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Usability Test of Android Based Questionnaire for Public Health Community Based Learning

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ABSTRACT

Background: Community data collections are periodic activity for public health student in Indonesia. It always uses paper-based questionnaires which have limitations not only during the interview process (incorrect of filling out the questionnaire) but also during data processing and archiving (validity of information). By taking advantage of the massive growth of cell phone and android platform, the transformation of the paper-based questionnaire into android based questionnaire was done in this study.
Methods: The study design consisted of three components, the development of the model, the development of the product, and the testing of the product. Android-based questionnaire as the product was tested three times. Data collection for the usability test of the product used questionnaire consisted of 16 questions represented 4 aspects (usefulness; ease of use; ease of learning; satisfaction). The response to each question used the Likert scale.
Results: The most effective change in the android based questionnaire was the addition of variables to facilitate filtering the list of the questionnaire for individuals according to self-characteristics. Although the use of android based questionnaire was new for the students, it was useful, the average score of usefulness aspect was 3.17.
Conclusion: Android-based questionnaire was more effective and efficient as media for data collection than paper-based questionnaire in community-based learning. A guideline of the android based questionnaire used was needed to support and to maximize the performance of it.

Keywords: android, data collection, usability test

INTRODUCTION

Pengalaman Belajar Lapangan (PBL) is a compulsory course for public health students in Indonesia. This course is community-based learning which gives the student experience to take action and to contribute to increasing of public health status through having comprehensive competency, knowing local wisdom, having good leadership, and doing systematically thinking(1). There are three steps in this course. The first is doing identification and asset mapping of the community as the basis to do health analysis in those communities. The second is designing and doing action plans based on the result of the previous step. The third is doing monitoring and evaluation toward an action plan in the previous step and develop a program and policy to solve the health problem.

The first step is done by collecting data from the community using paper-based questionnaire which has limitations not only during the interview process (incorrect of filling out the questionnaire) but also during data processing and archiving (validity of information). The content of the questionnaire depends on the university's consideration. In UIN Alauddin Makassar, this questionnaire consists of 15 indicators of public health, such as maternal health, communicable diseases, non-communicable disease, risk behavior, health-seeking behavior, and anthropometry(2). Students have to collect the data by doing interviews and measurements in the community.

The development of the Android platform asa questionnaire could be used to improve the quality data of PBL for short

response time and cost-effectiveness(3). In this study, the transformation of a paper-based questionnaire of PBL into android based questionnaire was done using Open Data Kit (ODK) application. Furthermore, the usability test of an android based questionnaire was run as a basis to improve the performance of android based questionnaire.

MATERIALS & METHODS

Development study was conducted in Medicine and Health Science Faculty of UIN Alauddin Makassar from February-August 2020. The study design consisted of three components; the development of the model, the development of the product, and the testing of the product(4). The testing process was done three times, by experts (quality assurance team, head, and secretary of the public health study program), by a small group (lecturers of the public health study program), and by large group/ field testing (students of public health class of 2018).

The basis to develop the model was a paper-based questionnaire of PBL and guidelines to develop ODK. There were two kinds of questionnaires (household and individual) as products. Product revision both in terms of content and appearance was based on the results of each testing.

Data collection for usability test using a questionnaire in google form was run after field testing. These questionnaires based on the Use questionnaire consisted of 16 questions represented 4 aspects (usefulness; ease of use; ease of learning; satisfaction) (5). The response of each question used the Likert scale (1= very not agree; 2=not agree; 3=agree; 4=very agree).

RESULTS

There were several changes to the android based questionnaire compared with the paper-based questionnaire. These changes included the layout of the question in the household questionnaire and the addition of variables in the individual questionnaire. One of the variables added was the age group both in months and years. The addition was aimed to facilitate filtering the list of the questionnaire for individuals according to self-characteristics. This filtering process would be effective work if the entire age group containing the age of the individual had been chosen correctly.

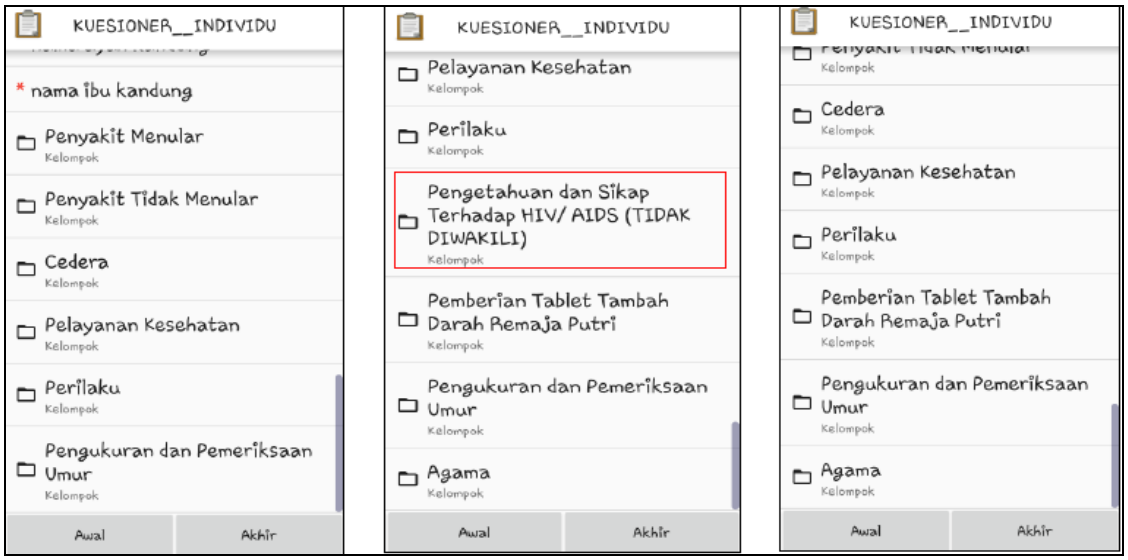

Fig1. Screenshot of list of questions for general/ all individuals (left); for individuals aged ≥15 years and female (middle); and for individuals aged <15 years and female (right)

Questions regarding knowledge and attitudes towards HIV/AIDS were specific to individuals aged ≥ 15 years. Individuals aged < 15 years did not quality of questions related to HIV/AIDS so that it would not appear on the list of questions that must be

asked. This was different for individuals aged 17 years old. For individuals aged 17 years, questions related to HIV/AIDS would appear on the list of questions provided the aged group selected for these individuals were >3 years; >5 years; > 10 years; 10-19 years; 10-54 years; >years; 15-19 years; and 15-49 years.

At the point of religious questions, update of contents was done. In the paper based questionnaire, religious questions were closed questions without additional questions or media to confirm the given answers. In android based questionnaire, the type of questions for religious questions was open questions and were supported by image to confirm the accuracy of the given answers.

K. AGAMA			
ART SEMUA UMUR			
K01	Apakah responden tahu gerakan shalat	1. Ya 2. Tidak	
K02	Apakah responden tahu bacaan shalat	1. Ya 2. Tidak	
K03	Apakah responden tahu baca al-qur'an	1. Ya 2. Tidak	
K04	Apakah responden tahu cara berwudhu	1. Ya 2. Tidak	
K05	Apakah responden tahu bertayammum	1. Ya 2. Tidak	
K06	Apakah responden tahu beristinja/bersuci	1. Ya 2. Tidak	

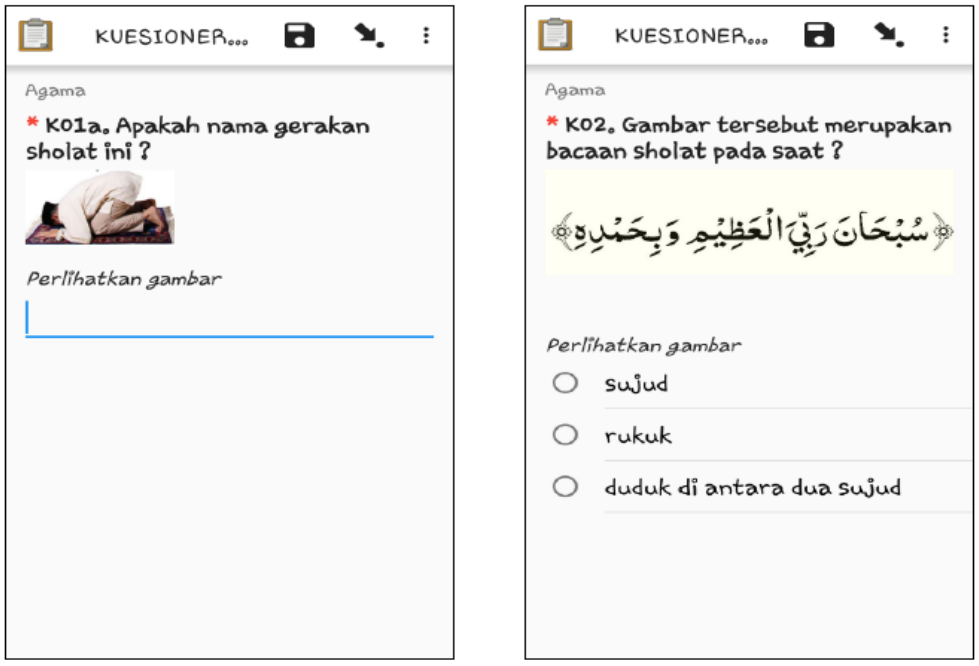

Fig2. Display of religious questions in paper based questionnaire (up) and androidbased questionnaire (down)

The use of android based questionnaire with ODK was a new experience for the students. They agreed and recommended ODK be used in the data collection process during PBL. They were enthusiastic to learn more about ODK. It was identified from agreement of statement "interested in learning more about ODK application".

The average score of usefulness aspect was 3.17. It was the highest score compared with the other three aspects. In the aspect of ease of use and ease of learning, the average score was 2.85 and

3.06 while on the satisfaction aspect, the average score was 2.96.

DISCUSSION

Android based questionnaire could minimize the obstacles encountered when using a paper based questionnaire. They were (1) the number of questionnaires that must be carried by the student (2) the duration of the interview (3) the clarity of the student's handwriting on the questionnaire and (4) the storage of data and questionnaire.

Students had to determine the number of questionnaires needed to be brought at least for one time interview to the community. If the individual questionnaire was less than the number of household members that must be interviewed, it had implications for two conditions. First, the use of a questionnaire related to individual characteristics for two different individual data. Second, the interview must be delayed.

This condition did not have to be faced by students when using android based questionnaire. Each type of questionnaire (household and individual characteristic) only needed to be downloaded once on the device and it could be used immediately without limiting the number of questionnaires used.

The android based questionnaire had been created using several types of questions. For open questions, space for giving response was not limited, so that students could type the complete responses given by the interviewee. Furthermore, the duration of the interview could be shortened than using paper based questionnaire because list of questions that must be asked to the interviewee would appear according to individual characteristics and the choice of response / answer given by the interviewee (automatically jumping).

The use of android based questionnaire would provide convenience in terms of data and document storage. Every questionnaire that had been filled in and sent to the ODK server would be automatically arranged in the form of a master table and stored. It also would also be stored on the device as long as the device did not damage which required resetting. If using paper based questionnaire, the potential for missing or incomplete questionnaires were greater so that special space was needed to store the used questionnaire and if re-verification of the validity of data entry was required, it would take a long time to check the questionnaire again.

The average score of usability test shown android based questionnaire was useful as media for data collection. Value of usefulness aspect was influenced by age and the experience of using the application/ technology from the user which also affected the expectations of application performance (performance expectancy) (6).

Value of ease of use aspect indicated that android based questionnaire was not easy enough to be operated or used by the students as users. It required written instruction such as filling guide to support the users. The addition of questions/ variables from the paper based questionnaire needed written explanations regarding the purpose and the usefulness of it. The complexity of the questions was one of the factors affecting the ease of use of questionnaires. The use of android based questionnaire was a new experience for users so it took time for them familiar with the appearance of the questionnaire in order to be able to fill out the questionnaire optimally.

The use of gadgets among students was not a new thing and they were able to develop applications on their own devices. It became facilitating condition to support the achievement of the ease of learning aspect of android based questionnaire.

Android based questionnaire had not provided maximum satisfaction for users. Unprepared of students to conduct interview made them stared at device more often to know the content and flow of questions. It had the potential to reduce or even lose the opportunity to make eye contact in order to build an emotional bond (7,8). The public

was generally accustomed to the interview process using paper based questionnaire so that if the interviewer had to look at the questionnaire repeatedly, it was understandable or accepted. However, public acceptance could be different if the interview was conducted using a mobile device. Therefore, it was important to provide an explanation that the interview would use mobile device so that the potential for being interviewed to feel unappreciated or offended could be minimized.

CONCLUSION

Android based questionnaire was more effective and efficient as media for data collection than paper based questionnaire in community or field based learning. Guideline of android based questionnaire used was needed to support and to maximize the performance of it.

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