USER INTERFACE DESIGN FOR AREA BOUNDARY ARCHIVE APPLICATION OF BANDA ACEH MUNICIPALITY DEVELOPMENT PLANNING AGENCY

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Abstract
This study aims to help the Development Planning Agency of Banda Aceh municipality in developing an online system interface for the data catalog of city boundary records. In addition, this research also aims to find out what functional requirements are needed by the user so the interface design will be able to assist people to store and retrieve the desired data. By using the DIA Cycle method, the interface design able to accommodate the user needs in utilizing the Banda Aceh city boundary catalog data archive system.

Keywords: *Area boundary document, Banda Aceh Municipality, DIA Cycle, User Interface, Archive information system*

Abstrak
Penelitian ini berguna untuk membantu Badan Perencanaan Pembangunan Daerah Kota Banda Aceh dalam merancang suatu antarmuka yang digunakan dalam sistem aplikasi katalog data tapal kota Banda Aceh. Selain itu, melalui penelitian ini juga didapatkan kebutuhan pengguna dalam pembuatan antarmuka yang dapat membantu pihak terkait dalam penyimpanan dan pengaksesan data yang diinginkan. Dengan menggunakan DIA Cycle, antarmuka yang didesain mampu mengakomodir kebutuhan pengguna dalam pemanfaatan sistem katalog arsip dokumen tapal batas kota Banda Aceh.

Kata Kunci: *Tapal batas wilayah, Kota Banda Aceh, DIA Cycle, Antarmuka pengguna, Sistem informasi pengarsipan*

1. Introduction

The boundary area documentation is needed by the Regional Development Planning Agency (Bappeda) in Banda Aceh municipality. This is because this type of documents plays significant role in recording the development history of Banda Aceh and also because maintaining these documents is related to the main tasks and functions of the Development Planning Agency Banda Aceh municipality, namely as the maker of the technical policies within the scope of regional development planning, and also act as the supporting role for the administration of the city of Banda Aceh [1].

In relation to the documentation of regional boundaries, the availability of documentation on the boundaries of the Gampong (village) region and also the boundaries of the Subdistrict and other regencies in Banda Aceh also beneficial to avoid

data confusion. Disputes caused by these boundaries are still one of the conflicts that often occur in Indonesia, as happened in the conflicts in the villages of Muhur and Kaliq in Kutai Barat, due to the absence of official and recognized boundary documents [2]. Likewise with the conflicts in Riau [3] and Semarang [4] also caused by similar reasons.

The Banda Aceh City Government through the Banda Aceh Development Planning Agency and related agencies have also collected data from various sources regarding the Banda Aceh boundary documents, including from the Geospatial Information Agency (BIG, 2016), Geospatial Work Unit of BRR Rehabilitation and Reconstruction Agency (2005), results of GTZ survey (2007) and the Banda Aceh city government survey to December 2018. Until December 2018, data collection from the Banda Aceh City Government itself has not yet been completed where the survey has only managed to record the boundary of 41 villages out of 90 villages in Banda Aceh municipality [5].

The differences in area boundaries are due to the differences in the source of origin of the boundary document. By archiving all of the boundary data coupled with the issued organization and date, also with other related information, it is expected that in the future documents validity can be tracked and will become a reference in resolving boundary disputes in the city of Banda Aceh.

Based on that problem, an online system was designed to archive all boundary related data and documents of the Banda Aceh municipality area. Through this online system interface, user can easily search for and access all document related to the Banda Aceh City boundary.

2. Related Works

The use of technology for archiving data on government has long been recognized as having a positive impact. By using search keywords in the form of years of format, management body, and others, government document libraries created online with the search feature will facilitate access to the data [6]. On the other hand, by connecting the data services will facilitate the government in the management of the data and the access between data can be analyzed to produce information that is useful for the government itself [7].

The similar research regarding document archive has been done, including the filing of government-owned social media data in the United Kingdom [8], where it is known that it can influence the country's policy decisions, and also on the research on data archiving success in the implementation of good governance in South Africa [9]. In Indonesia, GPS-based applications in regional boundary data collection have also succeeded in overcoming the conflict in the Ubud area, Bali [10]. From several reviews of the research, online documentation has a significant impact on improving government services. This is certainly in line with the objectives to be achieved by the Development Planning Agency of Banda Aceh municipality.

As a form of the final product, Online web is used as a reference in the development of the boundary document archiving application itself, because it is more efficient and also easy to develop, besides also viewed from the aspect of ease of access and can also be easily integrated further with other e-government services [11].

3. Method

In developing the user interface design for the document boundary archive application system, the Design, Implementation, and Analysis (DIA) cycle model is being used [12] which relies on the user requirements of the document boundary

archiving application. The DIA Cycle will define the form of application in its first interaction through the collection of user requirements, which are then implemented in the form of prototypes for interface display, along with the database system design and then should be tested on users, for the evaluation and development of features in accordance with the feedback from the user test. The entire cycle will be repeated until the optimum end result is obtained, and development can continue according to the needs in the future.
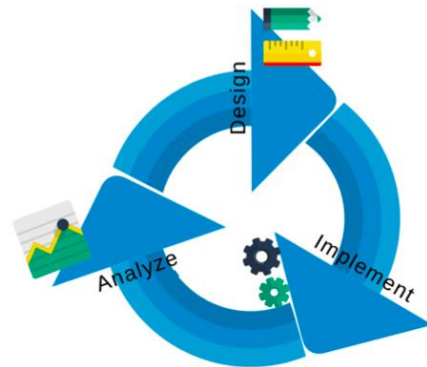

Figure. 1. Design, Implementation and Analysis development model [13].

System Architecture

This archive application system utilizes the REST API to perform CRUD activities and store data into the database. While the boundary document file itself will be stored directly in the server, and accessed through the address stored in the database. Users can access the system through a web-based application interface from the browser they are using as shown in Figure 2.
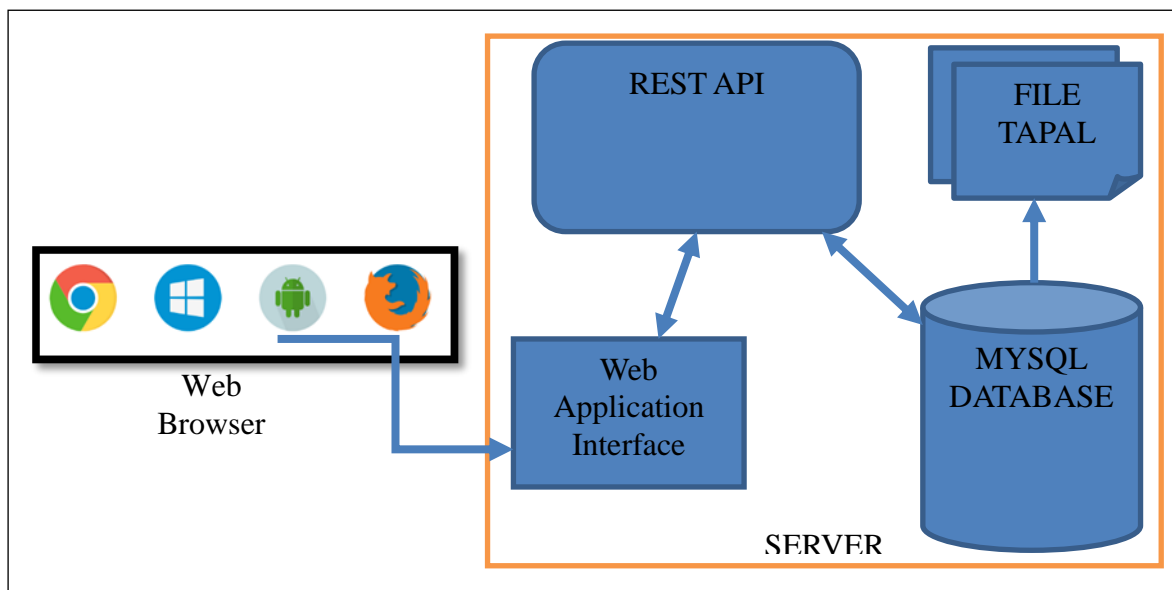

Figure. 2. System Architecture.

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System Design

In the development of the system, the design is initiated based on user needs. From the results of the initial interviews with users, in this case with the employees of the Development Planning Agency of Banda Aceh City, here are the main features that the system must have:

1. Ability to log in
   This feature is needed so the access to the system is also limited according to the role into at least three different users. The highest level is the administrator, then there are office employees who can add and edit documents, and also ordinary users who can access the document, without being allowed to change, reduce or add documents to the system.
2. The ability to upload boundary document
   Existing documents can be in the form of pdf files or images.
3. Ability to search for poultice data
   Documents that have been stored in the system, must be accessible quickly, through the list of data and search feature.

From the results of the development in the first stage of DIA cycle which was then tested to the user, some feedback was generated which later became the basis for continuing the DIA process in the next cycle. Some additional features based on the advice of several users after using the system then created and the measurement is based on the importance and the ease of implementation such as:

1. Register a new user page
2. The uploaded document must also be supplemented with some additional information to facilitate the documentation, such as the date of the published document, the category, and the issuing Institution.
3. There is a search feature based on all fields from the additional information

Some other features submitted by users are not implemented according to the level of urgency, and later can be implemented in the next DIA cycle, such as admin settings, and changes in user profiles.

4. Result

From the design of the system based on the user requirements that have been collected, then one by one the features that have been marked are implemented. The first part is the login page. This is the page where the user can log in according to the credentials that have been registered in the system. After logging in, the user access level will be adjusted to the user's role in the database list.
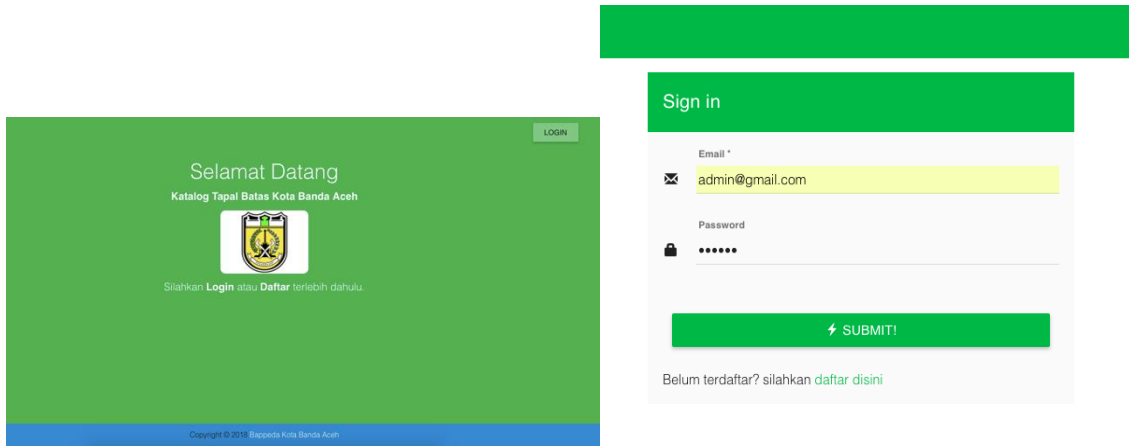
Figure. 3. Initial and sign-in page

For users who have the access rights to add the document, the user has a web page interface section that can be used to upload this document to the server. From the suggestions of users in Analysis step of first DIA cycle, adding some supporting data information to the file is also crucial, thus should be implemented in the second cycle, such as adding categories, sources, and other additional information, which can be used to facilitate the search function and data filtering.
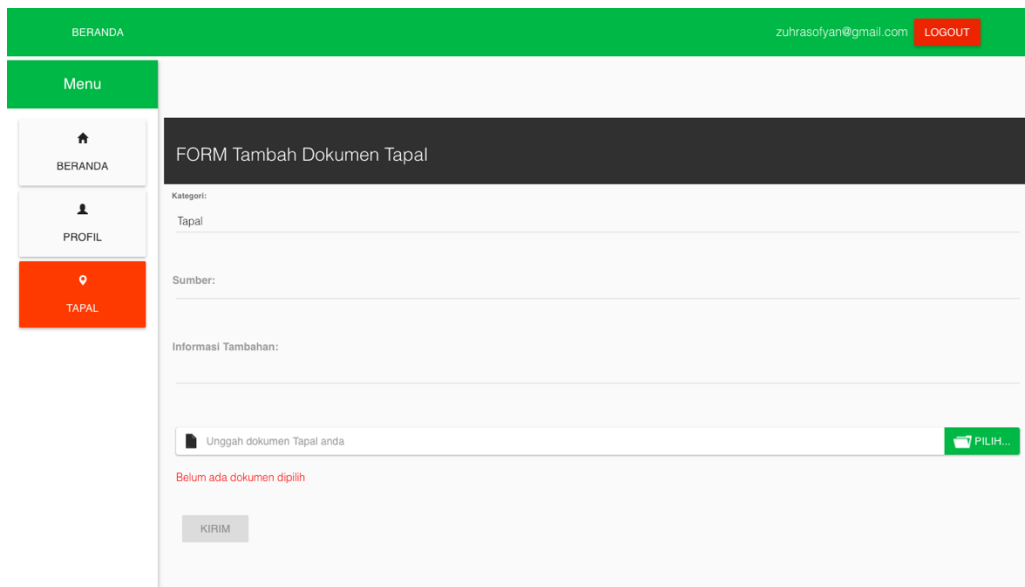

Figure. 4. Document upload page

The second DIA cycle follows the same step of the first iteration, and the development of features derived from the requirements that appear as a result of user feedback in the first iteration is implemented. Among those implemented requirements are the settings page for administrators or users, and a page to view a list of available documents including the filter function based on the supporting data as suggested from the user feedback.
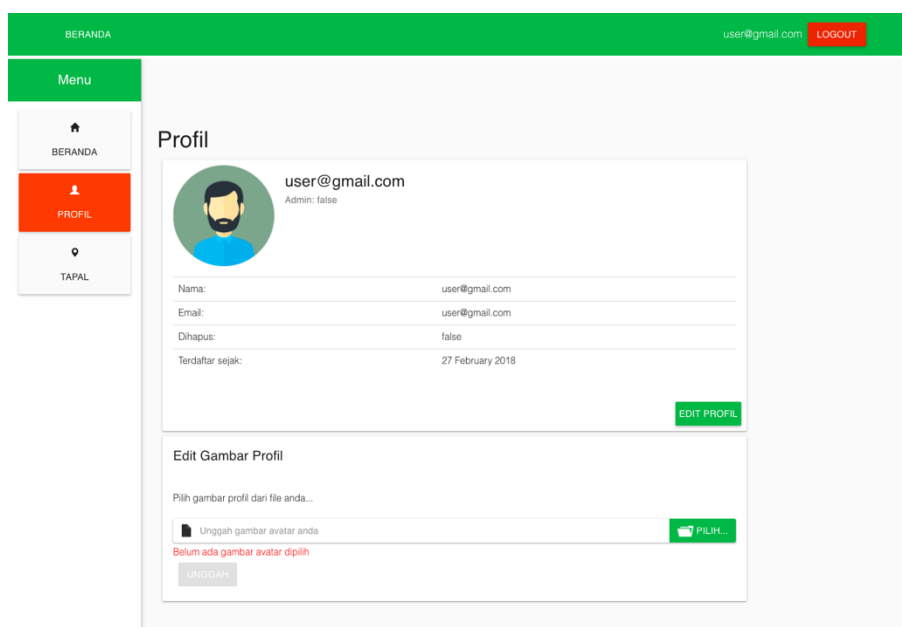
Figure. 5. User dashboard page

5. Result

By using DIA Cycle, the user requirements are obtained and translated in the form of user interface design which are then tested to be evaluated within some cycle iterations, so that the regional boundary document archive application system for Banda Aceh City is mature and able to accommodate user needs. It is hoped that the results of this development will make it easier for users to save and access the documents needed especially for Development Planning Agency as the public service provider in Banda Aceh municipality.

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