

# Development of Actuarial E-Learning Based on Android Applications

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## ABSTRACT

Nowadays, the rapid development of technology into mobile phones has changed the lifestyle for humans. In addition, being a country that became a mobile phone users, Indonesia is also noted as a country with high internet usage. But this is not in line with the utilization of the use of mobile phones, especially in the field of education. As a descriptive development research, in this research will be built an android application that can be used in e-learning process. Then, this applications will be piloted/ experimented on Actuarial course to observe its practicability and effectiveness.

**Keywords:** *Android Application, Actuarial Course.*

## 1. INTRODUCTION

The technology that is currently developing, has a lot to influence the human lifestyle. One example is the development of technology on mobile phones that has changed the mobile phone. This development can be seen from the number of cellphone users in various interests, such as in business/ work, on vacation, capturing various moments and so on. This does not only happen to adults, but also to children. Nowadays, children are using cell phones before they can even talk.

The survey results of the Association of Indonesian Internet Network Providers (APJII) revealed that more than 50% of Indonesia's population (132.7 million people out of 256.2 million people) has been connected to the internet and about 98% of it numbers show that they access the internet through their smartphones refers to *kompas.com*). Based on the data, most of the users are using smartphones to visit online stores and social media. Nevertheless, Indonesia is one of the countries with low internet penetration which is the second lowest number after India (Ministry of Communication And Information). Mostly, they use the internet for games, social media and online stores.

Based on the developments, we would like to develop the principle of learning anywhere and anytime (mobile learning) via mobile phones. According to [1], mobile learning is the delivery of electronic learning materials on mobile computing tools to be accessible from anywhere and anytime. Along with the opinion of [1] by [2] Mobile learning is one of alternative that

learning services must be implemented anywhere and anytime. Thus, through mobile learning can be realized learning media and teaching materials that can help students in achieving learning objectives. It is supported by the opinion of [3] that learning media can be used to deliver the message from the sender to the recipient so as to stimulate the ideas, feelings, interests and willingness of learners in such a way that the learning process occurs in order to achieve the learning objectives effectively.

Various studies have been conducted in order to develop a learning that can be implemented anywhere through the android device. [4]; [5] have expanded android apps in order to learn English. According to [4], the effectiveness and results will be achieved by someone who learns independently through their application is as good as someone who study in class. [5] revealed that the interested in learning English through android is high. While [6] build eLearning through android applications in language learning program. Based on Asienaro et al, the use of android applications for eLearning more friendly, reliable, accurate, and faster than the use of eLearning via webpage. Based on the studies that have been done, the author will conduct a research on other parts.

E-learning is a system or educational concept that manages the use of information technology in teaching and learning process. This understanding is in line with the opinion of [7] i.e. learning is prepared with the aim of using electronic or computer systems so as to support the learning process. [8] states E-learning is a process of

distance learning by combining principles in the learning process with technology.

Based on the implementation of mobile learning in the above research, the author wants to develop an android application to build an eLearning on android device through research that will be done. Building the eLearning application will be used Android Studio app and Android SDK, where Android Studio is used to build its application and Android SDK to activate some necessary plug-in. In addition, in this study will also be designed a lesson by utilizing the android application.

The Utilization of this application in learning will be done in Actuarial course. Selection of this course is done with some considerations. Considering the success of previous research on English grammar and programming languages along with actuarial courses containing various formulas that need repetition to understand it. In addition, actuarial course is also a regular subject that be taught by the author. Thus, this article entitled "*Development of Actuarial E-Learning Based on Android Applications*" with the aim is to develop e-learning actuary based on android applications.

## 2. METHOD

Research method in this research is research design. The reasons for choosing a research design are in line with [9]: (1) The research design provides a productive perspective on the development of a theory. (2) The research design has a special characteristics of results that can be utilized and (3) Direct research design involves researchers in improving mathematics education.

In this study, the product developed is android application that can be utilized to build e-learning. Furthermore, the product is applied/ piloted in Actuarial class.

Cobb, Confrey, et al 2003 in [10] identified five characteristics that were applied in different types of research designs. The first is the goal to develop theories and strategies designed to support learning. The researcher designs an instructional theory for students in integral learning and its application. The second feature is the intervention provided is natural. The methodology makes the researcher is not constrained to improve the design after the experiment is carried out. Third is the feature among which the research design has prospective and reflection on its components that cannot be separated from the experiment. The researcher is confronted with conjectures as a prospective with the actual learning process he or she observes in the reflection section. The fourth feature is the cyclical process of the research design itself. In the characteristics of this cycle the findings and revisions appear as an iterative process. Allegations of learning

sometimes do not occur so that alternative allegations can be raised and reexamined. The fifth feature of the research design is that the theory is relatively simple in that it is developed for a specific domain in which the researcher wishes to develop in the Actuarial domain.

## 3. RESULTS AND DISCUSSION

In accordance with the purpose of this research, which is developing an actuarial e-learning based on android applications. For that, the following presented the results of research that has been done as below.

### 3.1. Designing Android Applications of Actuarial Learning

The form of activities undertaken is to design an application program which will be used in android applications for e-learning. Next make the android application program for e-learning.

The application program that has been generated can be seen in the following.

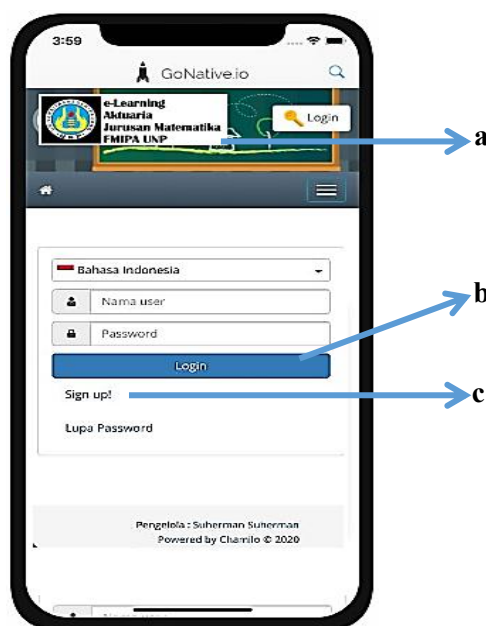


Figure 1 The preview display of Android application for E-learning

In figure 1 above there are three buttons which can be used by the user, either by lecturers and students who follow it. The explanation are as follows:

- 1) Number one (a) shows the file name of the android app for e-learning i.e. "E-learning of Actuary".
- 2) On the button one (b) lecturer course and students can go directly to the next section by writing the account name and password and press login as an account already registered.
- 3) On the button two (c) the lecturer who and students will be able to register the course can register first.



**Figure 2** Menu for the Actuarial Subject at Android application

Figure 2 shows a variety of menus that students and lecturers can use in the lecture process. The menus are course descriptions, documents, exams, exercise and assignments and others. In this study, only four menus are used, namely:

- Course description: contains information about the synopsis, descriptions of actuarial courses, learning outcomes, semester learning plans, lecturers, heads of study programs, references, and evaluations, as shown in the figure 3.
- Documents: contains teaching materials used in actuarial courses, SAP, mortality tables, assignment designs, motivational videos, and learning videos, as shown in the figure 4.
- Exams, exercises and assignments: contains exercises, assignments and exams given during actuarial lectures, as shown in the figure 5.
- Links, a place to put links for student needs, as shown in the figure 6.

Furthermore, lecturers and students commence:

#### Lecturers

- Uploading all of the materials in Semester Learning Plan (SLP) form for one semester, Learning Evaluation Unit (LEU) for each meeting, Learning materials for one semester, and Task Design for each meeting on android application.
- To bind the students to discipline in the use of time, lecturers can set the time required by students to access the materials.
- Especially for the design tasks, lecturers set the deadline of the emergence of questions and upload the answers for students.

#### Students

- Downloading all of the materials in Semester Learning Plan (RPS) form for one semester, Learning Evaluation Unit (SAP) of each meeting, Learning Materials for one semester, and Task Design for each meeting in the android application.
- Due to the limit of downloading time, the students can save the materials and learn it again on other occasion.
- Especially for the design task, the students do the given problem and then re-upload the tasks that have been made in accordance with the time specified.



**Figure 3** Course description of Actuary

Figure 3 above is a display of the Actuarial Course Description seen by the lecturer, the top of which shows menus where a lecturer can create or change the contents of these menus.



**Figure 4** Documents of Actuary Course

Figure 4 shows documents uploaded by lecturers and used in actuarial lectures such as teaching materials, instructional videos, motivational videos, mortality tables, and SAP from actuarial courses. At the top of the display, there is a menu that can be used by the lecturer to add the required document uploads.



**Figure 5** Exams, exercises and assignments

Based on Figure 5, we can see a set of exercises, assignments and exams and questionnaire sheets that can be used in actuarial lectures. From the lecturer side, they can do additional exercises, assignments, or every opportunity for lectures.



**Figure 6** Link of Actuary Course

Figure 6 shows Links, a place to put links for student needs, which contains videos about the actuary profession and videos about the smart 5 Minute Actuary Profession.

### 3.2. Data Analysis

Based on the data that has been obtained from this study, an analysis of the data was carried out. The following is an analysis of data from data that has been obtained from media experts and material experts.

#### 3.2.1. Validation of Media Experts

Media experts have provided e-learning assessments from the aspects of software engineering and visual communication. The learning media testing instrument was carried out by two media experts based on the calculation of scores using a Likert scale with a score range of 1 to 5. The results of the media expert validation are shown in Table 1 and Table 2 as follows.

**Table 1.** Analysis of Media Expert Test Results

No	Assessment Aspects	Number of items	Expert Score	Expected score	Percentage of Eligibility
1	Usability	8	65	80	81,25%
2	Functionality	13	123	130	94,61%
3	Visual Communication	12	95	120	79,17%
Sum		33	283	330	
Average score					85,75%

**Table 2.** Analysis of Material Expert Test Results

No	Assessment Aspects	Number of items	Expert Score	Expected score	Percentage of Eligibility
1	Learning Design	6	48	60	80%
2	Material Content	8	65	80	81,25%
3	Language and Communication	6	51	60	85%
Sum			20	164	
Average score					82,08%

Based on table 1, the results of the e-learning assessment by media experts obtained a feasibility percentage score from the usability aspect of 81.25%, the functionality aspect of 94.61%, while from the visual communication aspect it was 79.17%, so that the average percentage of eligibility was 85.75%. Eligibility categories in Table 2, then android-based e-learning is in the eligibility criteria "Very Valid".

### 3.2.2. Validation of Media Experts

Material experts provide e-learning assessments from the aspect of learning design. The e-learning test instrument was carried out by 2 material experts based on the calculation of scores using a Likert scale with a score range of 1 to 5. The results of the material expert validation were as follows.

Based on the feasibility category Table 1, the results of the material expert's assessment show that the learning design aspect gets a feasibility percentage of 80%, the material content aspect gets 81.25%, while the language and communication aspects get 85%. The average yield of these three aspects was 82.08%. Based on the eligibility category in Table 2, e-learning is in the "Very Valid" eligibility criteria.

## 4. CONCLUSION

Based on the explanation above, can conclude as follows:

- An android application program for e-learning for lectures Actuarial course in Mathematics Education Program, Mathematics Department, Faculty of

Mathematics and Sciences, Universitas Negeri Padang can be generated.

- It application can be used by the Lecturer as a course Actuarial learner. And also be used by students who join Actuarial course.

## AUTHORS' CONTRIBUTIONS

The first author contributed to this study as data collectors and the second and third authors contributed as guides in the research process.

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