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## Implementation of User Centered Design Method in Designing Android-based Journal Reminder Application

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# Implementation of User Centered Design Method in Designing Android-based Journal Reminder Application

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**Abstract.** The main objective of this study was to implement UCD in designing an Android-based journal reminder application to determine the user's needs for functionality and application interface. This study uses Data Collection Method and Application Design using UCD. To find out the result of the implementation UCD, measurements are used at the level of acceptance and support of prospective users by making a data collection instrument in the form of a questionnaire according to the usability testing framework using the Likert scale to calculate the variables. The results of testing of prospective users indicate that 84% of prospective users state that the functionality and interface design of the android-based journal reminder application can be accepted and can be developed in the next stage. This is concluded from the results of functional and interface design evaluations through questionnaires using a Linkert scale which shows that the design built is at a GOOD interval, which means that the functional design and interface of the journal reminder application can be accepted and can proceed to the next stage. However, in order to improve the accuracy of the development of the journal reminder applications, it is necessary to make a propototype based on the results of UCD modeling and design.

## 1. Introduction

Scientific journals are the main source of information that is important for science and technology. The scientific journal consists of a collection of articles published periodically, written by scientists and researchers showing the results of recent research [1]. With the increasing number and variety of journals and types, information technology and communication have helped a lot in managing journals, namely websites and online journal aggregator systems [2].

The philosophy of UCD is a way of achieving more effective systems. UCD challenges designers to mold the interface around the capabilities and needs of the operators. Rather than displaying information that is centered around the sensors and technologies that produce it, a user-centered design integrates this information in ways that the goals, tasks, and needs of the users [3]. The UCD method is currently being developed by various systems. This is because the emphasis made on UCD is on user profiles of prospective users [4]. Other research shows that the success of a UCD interface design comes from three things: user, utility, and usability [5]. UCD-related research in mobile applications has also been carried out like a mobile-based health application [6], where the approach used uses the ISR Framework. Other research uses the UCD approach to develop health emergency call applications for deaf people [7]. UCD is also used in research related to the use of mobile technology in the process of language learning [8]. Utilization of UCD is also used in designing applications for search of tourist attractions [9] and designing an android-based academic information system in one of the universities in Indonesia [10].

This study aims to produce a functional design and interface for journal reminder applications that are appropriate to user needs using the UCD method.



## 2. Methodology

This study uses 2 methods, namely :

### 2.1. Data Collection Method

The methods used in data collection include interviews with prospective application users, observations of similar systems, and review literature to explore theories and previous research..

### 2.2. Application Design using UCD

The methods used to design applications are 5 stages of UCD which include: plan the human centered process, specify the context of use, specify user and organizational requirements, product design solutions, and evaluate design against user requirement [11] .

## 3. Result and Discussion

The steps to design an android-based journal reminder application using the UCD method are as follows:

### 3.1. Plan the Human Centered Process

At this stage interviews are conducted with prospective users, to find out what the users want, namely researchers, so that they can instill a commitment that designing a journal reminder application using UCD can fulfill the wishes of users.

### 3.2. Specify the Context of Use

Applications that are designed will be used by researchers to find, store and get information about a journal they need, and can find out information that occurs when the journal provides the latest information. This is traced to the old business processes used by researchers in searching for journals. Figure 1 describes the researcher's business process in searching for journals (see Figure 1).



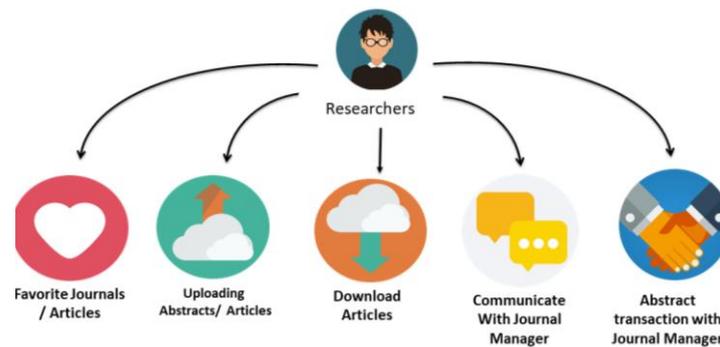
**Figure 1.** Business process journal search by researchers.

### *User Specification and Persona*

Based on its function, users of this journal reminder application are researchers who have the need to find and find a journal that suits their needs. From the results of interviews conducted, some information was obtained. The next stage is to make a persona design which serves to describe / describe about someone related to what needs are needed in work [12]. A researcher needs a journal as a media to publish the results of his research. To get a journal that is in accordance with their knowledge, researchers will look for journals that if they can accommodate the results of their research by selecting one by one, read the journal summary and decide whether to save and select the journal for publication of the results of their research. It's just that with the number of journals that must be selected and stored, researchers will be bothered with the latest information from each of these journals, so sometimes they don't know the latest information from these journals. The researcher wants an application that can help remind them and provide the latest information about the journals that they follow, and carry out activities that are commonly carried out in the management of journal publications.

### *Task Analysis and Task Scenario*

The next step is to make a task analysis model that explains the task analysis of users [13], namely researchers when publishing the results of their research. The user analysis task model can be seen in Figure 2.



**Figure 2.** Researcher's task analysis model.

*3.3. Specify User and Organizational Requirements*

The necessary requirements for development journal reminder application include:

*3.3.1 Information Requirements*

The steps taken are managing data, namely the data related to Journal profile data, Journal data manager, Data profile Researcher, Journal transaction data, Abstract and article data, Journal category data, and News data, which are manifested in related tables in one database.

*3.3.2 Functional and Non Functional Requirements*

This requirement is used to describe the application needs to be developed. Table 1 shows the functional and non-functional requirements of the application.

**Table 1.** Functional and non-functional requirements of the application.

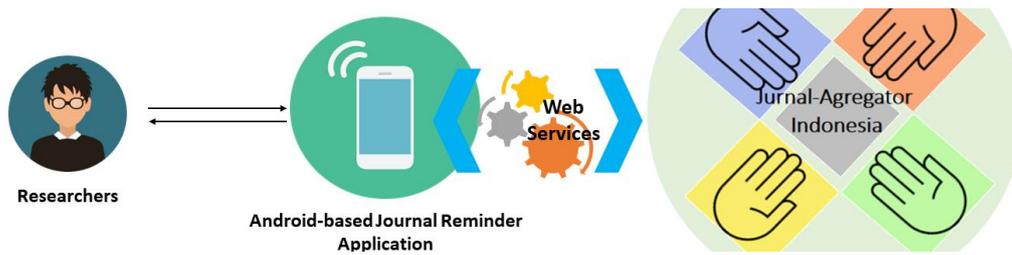
Non-functional requirements	Functional requirements
Applications that are built using Java, HTML 5 and frameworrk for mobile applications with the Android operating system	Applications can process profile data of researchers / writers
The application works well while connected to the internet with standard bandwidth	Applications can process journal data
There are no special users to use this system.	Applications can process journal category data . The application can do a journal search
Having a user friendly interface that is easy for users to understand, Applications must be able to protect data from unauthorized access	Applications can upload abstract / article papers, Applications can conduct journal discussions, Applications can favor journals

*3.4. Product Design Solutions*

At this stage, the application architecture is described, functional analysis of applications, database modeling and interface design.

*3.4.1 Journal Reminder Application Architecture*

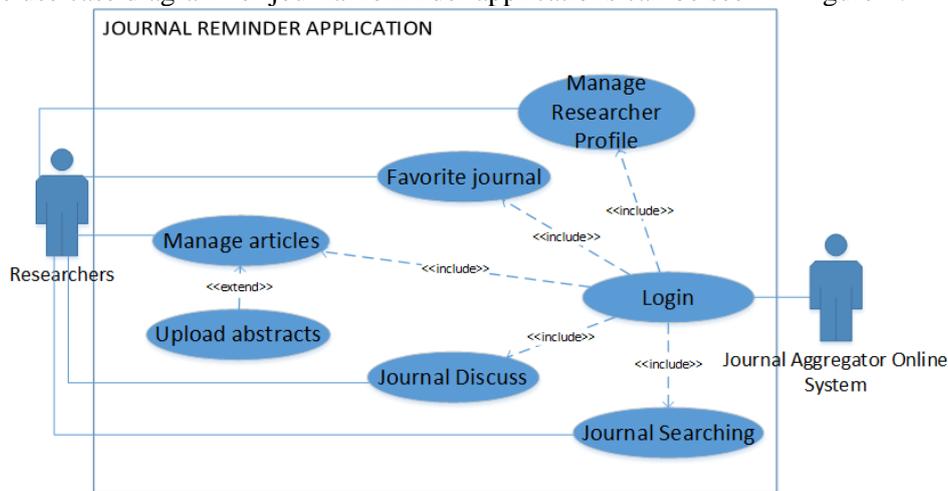
The architecture of application model involving interrelated entities to produce good system performance [14] . The journal reminder application architecture model is a description of the technology used in the application so that the application can be used optimally and can be seen in Figure 3.



**Figure 3.** Journal reminder application architecture.

*3.4.2 Functional analysis of the application*

One tool that can be used to modelling the functional requirements of software is UML (Unified Modeling Language). The modeling is done using use case diagram. Use case diagram is a construction used to describe relationships - relationships that occur between actors with activities contained in the system. The use case diagram for journal reminder applications can be seen in Figure 4.



**Figure 4.** Use case diagram journal reminder application.

*3.5 Journal Reminder Application Model Database*

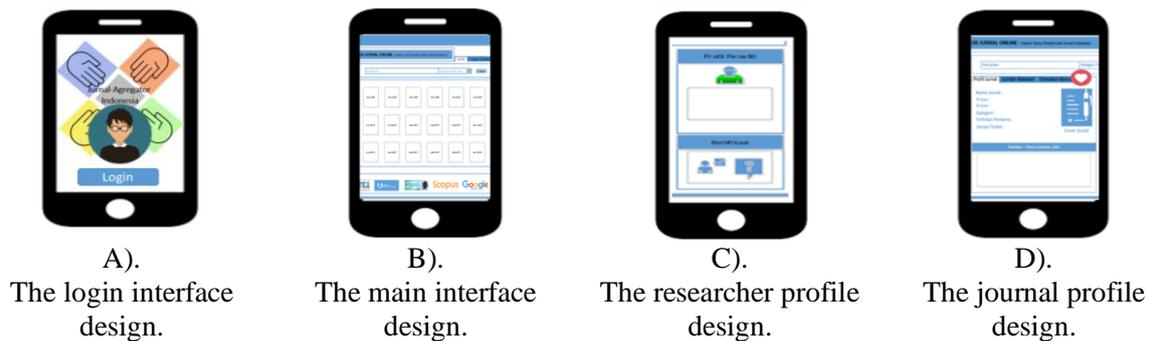
The database model used in developing journal reminder applications, uses entity models and attributes, and uses IDEF1X diagrams to show relationships between entities. The list of entities and attributes in the database of journal reminder applications can be seen in Table 2.

**Table 2.** Entities and attributes in the database

No	Entities	Attributes
1	Admin	id_admin,username,pass,nama,status,email
2	Pengelola_Jurnal	Id_pengelola,username,pass,nama,institusi,email,status
3	Jurnal	id_jurnal, nama_jurnal, sinopsis, issn, institusi_jurnal, alamat_jurnal, Provinsi, kota, email_jurnal, telp_fax, penerbit, situs, frek_terbit, terbit1, media_terbit, kategori_ilmu,cover
4	detail_jurnal	id_detail, id_jurnal, vol, no, link
5	Penulis	Id_penulis, nama_penulis, status, afiliasi_institusi, alamat, provinsi, kota, kategori_ilmu, email_penulis, pass, link_google, link_scopus, link_ipi
6	Makalah	id_paper, id_penulis, judul_paper, abstrak, penulis_paper, kategori_ilmu, kata_kunci, tgl_unggah, status
7	Kategori_Ilmu	id_ilmu, kat_ilmu, keterangan, id_admin

### 3.6 Journal Reminder Application Interface

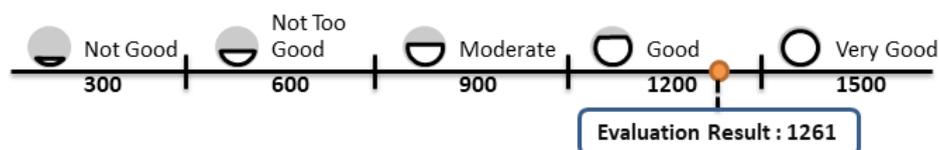
The design of the journal reminder application interface uses the layout concept to present each functional page to the user. The first design is to design a login interface that allows users to be able to enter and access journal reminder applications with accounts that have been registered . The design of main interface of the journal reminder application. The interface design for the management of researchers profile. While the final design developed is looking at journal profiles, where researchers can find out information related to the journal, and can favor journals that are considered to be in accordance with their needs and interests (see Figure 5) .



**Figure 5. Application Interface**

### 3.7 Evaluate Design Against User Requirements

The evaluation is done to determine the level of acceptance and support from potential users of the system being developed. Measurements were made using a Linkert scale to 30 prospective system users with the proposed statement covering usability in the system built, namely accessibility aspects, navigation aspects, and content aspects [15]. Measurements are made using the rating of user satisfaction preferences for 3 aspects of the application, namely: accessibility, navigation, and content aspects. The total score from the overall data collection = 1261. Thus the result of the preference matrix is  $1261: 1500 = 84\%$ . If the range is between 300-1500, the evaluation result is at GOOD intervals (see Figure 6).



**Figure 6. The range of user satisfaction preferences**

The results of other studies confirm that the application of UCD can produce a functional design and interface that is compatible with the user [15-16]. In addition, the UCD method can gradually improve the usability and user interface aspects [17].

## 4. Conclusion

The functionality and interface of the online journal aggregator system have met the usability aspects (accessibility, navigation, and content). This is concluded from the results of functional and interface design evaluations through questionnaires using a Linkert scale which shows that the design built is at a GOOD interval, which means that the functional design and interface of the journal reminder application can be accepted and can proceed to the next stage. However, in order to improve the accuracy of the development of the journal reminder applications, it is necessary to make a propototype based on the results of UCD modeling and design.

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