Redesign of User Interface Zakat Mobile Smartphone Application with User Experience Approach

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Abstract. Indonesia is a majority Muslim country with a percentage 87.1% of the population. Islam teaches its people to carry out activities that aim to share with the needy; Zakat, Infaq and also Shadaqoh (ZIS). However, zakat collection in 2015 is only 1.3% of its potential. Today, the marketing channels of ZIS products are starting to use the internet as the process of digitalizing zakat for communication channel and service channel to achieve efficiency. The most widely used device for internet browsing is smartphone devices. Growth of smartphone users in Indonesia occur along with the increase of mobile application users. Digitalization of zakat provides wider access to donors, fraud avoidance, reduced operational costs and better consolidation of national zakat reports. One of the effort is developing zakat mobile smartphone application which currently still encounters some problems in the development process. This study aims to re-design the User Interface of zakat mobile smartphone applications with the user experience approach for zakat mobile application in order to obtained the best recommended combination of user experience elements that aims to improve user experience of the application. The methods used are performance metrics, Single Ease Question (SEQ) questionnaires, System Usability Scale (SUS) questionnaires, Questionnaire for User Interface Satisfaction (QUIS) questionnaires, and Retrospective Think Aloud (RTA). Based on the results of this research, zakat mobile smartphone applications have low usability rating so there is a need to do re-design by using the TRIZ method. The result of this study is a prototype that meets the perceptions.

Keywords: Mobile smartphone application, TRIZ, Card sorting, User experience, User interface

1. Introduction
The conventional way of collecting zakat is through the payment of zakat in the collection office of zakat. Today, however, the busy lifestyle of a society reduces the ability of people to go somewhere to do transactions. The growing number of people who make transactions anywhere and anytime or regardless of space and time also encourage organizations to provide electronic services to meet these needs [1]. However, digitalizing the collection is not merely about shifting from cash to transferring zakat electronically. It also anticipates fraud in fund distribution, since every single activity can be monitored via the system [2].

In addition, because the payer of zakat is a Muslim. In the science of jurisprudence, Islam is governed by the laws of shari'ah which regulate whether or not it is permissible to do something related to religion,
including paying zakat using non-cash technology that in fact does not meet directly with parties relating to the collection, storage, guarding, recording, and distribution or distribution of zakat property (amil). There are some doubts and various views that arise regarding the implementation of zakat online include about the contract in the payment of zakat, the transfer of zakat out of the area of collection, the payment of zakat by credit card, clarity and consultation session on the property that must be issued and whether the allowance of zakat using money [3].

Currently BAZNAS and LAZ are trying to accommodate the doubts and various views that arise about the implementation of digital zakat in the community, to find out more about the application of mobile smartphone zakat, here are the results of interviews with the BAZNAS with Mr. Arifin Purwakananta (Deputy BAZNAS) and the team. The mobile smartphone zakat application is built on the basis of ambiguity in the community regarding LAZ's goal of serving or making money, there is a seasonal trend in the community to pay ZIS through a digital platform and as a form of engagement to muzakki. With the application of mobile smartphone zakat is expected to be a form of technological learning encouragement for the community, application of self-service technology, better report consolidation process, as well as an additional channel in building relationships with muzakki. However, the development of mobile smartphone zakat applications still encountered barriers such as lack of socialization to the community, still in the evaluation and development stage, and lack of human resources, as well as the cost for application development. Zakat mobile smartphone applications that have been available today are still considered far from expectations of user experience quality that users expect. Zakat mobile smartphone applications currently considered to be less friendly to users (not-user friendly).

The purpose of this research is to improve the quality of mobile smartphone user experience of zakat from user experience (UX) dimension related to user interface (UI), so it can bridge the people's doubts. User interface brings together the concept of interaction design, visual design, and information architecture. Users should be able to achieve their goals as efficient as possible, without too much focus on the user interface. Furthermore, usability study is a way to evaluate user experience. To meet current requirements, deep analysis is carried out to identify suitable model. TRIZ model identified as most appropriate collaborator for impactful effects [4]. In order structure the new design of the application, card sorting method is used to capture the user's mental model of how an information is structured in a mobile application software interface whose results also lead to suggestions for navigation, menu, and taxonomy [5].

2. Methods

This research used usability study as a method to redesign user interface of mobile smartphone zakat application. The user interface is a visual part of a computer application or operating system. A well-designed user interface is an important part of a good user experience. User Interface combines the concept of interaction design, visual design, and information architecture [7]. User interfaces mostly designed with a focus on usability and efficiency in order to make users achieve their goals without too much focus on the complexity of the user interface itself [8]. Furthermore, usability study is a way to evaluate user experience and usability problems. Some people are difficult to distinguish between the terms usability and user experience. Usability is usually considered the ability of the user to use the thing to carry out a task successfully, whereas user experience takes a broader view, looking at the individual’s entire interaction with the thing, as well as the thoughts, feelings, and perceptions that result from that interaction [6]. Metrics used to improve the user experience. Moreover, in the process of usability evaluation, observed task success rates, task completion times, post-task satisfaction ratings, feedbacks from user and expert reviews are taken into consideration.

2.1. User experience dimensions

Three metrics were used in this research to measure user experience of Zakat Mobile Smartphone Application i.e. performance metrics, self-reported metrics & issue-based metrics to measure user experience dimension which are usability, look and feel. First, performance metrics were used to
measure how much time a respondent takes when doing the tasks, how effectively a user can complete a certain set of tasks, and other measurements related to work performance when accomplishing tasks. Performance metrics must be performed with tasks or scenarios. Five basic types of performance metrics are task success, time on task, errors, efficiency, and learnability [6]. Second, self-reported metrics give the most important information such as users’ perception about the system and their interaction with it. Therefore, the data may tell something about how the users feel about the system [6]. Self-reported metrics done with questionnaires. These questionnaires generally use ratings with a rating scale. SUS (System Usability Scale), QUIS (Questionnaire for User Interaction Satisfaction) and SEQ (Single Ease Questions) questionnaires. are some questionnaires used to acquiring self-reported data.

Third, issue-based metrics is a qualitative metric used to identify usability issues that user experienced during his or her interaction with the system. Issue-based metrics done in two ways, namely in-person studies and automated studies. One of the most effective in-person study protocols is think-aloud. Through this protocol respondent should report and give comments after interacting with the system, in this case, researchers can also observe the verbal expression of confusion, dissatisfaction, confidence, nonverbal behaviours such as facial expressions, and others [6]. This research used Retrospective Think Aloud technique, where respondents verbalize when the respondents finished interacting with the system and respondents tell what felt and thought during interaction with the system. The advantages of this technique when compared with the CTA is to minimize the occurrence of interference that will arise as long as the respondents interact with the system.

2.2. Participants
The number of respondents in usability testing is only needed as many as 5-10 respondents because with the number of respondents as many as 5 people can reveal 80% of the problem and 10 people can reveal 100% of the problems and problems of the interaction between the system and the user [6]. There are 20 muslim respondents in this study to gain better statistical result, recruited in the urban areas of Indonesia consisting of various jobs. Before the experiment, the respondents have given the usability study procedures.

2.3. Materials and design
For data collection in user experience evaluation, the researcher created 4 tasks which used to perform performance measurement. The series of tasks provided are the main activities done by users when paying ZIS through zakat mobile smartphone application. In this study, each respondent was asked to complete as many as four tasks at “Lazismu”, “IZI”, and “Rumah Zakat” application. The 4 tasks are making account; donate at a certain campaign; calculating and paying zakat; and finally checking the history of ZIS payment. Moreover, for data collection also used SUS (System Usability Scale), QUIS (Questionnaire for User Interaction Satisfaction) and SEQ (Single Ease Questions) questionnaires.

2.4. Procedures
In collecting data, the main approach that serve as the basis for collecting data is series of tasks. The series of tasks given are the main activities that can be done in the mobile smartphone applications zakat so as to represent the performance and condition of the application. Data collection starts with performance metrics. Second, after each respondent completed the assigned tasks, respondents were asked to complete the SEQ, SUS & QUIS questionnaires that were part of self-reported metrics. Third, for issue-based metrics, RTA is used. Respondents were asked to provide opinions in accordance with what was felt and provide a reference error or improvement.

3. Result and discussion
In this part will be discussed and presented the results and discussion of this research data processing.

3.1. Task Success Rate
The analysis is done by comparing the average success rate among three mobile zakat applications. Based on the data taken, both groups of respondents are 100% able to complete all the requested tasks.
Therefore, without statistical test, it can be concluded that there are no differences among three mobile zakat applications. It can be concluded that there is no difference from the dimension of effectiveness.

3.2. Time on Task

The data analysis of time on task is done by calculating the average time at each application to see the significance of the time difference of the two sample mean population. The time difference completes significant tasks between the three applications in task scenarios 1, 3 and 4 of registering, calculating and paying zakat and finding payment history. This is because each application has a design and information structure with different elements. Based on the results of the one-way ANOVA, values for tasks 1, 3 & 4 (task 2 not normally distributed) have p-value < alpha value = 0.005.

![Figure 1. Time on Task Graph](image)

3.3. Efficiency

The efficiency data is taken by calculating the percentage of difference respondent’s time with baseline. The higher the percentage indicates that the user did not make a big mistake in visiting the interface while doing the task. The data shows that there is a difference in the efficiency. Significant efficiency differences between the three applications in task 2 & 4 scenarios are finding donation features and finding payment history. This is due to number of errors generated because of the difference of experience in application usage.

![Figure 2. Efficiency Graph](image)

3.4. Errors

Error calculation is done by counting the number of mistakes and slips the respondent performs in the tasks task to see how easily the application can be understood by the user.

![Figure 3. Error Graph](image)
The difference between the average number of significant errors between the three applications in the scenario of tasks 1, 2, 3 and 4 is to register, find donation features, calculate and pay zakat & find payment history. This is because each application has a design and information structure with different elements.

3.5. Single-Ease Question

The questionnaire data of Single-Ease Question was used to see the significance of difference of difficulty level among three applications. The ease of use assessment shows that there is a slight insignificant effect of the respondent’s experience on the ease of work on the app.

![Figure 4. Single-Ease Question Graph](image)

There is a significant difference between the two SEQs of the respondent group in task 1 & 4 scenario of registering & finding payment history. This is due to differences in perceptions and preferences of each respondent in assessing the level of ease of task. In task 1 indicated that the highest difficulty value occurs in the application of Rumah Zakat with an average value of 2.65 and in task 4 indicated that the highest difficulty value occurs in your application with an average value of 4.15

3.6. System Usability Scale

System Usability Scale (SUS) questionnaire uses five Likert scales. SUS contains value in each statement to measure overall usability satisfaction from the system being studied. In the Lazismu application, the average final value is 68.38 with a standard deviation of 13.01. In the IZI application, the average final score is 52.38 with a standard deviation of 18.90. In the Rumah Zakat application, the average final score is 41.00 with a standard deviation of 15.19. On the acceptibility range scale, the Lazismu application is on a "marginal high" or "high marginal" scale, while the IZI application and on the Zakat House application are on the scale of being in "not acceptable" or "unacceptable" scale. is in the "D" grade while the IZI and Rumah Zakat applications are in the "F" grade, and on the adjective ratings scale for common applications you are on the "OK" scale while the IZI and Zakat Houses are on the "Poor" scale.

![Figure 5. SUS Distribution](image)

3.7. Questionnaire for User Interface Satisfaction

Questionnaire of User Interface Satisfaction (QUIS) questionnaire data was used to see the significance of difference of satisfaction level among three applications. Then from the average value of QUIS per category among three applications, the category that has a value below the average is the category
Screen, Terminology and System Information, and Learning. So it can be concluded that the problems of the interface exist in all three categories.

**Table 3.1** Value Table of QUIS Questionnaire per Category - Lazismu Application

| Category                               | Score  |
|----------------------------------------|--------|
| Overall Reaction to Time               | 72.59  |
| Screen                                 | 70.28  |
| Terminology and System Information     | 68.80  |
| Learning                               | 70.56  |
| System Capabilities                    | 70.56  |
| **Average**                            | 70.58  |

**Table 3.2** Value Table of QUIS Questionnaire per Category - IZI Application

| Category                               | Score  |
|----------------------------------------|--------|
| Overall Reaction to Time               | 64.44  |
| Screen                                 | 62.22  |
| Terminology and System Information     | 67.50  |
| Learning                               | 66.48  |
| System Capabilities                    | 65.33  |
| **Average**                            | 65.41  |

**Table 3.3** Value Table of QUIS Questionnaire per Category - Zakat House Application

| Category                               | Score  |
|----------------------------------------|--------|
| Overall Reaction to Time               | 58.98  |
| Screen                                 | 55.63  |
| Terminology and System Information     | 58.33  |
| Learning                               | 58.15  |
| System Capabilities                    | 60.44  |
| **Average**                            | 57.80  |

**Figure 6.** QUS Distribution

3.8. Issue-Based Metrics
Data processing in this section is the processing of qualitative data in the form of verbal comments from respondents about their experience in the use of applications. The following is the result of data processing pareto diagram of RTA result:

![Pareto Diagram](image)

**Figure 7. Result of Pareto Method for RTA**

3.9. **TRIZ**

In this study the parameters that you want to improve are parameter-33: ease of operation and parameter-35: adaptability and versatility. TRIZ40 provides recommendations in accordance with 4 principles to resolve this contradiction, namely: Principle-15: Dynamics, Principle-34: Discarding and Recovering, Principle-1: Segmentation & Principle-16: Partial or Excessive Actions

![TRIZ Result](image)

**Figure 8. TRIZ Result**

4. **Conclusion**

From the evaluation results by knowing the user experience of mobile smartphone application users zakat in Indonesia first up to the recommendations of design improvement, got some conclusion research. The following summarizes the conclusions of this study:

- The design improvements are made based on a combination of UX dimensions of usability, look & feel with UX's six dimensions: effectiveness, efficiency, understandability, ease of use, satisfaction, and desirability.
- Improved design on display focuses on adding features, information architecture, font size fixes, color selection, interaction design compilation using hybrid card sort, and TRIZ.
- The result of this research is the acquisition of application prototype with new interface design in accordance with the understanding and requirement of customer and with the addition of supporting feature which is desired based on user RTA result.
- The results of the prototype test application with a new interface design in terms of UX coverage efficiency shows that the time to work the four task scenarios faster so that time efficiency increases.
The results of the application prototype test with a new interface design in terms of UX coverage understandability shows that the lower error rate value in all four task scenarios.

The results of the application prototype test with the new interface design in terms of UX ease of use coverage shows that the larger SEQ value so it can be seen that the level of ease of use increases in the four scenarios of the task.

The results of the prototype test of the application with the new interface design in terms of UX satisfaction coverage shows that the SUS value increases so it can be seen that the level of satisfaction increases in the new design.

The results of the prototype test of the application with the new interface design in terms of UX desirability coverage shows that the value of QUIS increases so it can be seen that the level of desirability increases in the new design.

It is expected that further research may involve a diverse sample of respondents to represent the population and increase the prototype to the extent of functionality.

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