Design and Build an Android-Based Digital Academic Guidebook Application at Universitas Teknologi Sumbawa

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Abstract. In order to increase the effectiveness of the existence of an academic guidebook at the Universitas Teknologi Sumbawa (UTS), the authors conducted a study that aims to design and build the Digital Academic Guideline Application University of Sumbawa Technology (UTS). The data collection methods used in this research are interviews and literature study as well as the prototype method as a software development method. Applications generated from this study are hybrid and android-based with version 4.4 (Kitkat). The process of making this application uses HTML5, CSS3, PHP5.6, and MYSQL as a database, and beta test as a testing method. In this academic guide application, it contains information on UTS academic guides which includes data on universities, faculties, study programs, lecturers, and courses as well as other information.

Keywords: Guidebook, academic, digital, android-based.

1. Introduction
The development of information technology that occurs very rapidly provides many choices as well as challenges for users to how to manage information easily and quickly. In the field of education, especially at the tertiary level, the application of information technology is able to simplify and accelerate all academic data processing processes such as filling in study plan cards, processing data of study card results, and many others.

Universitas Teknologi Sumbawa (UTS) is a technology-based university located in the Sumbawa district, which currently has a website-based academic information system to simplify and speed up the process of academic data processing. UTS has an academic manual which is a source for students to access faculty data, study program data, lecturer data and course data. In addition, the academic guide book is also a guide for students to complete the study plan card filling process. However, UTS has not yet developed the academic guide book in digital form, even though books in digital form will be easier to store and carry anywhere, because it can be accessed via a smartphone. Based on the results of interviews conducted by the author with the Vice Chancellor of UTS Academic Affairs, UTS hopes that
the academic manual can be developed in digital form. Therefore the author will build an android-based digital academic guidebook application in which there will be a menu to access academic data such as Course data, lecturer data and others.

With the android-based digital academic guidebook UTS students can access faculty data, study programs, lecturers, and courses along with other data contained in the academic manual through their smartphone or gadget. Besides this android-based digital academic books will be more easily stored and accessed.

2. Methods

2.1. Research Methodology

The flowchart of research carried out by researchers as follows:

![Research Flowchart](image)

**Figure 1. Research Flowchart**

Research Design and Development of Digital Based Academic Guidebooks of the University Technology Sumbawa (UTS) is classified into qualitative research that is experimental. The problem solving process in this research was carried out by transforming UTS academic manuals that were still paper-based into an Android-based application. Android is a Linux-based operating system for mobile devices [1]. The next stage is to compare the advantages and disadvantages between manuals and digital manuals in terms of effectiveness and efficiency. Then in the design phase the authors use the software development method which is prototype.

The method used in the process of data collection and software development in this research are:

2.1.1. Method of Collecting Data. In carrying out a study, data is needed to determine the input and also the output of the research. Below is the data collection method used by the writer, which is a qualitative research method. Qualitative research is a type of research that is not obtained through calculation or statistical procedures [2]. Stages carried out through literature study and interviews.

Literature study was conducted to obtain data from a literature needed in this research. The literature in this study is the 2017 UTS academic guidebook [3]. While interviews were conducted to obtain data from a resource person to strengthen the background of this study. In this case the author conducted an interview with the Vice Chancellor I of UTS Academic Section.
2.1.2. **Software Development Method.** In implementing the development process of an application or software, a software development method is needed to define each stage that will be carried out. In this case the author uses the prototype method. Prototype method is a method that allows users to know the outline of the program to be built and do initial testing [4]. The following are the stages of the prototype method.

![Diagram showing steps in prototyping](image)

**Figure 2.** Steps in Prototyping

The steps in prototyping are as follows:

**Collection of needs.**
In the activity of building an android-based digital academic guidebook application, the first step undertaken by the author was to meet with the UTS, in this case the Deputy Chancellor 1 to discuss existing problems related to academic manuals, then define the initial specifications of the application to be built.

**Build prototyping.**
The second stage by the author is to build a prototype of an Android-based digital academic guidebook application.

**Evaluating of prototype**
After the prototype is built the writer and Vice Chancellor 1 will evaluate the prototype in order to reach agreement on the final specifications of the application to be built. If the first prototype still needs improvement, a second prototype will be built. This process will occur until the prototype is approved by UTS Vice Chancellor 1. If the prototype has been approved, the workmanship will continue to the next stage.

**Encode the system.**
At this stage the program code began to be built from the Android-based digital academic guidebook application.

**Test the system.**
At this stage, testing will be conducted on an Android-based digital academic guide book application to ensure that every function and menu contained in the application is functioning properly or not.

**Evaluating of the System.**
At this stage the Vice Chancellor 1 will evaluate the android-based digital academic guidebook application that has been completed. If the application still needs improvement, the processing step will return to the coding stage, if the application is approved, it will proceed to the next stage.

**Using the system.**
After the android-based digital academic guidebook application is completed and approved by UTS Deputy Chancellor 1, the application can be used by every UTS student and lecturer.
3. Result and Discussion

3.1. System Design Result

The following are the results of the system design from the Digital Academic Guidebook application at the Universitas Teknologi Sumbawa (UTS) based on Android.

3.1.1. Use Case Application Diagram

Use case describes an interaction between one or more actors with the information system that will be created [5]. The draft use case diagram below for the application of the digital academic guidebook of Universitas Teknologi Sumbawa.

Figure 3. Use Case Application
3.1.2. Activity Application Diagram

The following is a diagram that illustrates the activities that occur in an Android-based digital academic guidebook application.

![Activity Application Diagram](image)

**Figure 4. Activity Application Diagram**

3.1.3. Homepage Sequence Diagram

The following is the sequence diagram of the homepage in the application of the digital academic guidebook of Universitas Teknologi Sumbawa:
3.1.4. Class Diagram

The design of class diagrams aims to describe the interactions of each class shown by a line connecting the classes. Following is the design of class diagrams in the Android Based Digital Academic Guidebook Application.

![Class Diagram](image_url)

**Figure 6. Class Diagram**
3.1.5. User Interface Design
Following is the user interface design of the Android Based Digital Academic Guidebook Application;

Homepage Design

The home page layout design of the Android-Based Digital Academic Guidebook application when the user runs the application.

![Figure 7. Home Page Design Android Based Digital Academic Guidebook](image)

Design of UTS History Information Pages

The design of the history page view UTS from the Android-Based Digital Academic Guidebook application:

![Figure 8. UTS History Information Page Design Android Based Digital Academic Guidebook Application](image)

3.1.6. Implementation of Program
Following is the program implementation of the Android Based Digital Academic Guidebook application:

Home page Display

The home page view of the Android-Based Digital Academic Guidebook Application:
3.1.7. Software Testing (Beta Testing)

Beta testing is a method of testing software that is done directly by the user, where the software can no longer be controlled by the developer [6]. The results of testing the Digital Academic Guidebook Application at the Sumbawa Technology University based on Android using the beta testing method, the testing process is carried out on 10 respondents who are directly related to the
application that has been built. Based on the results of the questionnaire that has been calculated, it can be concluded that the assessment of applications that have been built.

Calculation of questions and answers from the results of the questionnaire that has been done to the examiner using the formula:

\[ Y = \frac{P}{Q} \times 100\% \]

Description:
- \( Y \) = Percentage value
- \( P \) = Many respondents answered each question
- \( Q \) = Number of respondents

The results of testing that the author did with beta testing.

a. Is this Android-Based Digital Academic Guidebook application easy to use?

<table>
<thead>
<tr>
<th>Answer Category</th>
<th>Yes</th>
<th>Enough</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer Frequency</td>
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<td></td>
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<tr>
<td>Percentage value</td>
<td>100%</td>
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b. Does the Android-Based Digital Academic Guidebook Application make it easy for you to find academic guide data?

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<tr>
<td>Percentage value</td>
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c. Is the data presented in this application easy to understand?

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<tr>
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d. Would you prefer to use this application or an academic manual?

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<th>No</th>
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<tr>
<td>Percentage value</td>
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e. Will you continue to use this application?

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<th>No</th>
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f. Is this application feasible to be applied at the Sumbawa University of Technology?

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<tr>
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Based on the answers given by respondents, it can be concluded that the Android-Based Digital Academic Guidebook Application is easy to use, easy to find data, easy to understand, users are interested in using this application and based on the results of testing all respondents that the application is feasible to be applied at the Universitas Teknologi Sumbawa.

4. Conclusion

4.1. Conclusion

Android-based Digital Academic Guidebook application was successfully built using HTML 5, CSS 3 and PHP 5.6, using prototype software development methods and MySQL database with a minimum of Android version 4.4 KitKat and has carried out the testing process using the beta testing method and has successfully provided information in the academic guide book in the form of UTS history information, university vision and mission, organizational structure, faculties, study programs, courses, lecturers, credit systems, administration, final exams, service learning and academic ethics. With this research, it can be included for the Universitas Teknologi Sumbawa on how to make this digital academic guidebook application truly applicable. Thus, this research can provide information contained in academic manuals to UTS students via Android so that it becomes more effective and efficient.

4.2. Suggestion

Based on the description of the results of this study, the application of this digital academic guidebook still cannot be said to be perfect in other words it still needs to be developed so that this application can be truly useful. These developments are:

1. There is a need to search for subjects and lecturers to speed up the process of finding data.
2. For faculty data, study programs and lecturers need to be attached photos such as photos of faculty logos, study program logos and lecturer photos.
3. The author hopes that this application can be uploaded to the Playstore by the Universitas Teknologi Sumbawa (UTS)

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References

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