

The User Interface and The Implementation of Mobile apps for Donors in Natural Disaster in East Java, Indonesia

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Abstract- Natural disasters occur quite often in Indonesia. Relief can be in the forms of logistics or funds. Indonesian Red Cross is one of the institutions most trusted in distributing donations. Unfortunately, there is still no easy facilitation for donors in transferring funds. An effective system is needed to ease donors in transferring funds using an online application, to guarantee that the funds are not misused, to inform the kind of disasters requiring financial aids or to report the utilization of the aids.

Not many researches have been conducted in this subject. Those related to the Human Computer Interaction in Health Care were focused on patients. The ones in the field of e-commerce were focused on customers. Meanwhile this research on the case of natural disaster was focusing on donors, which was not quite ordinary. The researches in the case of natural disasters were mostly focusing on the problem of distribution and supply of logistics or searching the nearest locations using GIS.

This research aims to explore the user expectations of the mobile apps on the process of donating applying the principles of HCI such as conveniences, effectiveness, security, completeness of information, feedback, and visibility. It also includes the expectations on features for donors and volunteers in using secured payment gateway linked to the bank and on the history of the donation including the channel and their utilization.

The result of this research shows that the expected users wish this application could provide quality of information, continuity, easy of access and high security. The results of Developing a mobile application with effective interaction between the application and the users is included in this paper.

Keywords—*HCI; mobile apps; natural disaster; donors*

I. INTRODUCTION

Due to its geographical location, Indonesia is susceptible to natural disasters, such as volcano eruptions, earthquakes, landslides, flash floods etc.

Whenever a natural disaster occurs, the government always sends volunteers to the location together with logistic aids for the disaster victims. There has been a lot of expenses for the deliveries and procurements of those logistics. The government funds is often not enough to cover all expenditures for the disaster victims. Thus all parties who handle the disaster victims find every way to do fund raisings from the society who care enough with the fate of the disaster victims. The

Indonesian Red Cross, among others, is one of the Government institutions responsible for taking care of those disaster victims. Although the Indonesian Red Cross has received all kinds of donations, either in the form of logistics or financial aids, still the Indonesian Red Cross prefers financial aids. Logistics can be easily out dated and damaged before being used. Logistics also need lots of spaces to be kept in the warehouse.

From the side of donors, the problem is the process of financial funding. They sometimes have doubts whether the financial aids they donate will go to the right persons or not. The funding process is also often not easy to do. The donors also would like to know how far their donation have been channelled to the disaster victims. They need reports on how those donation has been utilized.

So far the donation funding process, facilitated by the Indonesian Red Cross, has been conducted via ATM of certain banks or transferred via certain banks facilitated by the Indonesian Red Cross website, developed by the Head quarter of The Indonesian Red Cross, Jakarta. The problem faced by the donors, among others, is the complicated process of transferring money. The donors have to upload the evidences of the transfer. The confirmation of receipt also takes a long time. There is no clear report on the utilization of the donation funds. There is actually a third party, indokasih.com, appointed as an intermediary agent on receiving the donation. Still, the process is also complicated. This intermediary agent takes 5 % of the donation funds as fees. It reduces the funds that can be allocated by the Indonesian Red Cross for the disaster victims. A research should be conducted to handle the problem of the Indonesian Red Cross in providing an easy online process for donors in transferring their donation funds.

Not all donors are computer literate persons in using online applications, therefore a user friendly interface is also needed to ease donors in using the application.

Not many researches have conducted in this subject. Those related to the Human Computer Interaction in Health Care were focused on patients. [1]. The researches conducted in the field of e-commerce were focusing on customers who are doing procurement. Meanwhile, researches on the case of natural disaster should focus on donors. So far researches on the subject of natural disasters, were mostly focusing on the problem of distribution and sending of logistics to the disaster

areas [2]. The above mentioned research was focusing on sending logistics to the disaster areas with the aids of convenience stores, but not yet focusing on the funding process.

This research being conducted, will fill the gap of what haven't been done at the researches on natural disasters. It will explore the needs of the donors in transferring donation funds using a mobile application for the disaster victims, focusing on the Human Computer Interface principles. Those principles being explored are conveniences, effectiveness, security, completeness of information, feedback and visibility.

II. MOTIVATION AND RELATED RESEARCH

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The development of mobile application has been growing so fast during these recent years. With the growing number of smartphone users in the world, people are not using smartphones only as social media such as WhatsApp, Line, WeChat only, but for other purposes as well such as financial transaction, health and government issues. According to the survey by Dogtiev, A. [3], the number of downloads of mobile applications is 197 millions, a 31,95 % increase from 2016. This fact drives application developers to choose developing mobile applications compared to web applications. The mobile application has excellent quality such as features on accelerometer, compass, location awareness, and push notification. Based on that fact, this research is more focused on developing a mobile application. Some researches have been conducted related to the use of mobile applications before.

The subject on Human Computer Interaction is also an interesting and complex subject to be explored as there have been a lot of questions raised. There have also been changes and new findings as time goes by Lazar, J. et al. [4]. The research methods being used are considered complex as they are drawn from several different fields. They are modified and thus creating new standards to be researched. Involving humans is also considered as complex. The root of the problems have to be comprehended, the development of Human Computer Interaction research methods have to be understood and there have some multi dimensional problems to be considered.

The research on mobile social application conducted by Hsiao, et.al. [5] was discussing about the satisfaction, habits and customer value perspectives, especially among youth. Some results of this research, firstly was to increase the user satisfaction factor by calculating the usability features, especially related to daily activities. The relationship formed through social networks could also develop the habits of the users especially among the young people. Therefore, the

information should be better delivered to the users in pictures, not only in text form.

Serra, L.C.et.al [6] did some researches on the use of mobile application for developing m-government, an application for providing services for citizens. By using m-government, services were more accessible to the citizens, including disabled people. The offered services, included information access, corruption reduction, efficiency increase, participation of the community on social activities. The method of Human Computer Interaction was used to evaluate the performance of the accessibility, both for the target users as well as experts. The evaluation was conducted using Web Content Accessibility Guideline [7]. The result of this research showed that a lot of users had difficulties in accessibility, especially using gestures replacing the use of keyboards.

The research related to health services using mobile application was conducted by Alnanih, R. and Ormandjieva [1], on the case of healthcare professional using mobile devices. This research put emphasis on user interfaces. As, doctors focus more on patients not on the system. bad user interface will create medical errors. They were using the method on Quality in User Measurement Model. The result of the research was successful in aiding doctors to take care of patients faster, and more effective. Thus they managed to do some correction action immediately and there was an increase in productivity. The loads of the doctors were also reduced.

Setiabudi, D.H et.al, [2] conducted a research on logistics distribution for disaster victims. This research focused on the process of documenting the logistic data and the process of logistics distribution to the location of the disaster victims. The donors generally gave their donation in the form of logistics. The donation in the form of financial aids was conducted using bank transfer method, verified manually, not automatically

III. RESEARCH METHODOLOGY

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To get the data of the donor candidates as the respondents. The method of gathering data selected was using questionnaires. They were distributed to 100 respondents randomly in Surabaya, Indonesia. The structure of the questionnaires consisted of 2 parts. The first part consisted of questions related to the profiles of the respondents such as gender, age, and education background. There were also questions on the habit of using mobile phones and experiences in donating to the Indonesian Red Cross. The profiles of the respondents covered higher education students, professionals, government officers, personnel from private sectors, members of Indonesian National Army/ members of police corps. As shown at Figure 1., the results indicated that 57 % of the respondents were personnel from private sectors and higher

education students. In term of gender, 55 % were males and 45 % were females. In term of age, most of the respondents were between 21-30 years old. In term of education, 50 % were senior high school graduated. 95 % of the respondents had mobile phones and 65 % of them were using their mobile phone to find for information. 38 % of them had donated to the Indonesian Red Cross but gave more manually in the form of coupons and donation box, not donated through online application.

TABLE 1. DATA ON RESPONDENTS' OCCUPATION

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
government officers	12	12.0	12.0	12.0
personnel of private sectors	32	32.0	32.0	44.0
Members of Indonesian National Army/Police Corps	13	13.0	13.0	57.0
Professionals	18	18.0	18.0	75.0
Students/higher education students	25	25.0	25.0	100.0
Total	100	100.0	100.0	

The second part of the questionnaires included questions on the expectations of the respondents, such as the application features they prefer to use if they donate online to the Indonesian Red Cross. The expectations were divided into five aspects: benefits, ease of access, trust, the quality of information and user interface. The questions on the aspect of benefits were directed to identify what kind of features were expected by the candidate users of the application. Those questions on the aspect of ease of access were focusing on significant issues to be considered to ease the candidate users in using the application. The aspect of trust was directed to get to know whether the candidate users had high hopes on the guarantee of security as this application involves financial transaction. While the inquiries on the aspect of the quality of information were to gain the knowledge whether the quality information provided by the application were something expected by the candidate users. The aspect of user interface of the questions had a purpose to identify what kind of user interface will attract the candidate user to use the application to be developed.

IV. RESULT AND DISCUSSION

There was an opportunity for effective usage of the Indonesian Red Cross Donation Mobile Device Application as 95 % of the respondents had mobile devices. Most of them were using mobile devices for finding information. This profile matched one of the function of the application which was supposed to give information needed by the donors. The interaction between the society and The Indonesian Red Cross was quite good, indicated by the fact that 44 % of the respondents had contributed in blood donor activities. 59 % of

the respondents recognized the function of The Indonesian Red Cross in doing fundraising to support humanitarian activities. On the other hand, there was also a gap to fill as 41 % of the respondents still did not know the function of the Indonesian Red Cross as a support system for humanitarian activities.

Fundraising using a mobile device application also has a good prospect as 61 % of the respondents had never contributed any funds for the Indonesian Red Cross. The ones who contributed, were doing the donation using The Indonesian Red Cross coupons or donation box, as indicated at Table 2.

TABLE 2. THOSE WHO HAD /HAD NOT DONATED FUNDS

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Coupons	20	20.0	20.0	20.0
Donation Box	18	18.0	18.0	38.0
Never	61	61.0	61.0	99.0
others	1	1.0	1.0	100.0
Total	100	100.0	100.0	

These two types of donation are local in characteristic. They can only reach out relatively small number of donors. Using mobile devices will allow wide range of reaching out. Another effort of sending donation has also been done via the Indonesian Red Cross website. This website actually can reach out wide range of users, but not many people have been attracted to visit the website, as only 11 % of the respondents visited the website, as shown at Table 3. On the other hand, 65 % of the respondents were using mobile devices to find for application as visible at Table 4.

TABLE 3. VISITS TO THE INDONESIA RED CROSS WEBSITE

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
yes	11	11.0	11.0	11.0
No	89	89.0	89.0	100.0
Total	100	100.0	100.0	

It seems that people are not interested in finding information in the Indonesian Red Cross web site using mobile devices. This fact indicates that the Indonesian Red Cross needs an information and donation application to be more widely accessed by the society. The result of the questionnaires also shows something interesting as 9 out of 11 people or 80 % of those who accessed the website, had been giving donation as pointed out at Table 3 and Table 5.

TABLE 4. THE USAGE OF MOBILE DEVICES

	Frequency	Percentage	Valid Percentage	Cumulative Percent
Valid Finding for information	65	65.0	65.0	65.0
Music/film	21	21.0	21.0	86.0
Game	8	8.0	8.0	94.0
Others	6	6.0	6.0	100.0
Total	100	100.0	100.0	

TABLE 5. DONATION VIA THE INDOONESIAN RED CROSS WEBSITE

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Yes	9	9.0	9.0	9.0
	Tidak	91	91.0	91.0	100.0
	Total	100	100.0	100.0	

It means that those who accessed the website really had the intention of donating. Actually a lot of people are willing to participate in giving donation but they do not know the right channel yet. Table 6 shows that 6 % of the respondents were giving donation to some boards or organizations online. Thus a disaster aid application needs to be carefully designed to run effectively

TABLE 6. DONATION VIA ONLINE APPLICATION

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
	Yes	6	6.0	6.0	6.0
	No	94	94.0	94.0	100.0
	Total	100	100.0	100.0	

Based on the analysis of the data, the first issue found is that society prefers a donation application with an up to date user interface. The fact that the respondents seldom visited the website of The Indonesian Red Cross shows that the website is not attractive enough compared to the user interface of an online application. In conjunction with the fact that the majority of the respondents were using mobile devices to find information, the second issue comes up on the quality of information delivery. Therefore, a selection of information needed or not needed by the society and future donors is very crucial. The third issue to be considered is a challenge of providing an attractive, up to date application, yet not complicated access to the users. The fourth expectation of the respondents is an application, easy to download. The fifth expectation is easy to understand, clear and concise information.

Some interesting findings are detected from the responses of the questionnaires as the respondents did not consider the use of symbols as an important issue. The use of pictures and the right sentences is enough for the respondents. The information on the last donation is also considered essential. This fact shows that the respondents trust the Indonesian Red Cross in managing their donation. Something considered least important is an event-based donation. It shows that respondents generally have the willingness to help universally, disregarding the area of the natural disasters or who are the victims of the natural disaster. This kind of findings is an opportunity for the Indonesian Red Cross to do fundraisings in continuity not only during any event of natural disaster. Thus an updated, annual and continual information is needed.

To develop an effective application for the Indonesian Red Cross, the views of the respondents in different range of age should be put into consideration. As viewed at Table 7, at the range of age under 30 years old, either between 17-21 or 21-30 years of age, the quality of information, ease of use and

reliability are three highest variables expected of an application.

TABLE 7. DESCRIPTIVE STATISTICS FOR USERS AT 17-21 YEARS OLD

	N	Minimum	Maximum	Mean	Std. Deviation
Average On Quality	14	3,67	5,00	4,4762	,44749
Average On Ease	14	3,17	5,00	4,4405	,56086
Average On Reliability	14	3,00	5,00	4,3571	,66299
Average On UserInterface	14	3,83	5,00	4,3214	,31666
Average On Benefit	14	3,67	5,00	4,2857	,36061
Valid N (listwise)	14				

Meanwhile, the users at the range under 17 years old of age put more emphasis on the ease of use, reliability and the quality of information, as shown at Table 8.

TABLE 8. DESCRIPTIVE STATISTICS FOR USERS AT <=17 YEARS OLD

	N	Minimum	Maximum	Mean	Std. Deviation
Average On Ease	3	4,00	5,00	4,6111	,53576
Average On Reliability	3	4,00	5,00	4,5000	,50000
Average On Quality	3	4,00	5,00	4,3333	,57735
Average On Benefit	3	3,00	4,83	3,9444	,91793
Average On UserInterface	3	3,00	5,00	3,6667	1,15470
Valid N (listwise)	3				

The fact that young adult respondents prioritize the quality of information is very interesting and relevant with the fact that respondents used smartphones for finding information. The needs of quality of information as the main variable is also indicated by the respondents at the age of above 40 years old. Meanwhile the young users or the ones with the range of 30-40 years of age put more emphasis on the ease of use.

From Table 9, it was seen that two variables of most important for most ranges of age, are quality of information and ease of access. As for those with the range of age between 30-40 years old, user interface beside the quality of information are considered as important.

TABLE 9. DESCRIPTIVE STATISTICS FOR USERS AT 30-40 YEARS OLD

	N	Minimum	Maximum	Mean	Std. Deviation
Average On Ease	29	2,83	5,00	4,2874	,47538
Average On Quality	29	3,00	5,00	4,1724	,48486
Average On Benefit	29	2,83	5,00	4,1149	,46740
Average On UserInterface	29	3,17	5,00	4,0632	,47017
Average On Reliability	29	3,00	5,00	4,0517	,54025
Valid N (listwise)	29				

The different expectations between the respondents who have or have never donated are the next pattern to be studied. The survey shows that there are no differences of expectations between the two types of respondents. They both consider quality of information, ease of access and then reliability at the third place.

The next thing to be learned is the different expectations between those who have donated using coupons, box donation and the one who have never donated. This research is focused to the expectations of the respondents who have never donated

with the hope that there will be more people who would like to donate. The respondents who have donated using coupons or box donation consider ease of access is more important than the quality of information as second of importance. Those who have never donated, seem to think they would like to find information first, then decide to donate or not. They also expect ease of information access. The same pattern is seen at the respondents who have donated or never donated via the website of The Indonesian Red Cross. For the respondents who have donated using the website of The Indonesian Red Cross, the ease of access is the main variable, then the quality of information. While for those who have never donated, quality of information becomes the variable most expected.

Based on the above analysis, the Indonesian Red Cross Donation Application first of all has to pay attention to the quality of information as the main variable expected by the respondents, especially those who have never donated to the Indonesian Red Cross. The application has to be designed to give reliable information. Therefore, the application should limit the access for those users who can contribute information and be able to use the concept of open information exchange. At the other side, the application is expected to be able to provide the most current information, which is quite difficult to be provided if the number of information providers is limited. Thus an application should be designed with the involvements of quite many number of reliable and registered volunteers who can provide information beside the administrator of the Indonesian Red Cross. The application should also be able to show the latest information related on the balance between the amount of donation transferred and the needs of funds for the natural disaster.

The second most important variable is the ease of acces. The application designed, should be able to be easily access, easy to do the transaction, easy to understand using simple language or clear symbols and have payment gateway feature. Providing high quality of information, but easy to access for the users is an interesting challenge. It is also a challenge of itself, as how to link the information with the feature of payment gateway which is linked to the bank.

Fig. 1. Registration

The results of the implementation of mobile apps for donors based on input from the questionnaire can be seen in Figure 1 for the process of registration, Figure 2 for entering the amount of donations, Figure 3 for selecting payment methods, Figure 4 for payment by credit card and by bank transfer, Figure 5 for Donation History.

Fig. 2. New Donation

Fig. 3. Payment Method

Fig. 4. Payment using Credit Card and Bank Transfer

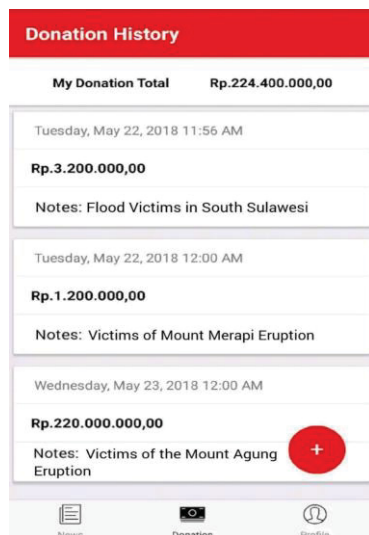


Figure 5. Donation History

V. CONCLUSIONS

This research tries to develop a Donation Application and Volunteers Application for The Indonesian Red Cross using a mobile device. In the effort of developing an effective mobile device application, characteristics of the user candidates as respondents of the survey, have to be put into consideration. The respondents are represented by the community in Surabaya, the second biggest city in Indonesia with quite big number of smart phone users. The questionnaires were distributed randomly to 100 respondents in various range of ages.

The result of the initial research is very interesting as there have been not so many people giving donation via website, though their willingness to donate is very strong. The huge participation of the society in giving donation is also indicated by the number of respondents who gave donation via coupons and donation box of the Indonesian Red Cross, which scope of information distribution is very limited. Therefore, this Mobile Device Donation Application for the Indonesian

Red Cross has a big prospect and is very possible to be run effectively. To be able to have an easy and wide range of access, the expectations of the user candidates have to be analyzed. The survey conducted shows that the user candidates expect that the application could provide information of quality, in continuity and ease of access. It is quite a challenge to develop an application with having an effective interaction between the application and the users.

Based on the survey, the interaction most expected by the users, is the quality of information which means that the application can provide reliable and up to date information. Therefore, the application has to be designed with information in the front page and keep the quality of the information by limiting the users who could provide information. Those who provide information should be front liners in taking care of the logistics of the disaster, as the ones who know best of the situation. The second expected interaction is the ease of access on the process of donating. Therefore, the application should be designed with the access to the process of donating being placed at the same page with the information provided, to make it easy for the respondents to give donation. Finally, the results of the questionnaire received from the respondents were implemented.

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