Designing an online-based questionnaire application for mobile devices

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Abstract. In a decision making and assessment, a lot of data is needed as a reference, the data needed can be obtained through filling out a questionnaire distributed to the community. With the rapid development of technology in the IT field, it is necessary to create a questionnaire application that is based online so that it can be accessed anywhere and anytime through the current mobile device. Online-based data storage needs are also important in a questionnaire, if all this time a questionnaire was made in paper form, in this paper we will discuss how to create an online questionnaire application. With the location of data storage also in online servers that can facilitate data processing. Application design is adapted to mobile devices that are currently owned by everyone. This paper aims to provide an effective and efficient solution for researchers, companies or individuals who want to use questionnaires as a method of data collection.

1. Introduction
A questionnaire is often the first tool that people consider when undertaking a research project. However, designing a questionnaire is complex and time-consuming and the quality of the data collected is determined by the quality of the questionnaire used. It may be more appropriate to consider alternative methods such as focus groups, voxpops, etc. (add links). Therefore, ask yourself: ‘what do I need to know?’ and ‘how can I find this out?’ It is important to consider the advantages and disadvantages of using questionnaires [1].

Advantages: 1. The data gathered is standardized and therefore, easy to analyse; 2. Data can be gathered quickly from a large number of respondents; 3. It is possible to compare your results with similar surveys used in other institutions; 4. Respondents can answer anonymously which may produce more honest answers; 5. Online surveys are relatively inexpensive; 6. One person can administer the whole process if they have the necessary skills.

Disadvantages: 1. Responses may be inaccurate, especially through mis-interpretation of questions in self-completing questionnaires; 2. A reasonable sample size is needed before the responses can be used to represent the population as a whole; 3. Response rates can be poor, people may lack the motivation to complete or return the questionnaire. Consequently, some sort of incentive may have to be included, for example, a prize draw; 4. The complexity of designing, producing, distributing, and analysing the questionnaires may make them expensive and time consuming; 5. Quantitative data (i.e., research that produces numbers and percentages etc.) may not be enough to answer the questions you are seeking to answer in your research. More in-depth interviews or focus groups may be needed. This guide is intended as an overview.
order to successfully use a questionnaire as a research tool it will be necessary to consult more detailed texts, some of which are listed in the reference section. Marketplace for their dissatisfaction. Complaints given consist of non-conformance of goods with display, slow delivery, product defects, and no compensation [1].

The use of online-based questionnaire to elicit consumer preference and estimate welfare measures such as willingness-to-pay (WTP) is growing because of the increasing coverage of internet and several advantages of online-based questionnaire. One potential advantage of online-based questionnaire is that it is relatively easy to collect data from multiple countries to compare responses to the same questions and therefore contrast consumer attitude, preference, and WTP across countries [2]. However, using online-based questionnaire to collect data may result in problems such as lowering the reliability of the data for analysis, or lower data quality.

Mobile applications are consist of software/set of program that runs on a mobile device and perform certain tasks for the user. Mobile application is a new and fast developing Segment of the global Information and Communication Technology [2]. Mobile application is easy, user friendly, inexpensive, downloadable and run able in most of the mobile phone including inexpensive and entry level phone. The mobile application has wide uses for its vast functioning area like calling, messaging, browsing, chatting, social network communication, audio, video, game etc. In large number of mobile application some are pre-installed in phone and others user can download from internet and install it in mobile phone [3]. This large number of mobile application market served by increasing no of mobile application developer, publishers and providers. From the technical point of view the different mobile applications are run able in different managed platforms like iPhone, BlackBerry, Android, Symbian, windows; also some virtual machine such as Java/J2ME, BREW, Flash Light, Silverlight [4].

2. Method
This project uses a bootstrap framework, Bootstrap is a web framework that focuses on simplifying the development of informative web pages (as opposed to web apps). The primary purpose of adding it to a web project is to apply Bootstrap's choices of color, size, font and layout to that project. As such, the primary factor is whether the developers in charge find those choices to their liking. Once added to a project, Bootstrap provides basic style definitions for all HTML elements. The end result is a uniform appearance for prose, tables and form elements across web browsers. In addition, developers can take advantage of CSS classes defined in Bootstrap to further customize the appearance of their contents. For example, Bootstrap has provisioned for light- and dark-colored tables, page headings, more prominent pull quotes, and text with a highlight. Bootstrap also comes with several JavaScript components in the form of jQuery plugins [5].

They provide additional user interface elements such as dialog boxes, tooltips, and carousels. Each Bootstrap component consists of an HTML structure, CSS declarations, and in some cases accompanying JavaScript code. They also extend the functionality of some existing interface elements, including for example an auto-complete function for input fields. Determine the framework of thinking and research questions or hypotheses, design research methods to be used including determining the population, samples, sampling techniques, and analysing data, and the last is making a research report [4].

An example of a questionnaire designed in this paper is burnout in the lecturer environment. Burnout is a state of emotional, physical, and mental exhaustion caused by excessive and prolonged stress. It occurs when you feel overwhelmed, emotionally drained, and unable to meet constant demands. As the stress continues, you begin to lose the interest and motivation that led you to take on a certain role in the first place.

To fill this questionnaire, must first install the questionnaire application in the form of this apk on an android smartphone and then run it. Then Users are required to create an account first and then fill out a questionnaire to see if the user was exposed to burnout or not.
2.1. Data collection
The way to collect data in this study is to create a registration form with a list of names, gender, origin of institution, date of birth, email, and password. All this data is used to create a new user account so that in the sql database it forms a new table. After pressing the agree button to create an account, the user of this questionnaire application goes to the login page which contains the full name and password form. By filling in the full name and correct password, this application will go to the user page according to the data created on the registration form. This method is called authentication.Authentication is the process of validating the user when entering the system, the name and password of the user is checked through a process that checks directly into the list of those who are given the right to enter the system. This authorization is set up by administrators, webmasters or site owners (the highest rights holders or those appointed on the system. For this process each user will be checked from the data he provides such as names, passwords and other things that are not closed possibilities such as hours of use, locations allowed.

Authentication is a step to determine or confirm that someone (or something) is authentic or authentic. Authentication of an object is to confirm the truth. While authenticating someone is usually to verify their identity. In a computer system, authentication usually occurs when logging in or access requests.

The population of this study is the 100 lecturers at the University of Wijaya Kusuma Surabaya with Wi-Fi internet access on campus using an Android-based smartphone

2.2. Data analysis technique
All input data in this application are stored online in a hosting so that security is guaranteed. The questions in the questionnaire application are grouped into 3 classes. Each class consists of 10 questions. In the first and second classes there are 5 answers with weights, namely TP: Never = 1, Jr: Rarely = 2, Kd: Sometimes = 3, Sr: Often = 4 SS: Very Often = 5. While especially for class 3 there are 4 answer with weight namely SS: Very Agree, S: Agree, TS: Disagree, STS: Very Disagree

The analysis of the algorithm is based on this table for class 1.

Table 1. Algorithm for question in class 1.

| Answer | Score | Total | 10-20 | 21-30 | 31-40 | 41-50 |
|--------|-------|-------|-------|-------|-------|-------|
| TP     | 1     | 10    | Happy | Tends to be easy | Tends to be Easily | Positively |
|        |       |       |       | Stressful        | Affected by Burnout| Burnout  |
| JR     | 2     | 20    |       |       |       |       |
| KD     | 3     | 30    |       |       |       |       |
| Sr     | 4     | 40    |       |       |       |       |
| SS     | 5     | 50    |       |       |       |       |
The analysis of the algorithm is based on this table for class 2.

**Table 2. Algorithm for question in class 2.**

| Answer | Score | Total | 10-20 | 21-30 | 31-40 | 41-50 |
|--------|-------|-------|-------|-------|-------|-------|
| TP     | 1     | 10    | Not   | have control | Tend | Error happen |
| JR     | 2     | 20    | Happen | Easy | Happen | Error |
| KD     | 3     | 30    |       |      |       |       |
| Sr     | 4     | 40    |       |      |       |       |
| SS     | 5     | 50    |       |      |       |       |

While for class 3 uses the rules of this algorithm.

**Table 3. Algorithm for question in class 3.**

| Answer (1,3,4,7,10) | Score | Total | <20 | 20 - 30 | >30 |
|---------------------|-------|-------|-----|---------|-----|
| SS                  | 4     | 20    |     |         |     |
| S                   | 3     | 15    |     |         |     |
| TS                  | 2     | 10    |     |         |     |
| STS                 | 1     | 5     |     |         |     |
| Answer (2,5,6,8,9)  |       |       |     |         |     |
| SS                  | 1     | 5     |     |         |     |
| S                   | 2     | 10    |     |         |     |
| TS                  | 3     | 15    |     |         |     |
| STS                 | 4     | 20    |     |         |     |

All the rules of the three tables are combined in this questionnaire application so that it can produce the final appearance after the user fills in all the questions. Then the results are stored in each user's account as seen in this activity diagram.

There are 2 levels of users in this questionnaire application, namely admin and user. Each level of this user has different rights. Later it will be explained in the use case and activity diagram. With the division of 2 user levels, it aims to sort the data correctly between the data of each user and there is data as an administrator who has the right to create, edit and delete data.
3. Results and discussion

3.1. Data analyses result

Based on the results of the questionnaire obtained the following results:

*Figure 1. Graph of user satisfaction in using the application.*

Based on figure 1, the majority of users said they are easy to use this questionnaire application. Starting from installing applications on smartphones, creating user accounts and filling out questionnaires can be done easily.

*Figure 2. Relationship to internet connection speed with the use of questionnaires.*

In figure 2, the internet connection has a very large influence >85% for convenience in using this questionnaire application. When the application is run using an unstable connection, the stages in filling out this questionnaire are interrupted so the questionnaire results do not appear. Users say they are not satisfied > 85% if the internet connection is unstable.

The internet connection is influential in this application because all data is stored in hosting so it requires internet access in retrieving and issuing data.
Figure 3. Graph of consumer attitudes towards complaints.

Figure 3 illustrate that the size of this application does not disturb the stability of the smartphone. And stated that he was quite surprised that the questionnaire application had a small size and a fast loading process. Opening the question page is quite easy, questions are easy to understand and results can be immediately seen.

3.2. Use case and activity diagram
The design of the proposed system uses the Unified Modeling Language (UML) as system modeling.

3.2.1. Use case admin. In the use case admin diagram, the admin can do the questionnaire data, process user data, process question data and see Application usage report.

3.2.2. Use case user. In use case diagrams, user can register, check questionnaire, contents of the questionnaire, see instructions and see the status of the questionnaire.
3.2.3. Activity data check questionnaire data. Activity The following diagram illustrates how admin do data processing questionnaire. Admin can do more, change and delete questionnaire data.

![Activity Diagram for admin](image)

**Figure 5.** Use case user.

**Figure 6.** Activity Diagram for admin.
3.2.4. Activity filling diagram questionnaire. The following activity diagram illustrates how user fill up questionnaire.

![Activity Diagram](image)

**Figure 7.** Activity diagram for user.

4. Conclusion
In this paper, we discuss how to design an application for questionnaires on smartphone devices, especially those based on Android. This application is made with the bootstrap platform and must use an internet connection. All data is stored not on a smartphone device but on a hosting server so that it is safer, simpler and does not overload smartphone memory.

By using the one user multiple result workflow, all users must create an account first in the questionnaire application. After creating an account, you can only fill out the questionnaire, the results can be seen again when the user logs into the account. An example of a questionnaire used in this application is a questionnaire to find out whether someone is exposed to burnout or not. Moving all the rules of the burnout questionnaire into a simple programming algorithm makes this application easily accessible and does not require long manual calculations to find out the results.

With the existence of the authentication process in this application, it provides a guarantee that the questionnaire fillers are in accordance with the user who is logged in using the name and password they created themselves when registering. So the results of this questionnaire are valid indeed for those users. Of course this gives certainty to Wijaya Kusuma University institutions in assessing each lecturer according to whether it is exposed to burnout or not.

The trial was conducted on 50 lecturers in the University of Wijaya Kusuma, Surabaya. By using each smartphone using a different internet connection.

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