded should be made as attractive as possible so that the students can understand the downloaded material.

Next is the form of learning materials, in this form the students can read about the learning materials that have been uploaded by the teacher related to learning materials (See Figure 5).

The Materi E-LEARNING form displays a list of meeting materials on the left, including 'Pertemuan 1' through 'Pertemuan 5'. The central section shows the details for 'MATERI PERTEMUAN KE 1', including the school logo, the name of the school 'SMK Medikacom Bandung', the department 'Jurusan Rekayasa Perangkat Lunak', and the teacher 'Ibu Eli Amelia S.Pd'. The right section features a calendar for January 2018, with the 19th highlighted as the current date.

Figure 5. E-learning

Then the teacher can upload a video containing a video of learning materials so the students can understand the material delivered directly by the teacher by viewing the video uploaded by the teacher through the video form (See Figure 6).

**Upload Mata
PELAJARAN**

Pengajar / Guru

Nama Guru / Pengajar

Form Untuk Upload daftar mata pelajaran

Pilih file yang akan di upload

Browse

Upload

January 2018

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
01		1	2	3	4	5	6
02	7	8	9	10	11	12	13
03	14	15	16	17	18	19	20
04	21	22	23	24	25	26	27
05	28	29	30	31			

Figure 6. Upload Form

For teachers who will upload the subjects and for their students to be downloaded on the upload form (See figure 7).

**Materi E-Learning
Di Lengkapi Suara**

Materi Berbentuk Video

Duration

Join Test Exit

Data Manajement : Collecting, Presenting
And Analyzing Research Data

By : Mardi Turnip S.Kom

Figure 7. Video Form

Form Quiz is used for students to answer quiz questions given by teachers or speakers so that students can know how much their understanding of the material presented in the e-learning application. (See figure 8)

Figure 8. Quiz Form

4. Conclusion

When designing an e-learning system many factors must be considered. However, the main factor in the design of e-learning system is the characteristics of users and admin or the material providers, so e-learning system is not monotonous to either party, but both teachers and students can interact with each other via internet access, and how e-learning system can make users understand the material submitted, therefore it needs a form quiz or a simple exam as an evaluation for users of the understanding of the material presented by e-learning applications.

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