Profiling Users of Technology Used to Deliver Disaster Warning Messages

(Study of SMS for early warning messages in Semarang, Indonesia)

by

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DECLARATION

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Adelaide, 5th March 2019

Dinar Mutiara Kusumo Nugraheni

LIST OF ABBREVIATION

APCICT	Asian and Pacific Training Centre for Information and Communication Technology for Development
BPBD	Badan Penanggulangan Bencana Daerah
BPBN	Badan Penganggulangan Bencana Nasional
CoU-HMCI	Context of Use in Human-Mobile Computer Interaction
EOU	Ease of Use
EWS	Early Warning System
FOU	Frequency of Use
GSM	Global System for Mobile Communications
GTZ	Gesellschaft für Technische Zusammenarbeit
Ha	Hectare
KSB	Kelompok Siaga Bencana
S1	Strata Satu
SBREC	Social and Behavioural Research Ethics Committee
SD	Sekolah Dasar (Elementary school)
SEM	Structural Equational Modelling
Sig.	Significance
SMP	Sekolah Menengah Pertama (Junior High School)
SMS	Short Messages Services
SMU	Sekolah Menengah Umum (Senior High School)
SN	SMS Notification
SPSS	Statistical Package for the Social Sciences
SV	SMS Verification
TAM	Technology Acceptance Model
TTF	Task Technology Fit
UCD	User Centred Design
URT	User Readiness for Technology

UN-ISDR United Nations International Strategy for Disaster Reduction

Z_{obs} correlation coefficients

ABSTRACT

The use of technology has proven effective to help the dissemination of early warning messages to end users. Moreover, as technology advances, there are many options that can be used to deliver early warning messages. Prior studies have recommended that effective technology to deliver early warning messages should: deliver warning messages in local languages; consume minimal electrical power; be low in cost; and be used by many people.

Problems discovered with early warning messages referred to the user's ability and skill with using technology. In addition, no existing methodological tools were found that can help the information system designers and the authorities to recognise the user's skill with using technology to access the early warning messages.

From the literature, three factors that strongly influence the effectiveness of mobile technology to deliver early warning messages were found: the user's devices, the user's skill, and the user's positive perceptions to use the technology. These factors were refined into metrics, which were: device preparedness, the user's task or skill level (ease of use and confidence with skill), and the user's positive perceptions (usefulness and satisfaction). The aim of this thesis is to provide a methodological tool that can produce a profile of a population group incorporating these metrics for mobile technology that may be used to design effective delivery of early warning messages.

These metrics were validated by evaluating data collected in two surveys. Both surveys were conducted in flood prone areas of Semarang, Indonesia. Recent data (2016) show the majority of mobile phone users in Indonesia were non-smartphone users, so SMS (Short Messages Services) was used to validate the metrics. In addition, the first survey confirmed that people living in flood-prone areas of Semarang were non-smartphone users. Moreover, SMS can be accessed either from a smartphone or non-smartphone.

From evaluating the data from both surveys, the metrics were successfully validated, and they identified typical SMS users for notification and verification services. In addition, it was validated that the verification service was effective for clarifying notification messages when SMS was used for both services to deliver an early warning message.

This thesis proposes a model consisting of a methodological tool that places user at the centre of readiness evaluation to evaluate the potential of technology that may be used to deliver an early warning message. It proposes a model, called User Readiness for Technology (URT) that is beneficial to identify the user's level of skill on device preparedness and tasks for using the technology that will be used to deliver early warning messages. Moreover, this model also identifies the user's positive perceptions of technology.

This thesis contributes the methodological tool for recognising the user's skill level and positive perceptions with technology. The results from this tool provide suggestions, for the information system designers and authorities, for factors that should be considered when choosing the technology to deliver early warning messages. This research contributes to provide opportunities for marginalised communities, especially people living in disaster-prone areas, so they can receive benefit from technology used to deliver early warning messages.

CHAPTER 1 : INTRODUCTION

1.1 Flooding in Indonesia

Indonesia is one of the most disaster-prone countries in the world. Data from the United Nations International Strategy for Disaster Reduction (UN-ISDR) show that, Indonesia was ranked 6 out of 162 countries, with 1,101,507 people exposed to flood disasters (AIPA, 2011). In 2014, Indonesia was recognised as country with the most instances of flood and landslides (Statista, 2016a).

Figure 1-1 shows the size of the flood-prone areas in Indonesia. The colours red, yellow, and green indicate the level of flood threats. The red areas represent a high flood threat, the yellow areas a moderate flood threat, and the green areas a low flood threat. Semarang, where this study was conducted, is located on Java Island, Central Java Province. In Figure 1-1, the island of Java is shaded red indicating that Java is an area that is highly prone to flood disasters (BNPB, 2017).

Figure 1-1 : Map of flood threat index in Indonesia

Flooding is defined as water that rises above the normal water level to cause an overflow from the river in low land on the river side. In Indonesia

the first type of flooding is caused by heavy rainfall above the normal rate which the water drainage system cannot accommodate. This type of flooding is common in urban areas, such as the flooding of Jakarta that occurs every year during the rainy season (Maclean, 2014).

The second type of flooding occurs in agricultural areas and effects the cultivation of crops rice, corn, soybeans and others. The third type of flood is tidal or coastal flooding. It happens because of a lower topography compared with sea level, which experience very high or king tides. The first and the third type of flooding commonly occurs in coastal cities such as Jakarta (Rukmana, 2016) and Semarang (Marfai et al., 2008).

1.2 Background

Many tools have been used in emergency management. One part of early warning system technologies that directly interacts with people or communities living in disaster prone areas is technology that is used to deliver early warning messages. While papers have been published researching the technology used and the information that is distributed, few investigate the effectiveness of the information system from the users' perspective (Kuantama, E., Setyawan, L., & Darma, J, 2012; Erdik, M., Fahjan, Y., Ozel, O., Alcik, H., Mert, A., & Gul, M.,2003).

In Indonesia various technologies are employed to deliver early warning messages such as: radio, television, Short Messages Services (SMS), Facebook, and Twitter (Anggunia & Kumaralalita, 2014). Indonesian authorities used Twitter and Facebook (Carley, Malik, Landwehr, Pfeffer, & Kowalchuck, 2016). Kapoor et al. (2017) recognised social media as tools that can be used for sharing and exchanging information and Twitter was the technology that was commonly analysed to understand user behaviour in sharing and exchanging information during natural disasters or critical events. Early warning messages contain information about current disaster conditions or emergency situations.

The use of technology to deliver early warning messages has been applied by the Indonesian authorities. However, it was acknowledged the problem with technology used to deliver early warning messages in Indonesia was

not about the technology. It was that people living in disaster prone areas do not own the technology necessary for accessing early warning messages and also their lack knowledge of the latest technology that the authorities use for delivering early warning messages (Marfai et al., 2008). *Gesellschaft für Technische Zusammenarbeit /GTZ* (German Technical Cooperation agency) reported when Tsunami early warning system was implemented in Indonesia, one of the major challenges was at the local level. Due to the limited information and guidance from the national authority, the local authorities had limited understanding of the system (Spahn, Hoppe, Vidiarina, & Usdianto, 2010).

A study in Bangladesh also showed that the technologies used to deliver early warning messages could not be accessed by a significant number of people living in disaster-prone areas due to poverty and low levels of education (Velasquez . J et al., 2015). The infrastructure supporting communications technology is also an important consideration.

A study of e-government in New Zealand with aim to assess the usability of e-government, found the local authorities are aware of the users' lack of skill in the use of and lack of access to electronic public services (Asgarkhani, 2005).

Indonesia used SMS for detecting flood (Kuantama, E., Setyawan, L., & Darma, J. ,2012), but the effectiveness of the technology from the users' perspective has not yet been investigated. In Turkey, the Istanbul government employed SMS as tool to warn people about the upcoming earthquake (Erdik, M., Fahjan, Y., Ozel, O., Alcik, H., Mert, A., & Gul, M.,2003), but again the focus was on the function of the tool and not the effectiveness from the message receivers' perspective.

From the above examples, it can be suggested that the problem with the technology used to deliver early warning messages is that the user cannot readily use technology or understand the system when the disaster occurs. In addition, they may not own the technology. These problems occur not only in Indonesia but also in other countries.

Prior studies have suggested that SMS is an effective tool to deliver early warning messages, based on:

- SMS can be accessed from two types of mobile phone (smartphone and non-smartphone), so, it can increase the number of early warning message recipients (Aloudat & Michael, 2011; Samarajiva & Waidyanatha, 2009). SMS can display information in the local language (G. H. Chowdhury, Chowdhury, & Kushchu, 2005; Keoduangsine & Goodwin, 2012; Samarajiva & Waidyanatha, 2009). SMS is useful when the alphabet characters in the local language can be written using the international alphabet that is available on mobile phones. Therefore, it should be no problem for people in Indonesia to relate to the information displayed.

- For areas with a limited electricity supply, using SMS to deliver early warning messages is more effective than using television, which consumes more electricity (Mahmud, Akter, & Rawshon, 2012). This research was conducted in 2012 in Bangladesh where limitations of electricity supply still occurs. In addition, the conditions in Bangladesh could be different from other countries. It should be noted that electricity problems do not occur in all areas.

Thus there are identified problems with using social media and identified advantages for using SMS. Consequently the identified need is for methodological tool that can elicit the necessary characteristics a user should have to use technology for early warning messages, especially when creating the usability specification the situation to a public notification service.

As the user and context is an essential part in any working system (Folmer & Bosch, 2004), it should become a priority for the authorities and information system designers to identify the user's characteristics with the technology that is to be employed.

It follows that the technology, used by authorities to provide public services, is vital for users to own and use if they wish to receive authoritative services.

Alryalat, Dwivedi, Williams, and Rana (2011) noted, in their systematic review, that the Technology Acceptance Model (TAM) is a popular theoretical model used to find user problems with technology. Consequently, user problems can be identified and used as indicators by the authority to decide the effectiveness of the services.

Research on evaluation of user's characteristics with technology used to deliver early warning messages has not been found.

There is a gap in terms of the user's characteristics with technology used to deliver early warning messages, which has so far not been identified by authorities or information system designers. It will be useful for them to have a methodological tool that can be used to recognise the user's characteristics and provide information about the users that can help the process of technology selection for the delivery of early warning messages.

1.3 Motivation

This research has been inspired by the personal experience of living in a flood prone area in Semarang, Indonesia. The researcher knows that people who live in disaster-prone areas are people who live in poverty and with a low level of education. This empirical knowledge is supported by the World Bank report "Disaster risk, climate change, and poverty: assessing the global exposure of poor people to floods and droughts" (Winsemius, HC, Jongman, B, Veldkamp, TI, Hallegatte, S, Bangalore, M & Ward, PJ 2015)

The Indonesian authority to deliver information uses technology, such as Twitter and Facebook. However, a prior study has shown that people who could use smartphones and Internet are usually those who have higher levels of education and/or have better economic means (Poushter, 2016).

Therefore, it becomes a concern when the authority uses the latest technology to deliver early warning messages. Which people actually receive the early warning messages? Do people living in disaster-prone areas receive benefits from the technology that is used to deliver early warning messages?

The second motivation is to minimise problems in the dissemination of early warning messages. Good preparation and planning in the selection of technology used to deliver early warning messages can help more people receive benefit from the technology. This study considers a user's characteristics as valuable information. Identifying user characteristics with regard to technology should be conducted before the technology is applied to deliver early warning messages. Consequently, I am motivated to provide a methodological tool that can help the authorities and information system designers to collect these data.

The implication of research is to provide methodological tool that can be used to investigate the user's characteristics for interacting with technology.

1.4 Aim and Objectives

The aim of this study is to provide methodological tool that can be used to investigate the user's characteristics for interacting with technology that will be used to deliver early warning messages.

To achieve this, the aim is split into the following objectives to be met.

i. Determine the effectiveness of mobile technology for delivering early warning messages from the user's perspective;

ii. Determine the measurements for user-centred evaluation of mobile technology to deliver early warning messages;

iii. Provide empirical evidence for the effectiveness of mobile technology for delivering early warning messages from the user's perspective;

iv. Design a model that includes and facilitates user contribution to the effectiveness of mobile technology used to deliver early warning messages.

1.5 Potential contribution of this research to theory and implication to the practice

This research contributes to theory and to the practice in the evaluation of information systems that delivers a service to the community.

The potential contribution to theory is the evaluation for the information system that delivers a service to the end user by using model, based on the usage of SMS as an early warning message.

The potential implication to practice is the evaluation method of an end user's technology readiness, before the information system is distributed implemented to the community.

1.6 Research Procedure

The research procedure described as follow:

a. Recognised problems

Identification of features of early warning messages, such as warning forms, issues in the dissemination of early warning messages, and indicators for an effective mobile technology to deliver early warning messages.

b. Defined metrics

Adaptation of factors defined in previous studies to metrics that can be used to capture a user's characteristics with interacting with technology used to deliver early warning messages. It suggests, when designing an evaluation to measure the effectiveness of a system, the evaluation method should be adjusted according to the conditions in which the system will be implemented (Jokela, Koivumaa, Pirkola, Salminen, & Kantola, 2006).

c. Ethical research

Ethics approval was received from the Flinders University Social and Behavioural Research Ethics Committee Project no. 6817. Ethics approval was necessary as this study involved human participants.

d. Validated the metrics

Evaluation of the metrics to capture the profiles of typical SMS users in emergency conditions, typical SMS users in notification and verification services to deliver early warning messages, and identified the effectiveness of verification services in an early warning message. The metrics successfully captured the profiles of typical SMS users for flood warning messages and validated the effectiveness of verification services in Semarang, Indonesia.

e. Data collection and data analysis.

The data was collected in the flood prone area in Semarang, Central Java, Indonesia. The context of the data was the user's perception after using the technology to access information in emergency situations. These data were collected by using a paper-based survey. The IBM Statistical Package for Social Science /SPSS tool (version 22) was used to analyse the data.

f. Provided a methodological tool

Validated metrics were used to create a methodological tool that can be used to capture information about user characteristics on mobile technology used to deliver early warning messages.

The research work procedure can be seen in Figure 1-2.

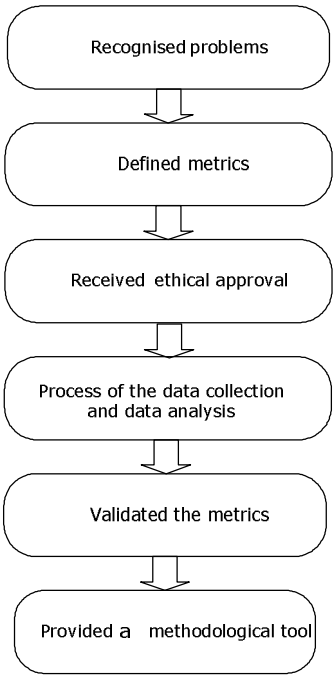

Figure 1-2: Research procedure

1.7 Thesis Structure

This section presents the thesis outline that shows the approach taken in this research project. This thesis consists of eight chapters (Figure 1-3).

The first chapter introduces the problems that exist when technology is used to deliver early warning messages, prior research suggesting SMS as a tool to deliver early warning messages, and explanation of the aim, procedures and contributions of this thesis.

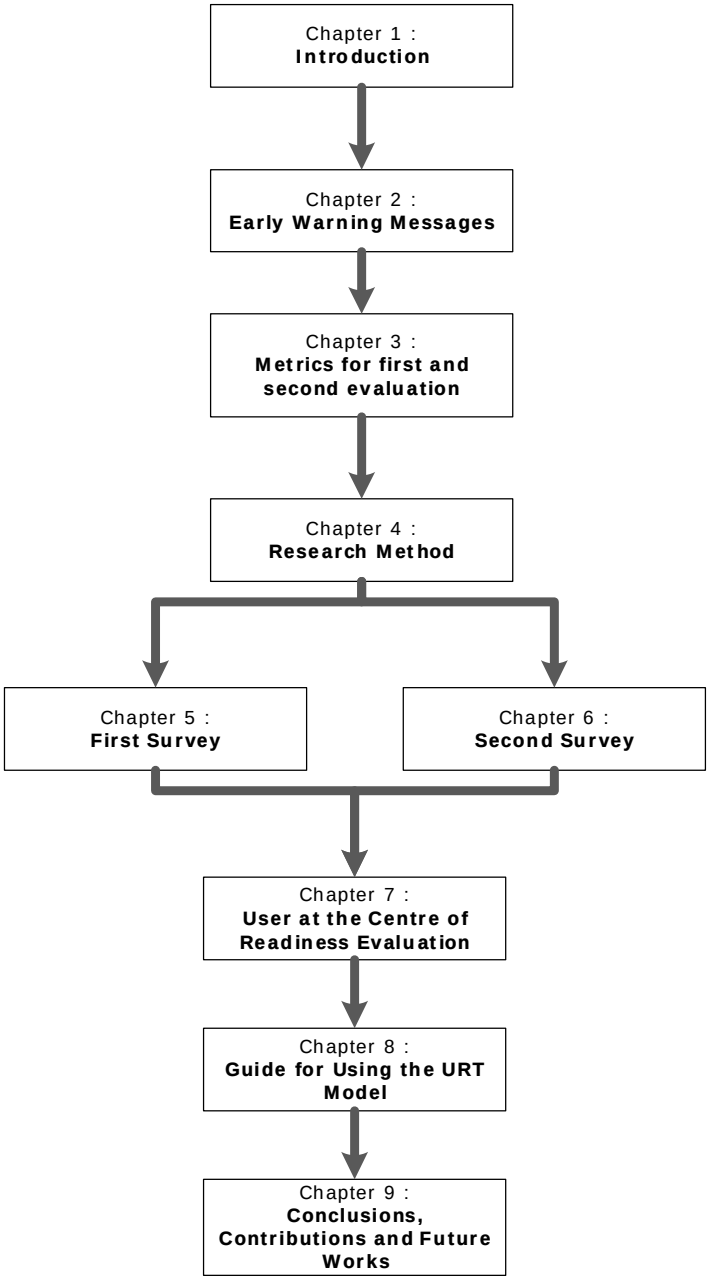

Figure 1-3: Thesis structure

The second chapter provides an explanation of early warning messages, including: the techniques used to notify people in emergency conditions, the dissemination's method of early warning messages, and the factors that influence the technology used to deliver early warning messages from the user's perspective.

The third chapter reviews the literature regarding metrics in prior studies that put the user at the centre of the evaluation. The aim of this chapter is

to expand the factors recognised in Chapter 2 and adjust them into metrics and measurements that can be used to investigate the user's characteristics with utilising mobile technology that will be used to deliver early warning messages. This chapter explores a user-centred evaluation model, such as Technology Acceptance Model, Task Technology Fit, and usability theory; the identification of methods to assess a user; a definition of metrics for a user's device preparedness, skill level and positive perception and a determination of the independent variables.

The fourth chapter explains the methodology that was used on the first evaluation and second evaluation. In addition, this chapter describes the selection process for data collection, participant selection, and the methods used for analysing the data. This chapter also addresses the ethical issues that could occur when presenting the data.

The fifth chapter presents the results and discussion for the first evaluation to investigate the typical users of SMS in emergency conditions. Analysis of statistical data was used to capture profiles of a typical user from mobile technology users during emergency conditions.

The sixth chapter presents the results and discussion of the evaluation on the effectiveness of verification services to confirm flood early warning messages. This evaluation also captured the profile for mobile technology users on verification and notification services.

The seventh chapter provides a general discussion of metrics that were used in the first and second evaluation. An approach is proposed to the user variables that influence the effectiveness of mobile technology messaging in emergency situations. Furthermore, this chapter presents the validation process for readiness evaluation of mobile technology to deliver early warning messages from the user's perspective (device preparedness, task and positive perception).

The eighth chapter provides guidance for using User Readiness of Technology (URT) model.

The ninth chapter concludes this research project, describes the limitations of this study, and provides recommendations for further research.

1.8 Summary

Significant problems in emergency situations with the technology used to deliver early warning messages are that the user cannot access the technology, the user does not own the technology, and the authority cannot recognise the user's skill with the technology.

It is recognised that some problems occur because the authorities and information system designers cannot discern the user's characteristics with interacting with technology that is used to deliver early warning messages.

Factors have been identified that suggest the effectiveness of SMS to deliver early warning messages is based on SMS characteristics, such as: SMS can be accessed using a smartphone or non-smartphone to increase the number of early warning message recipients; SMS consumes minimal electric power, SMS is low cost, and SMS can deliver warning messages in local languages or symbols.

CHAPTER 2 : EARLY WARNING MESSAGES

Part of this chapter has been published in the following conference proceedings:

- Nugraheni, D.M.K., and de Vries, D., "Improving the Effectiveness of the Dissemination Method in Disaster Early Warning Message", E Proceeding of the International Conference on Information Technology & Society 2015, 2015

2. 1 Introduction

Technology use in society influences the implementation of technology used in emergency management. For instance, in emergency management communication, the use of social media and Short Messages Services (SMS) during the Haiti earthquake was useful in aiding with the coordination volunteers after the disaster (Dugdale, Walle, & Koeppinghoff, 2012). Twitter was also useful to collect data on users' locations during the emergency condition (Vieweg, Hughes, Starbird, & Palen, 2010).

The technology that supports activities in emergency or disaster management works as one package and is known as an Early Warning System (EWS). The aim of providing an EWS is to help communities in disaster-prone areas avoid the disaster as well as, reduce loss of life, injury and property damage (UN-ISDR, 2006)

Prior research and studies on the technology for EWS have been conducted with the aim of improving technology effectiveness. However, existing research has lacked focus due to the massive elements in EWS (Asimakopoulou, 2010) and the difficulties of measuring EWS effectiveness as one package (APCICT, 2010).

The remainder of this chapter will discuss the following: (1) early warning messages in EWS; (2) methods to notify people in emergency conditions; (3) identification of users that have an interest in early warning messages; (4) a review of prior studies evaluating factors used to assess the technology for delivering early warning messages; (5) problems with the

notification method used in early warning messages; and (6) suggested solutions to address a user problem with existing notification system.

2. 2 Elements in Early Warning Systems

The final product for an early warning system is to notify and warn people in emergency situations. As the early warning system is a composite system, this section describes the elements inside the Early Warning System (EWS).

2.2.1 EWS Model Based on Functionality

From the information system designer's perspective, EWS can be categorised based on functionality. An EWS contains a monitoring and data collection layer, an information processing layer, a warning production layer, and an alert dissemination (Meissen & Voisard, 2008). The monitoring and data collection section works to provide data about the disaster situation. Information processing analyses the data before it goes to the warning production section. The warning production section decides which information goes to people who have an interest in disaster situations. The alert dissemination section distributes the alert or the information. Figure 2-1 shows the scheme of an EWS from the perspective of an information system designer (Meissen & Voisard, 2008).

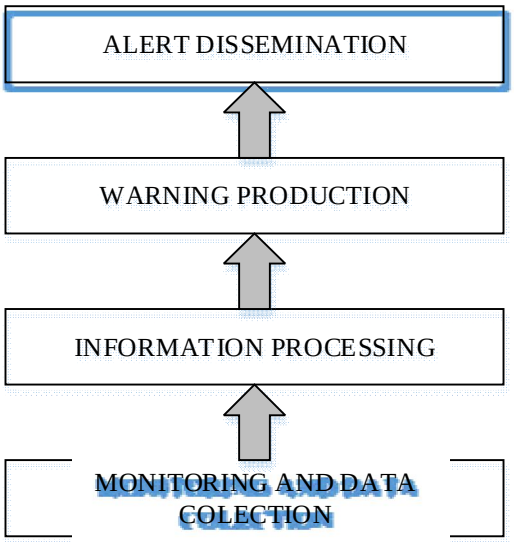

Figure 2-1: The scheme of an EWS from the perspective of an information system designer (Meissen & Voisard, 2008)

As per the Australian Institute for Disaster Resilience, the functionality of an EWS is defined by six components (Figure 2-2).

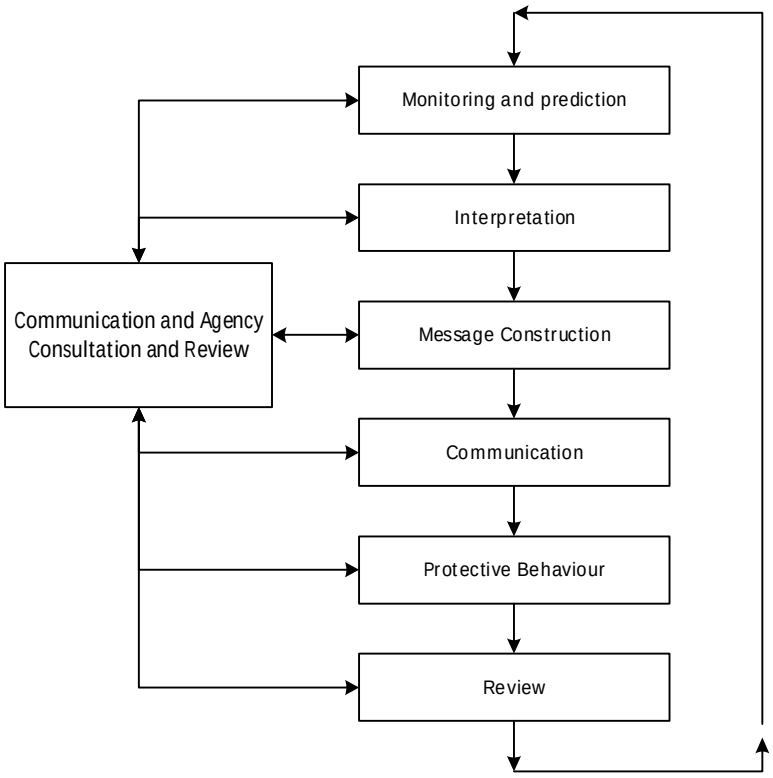

Figure 2-2: The scheme of an EWS for flood warning systems in Australia (Australian Institute for Disaster Resilience, 2009)

The top layer is *monitoring and prediction*. *Monitoring and prediction* layer collects data on current disaster conditions. The data go to the interpretation layer where the data is used to identify the disaster impact on the people. The message construction section formulates the messages before the information goes to the people who have an interest in disaster information. From the *communication* layer, it continues with actions to *protective behaviour* layer. Each layer relates to communication, agency consultation and review.

The Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT) has a different perspective for categorising the elements in EWS (APCICT, 2010). The EWS is divided into two sections: monitoring and output of information. The monitoring section consists of the functions forecasting, mapping, monitoring and modelling. The output section refers to dissemination of information and communication processes.

2.2.2 EWS Model Based the users' responses

Based on users' responses related to disaster management that is performed by users, the United Nations Inter-Agency Secretariat of the International Strategy for Disaster Reduction (UN-ISDR), divided EWS into risk knowledge, monitoring and warning, dissemination and communication, and response capability (UN-ISDR, 2006). Risk knowledge refers to predicting the risk and using the resulting knowledge as a resource for predicting further disasters. Monitoring refers to observing and forecasting hazards while, the warning service provides information from analysis of disaster monitoring. Dissemination and communication is the process of disseminating a hazard's information by communicating between agencies and communities. Response capability refers to community ability to handle the hazard.

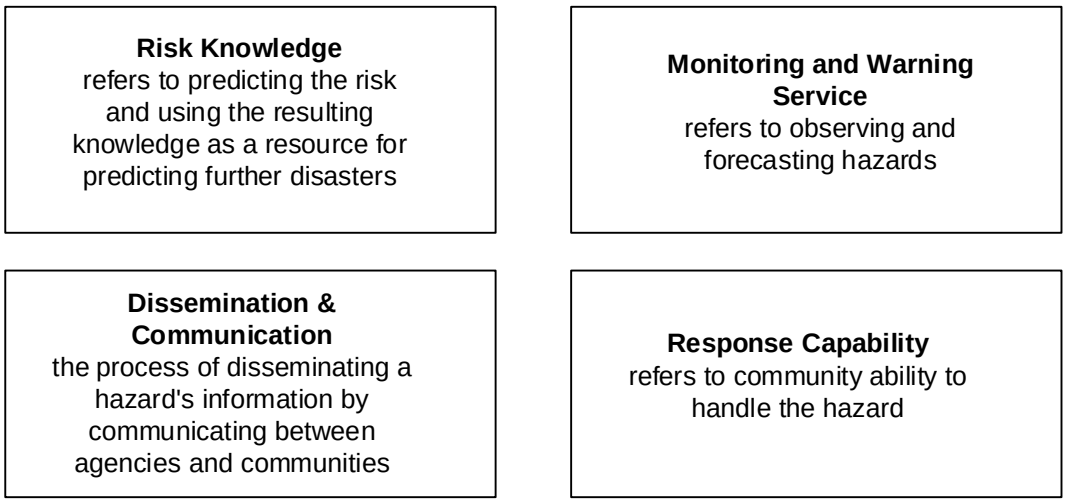

Figure 2-3 EWS Model focused on users' responses

2. 3 Techniques to Notify People in Emergency Conditions

This section describes techniques that are commonly used for notifying people of emergency situations.

2.3.1 Alert

An alert is a method that involves using loud sounds to attract attention in an emergency condition. The use of an alert is popular because it attracts

people's attention (Kesper, 2007). Alerts are only useful to those close enough to those in range (Chanawongse & Wattegama, 2007). In addition, alerts can create mass panic and chaos (Proulx & Sime, 1991).

To address the mass panic and chaos caused by alerts, the authorities need to conduct regular training for people who live near them. However, there are still draw-backs to conducting training, such as cost and time (Mahmud et al., 2012). Therefore, it is recommended to send warning messages before an alert is sounded (Proulx & Sime, 1991) so that, people can understand the emergency situation and prepare accordingly.

2.3.2 Early Warning Messages

Early warning messages contain information about current disaster conditions or emergency situations and are different from alerts. An early warning message can include more information while alert does not contain any information just a sound that attracts people attention.

Warning messages can also be disseminated through loudspeakers, such as the use of mosque loudspeakers in Indonesia (Kesper, 2007), to inform people of emergency situations . However, sometimes the quality of the equipment influences the ability of people to understand the content of the message. In addition, the use of local languages and accents to deliver information can also influence users' perception of messages content.

Early warning messages deliver information about the current disaster condition (Uddin & Awal, 2013) or they can serve as a reminder for tasks that people should be doing when a disaster occurs (Proulx & Sime, 1991).

This study employs the emergency situations in terms of flood disaster conditions.

The following section describes the type of users who have an interest in early warning message technology.

2. 4 Users Who Have an Interest in Early Warning Messages

In the provision of public services, it is essential to focus on the users who use and receive benefits to early warning messages system (Bertot, Jaeger, & McClure, 2008; Følstad, Jørgensen, & Krogstie, 2004). To understand technical skill level users can be classified based on how frequently they use a system (El-Kiki & Lawrence, 2006) or their position within an organisation (Sagun, Bouchlaghem, & Anumba, 2009; Velasquez . J et al., 2015)

In terms of understanding the users who have an interest in early warning messages, the users are classified, based on familiarity with technology and experience with emergency conditions. There are the *authority* (owner), and the *user* (recipient) of the disaster information (the community who lives in a disaster-prone area) (Nugraheni & deVries, 2016).

Recognition that the user‘s characteristics when using technology are rarely identified by the authorities and information system designers because there has been no methodological tool that can be used to identify the user’s characteristics when interacting with technology.

2.4.1 The Authority

The authority is the owner of the information on the disaster condition. It becomes the authority’s responsibility to disseminate the emergency information to the communities. The authority consists of staff that understand the emergency preparation process for handling a disaster (Yap, 2011). The staff have the ability and capability to access the technology that is used to deliver early warning messages. In addition, the authority staff are people who always use the system as part of their work (El-Kiki & Lawrence, 2006). The authority is interested in technology that can deliver messages to many people.

2.4.2 The User of the Disaster Information

The community living in the disaster-prone area is the user who receives the information from the authority. This type of user is a user that needs

information on current emergency conditions. These users are those who use the system only when emergencies occur (Spahn et al., 2010)

Moreover, this type of user has no preference for technology. This user uses technology to access public services based on the authority's preference for technology that can be used to deliver the services (Følstad et al., 2004).

2. 5 Dissemination of Early Warning Messages.

There are two methods to disseminate early warning messages to the user of the disaster information: notification and verification. The following sections describe the challenges of using notification services, and the solution to address the user's problem in notification services.

2.5.1 Challenges of Using Notification Services

Delivering early warning messages notifications is achieved using the push messaging services method. The authorities send notifications of warning messages to multiple recipients (Samarajiva & Waidyanatha, 2009). Typically, the messages go directly to the user.

The problems with using notification services to deliver early warning messages are described below:

- ***Incidents of Hoax messages***

  Incidents of hoax messages have occurred during several emergency situations. Examples include the tsunami hit in Mentawai in October 2010, the Merapi volcano eruption in Yogyakarta in November 2010, the earthquake and tsunami alert in Jakarta in 2010 and 2011, respectively, and the tropical storms in Jakarta in February 2012 (BNPB, 2015). As described, the use of hoax messages has not only happened once, but has occurred frequently when disasters strike. The hoax message incidents make early warning messages using notification services ineffective.

- ***Multiplication phenomenon***

  In emergency situations, there is also the *multiplication phenomenon* that refers to information that is spread by those who have already received early warning messages. The aim of multiplication phenomenon is to share information. The person resending the messages may not have the same negative intent as people sending hoax messages, because the people who resend the information, who are often family, friends or neighbours, believe the information is essential and needs to be spread (Hellriegel & Klafft, 2014; Nagarajan, Shaw, & Albores, 2010; Dennis J. Parker & Handmer, 1998). However, this type of warning message can be dangerous because it can cause problems when the information is out of date.

- ***No priority network access for early warning messages***

  Using technology to deliver early warning messages can cause traffic congestion on the telecommunication network. It is a system issue, because early warning messages need to be delivered to the right person and deliver at the right time (Abdul Aziz, Hamizan, Samiha Haron, & Mehat, 2008; Aloudat, 2010; ETSI, 2006; Samarajiva & Waidyanatha, 2009).

- ***Undelivered early warning messages***

  From the system perspective, the telecommunication network can become overloaded when many users are using its services; this can cause undelivered messages (ETSI, 2006). The information carried by the network has a certain lifetime. When there is data congestion on the network, some of the information will be lost. That is the reason some of the messages are not delivered to the users. In an emergency condition, a few people might not receive the early warning messages (D. J. Parker, Priest, & Tapsell, 2009; Sagun et al., 2009).

Uncertainty with early warning message information can cause the community to panic, leading to chaos. A direct call to the authority can help users to receive warning messages with certainty. However, direct calling has disadvantages such as, the telephone network becoming

overloaded or the absence of staff to answer the call (Samarajiva & Waidyanatha, 2009).

This thesis proposes a method to address the problem of hoax messages and multiplication phenomenon by adding verification services to early warning messages (Nugraheni & deVries, 2015). The problems within the authorities, such as bureaucracy or internal organisational communication are out of scope. The focus is on the community and its users and investigates the effectiveness of technology that can be used to deliver early warning messages.

The next section explains the concept of verification services in early warning messages.

2.5.2 Verification Services in Early Warning Messages.

Prior studies have shown the use of SMS as notification services and verification services in e-banking and e-commerce to secure the transaction (G. J. Peevers, 2010; Riley, Schmidt, & Tubin, 2011; Unni & Harmon, 2007), and in e-government to aid the authority in delivering government information services to the public (Shih, 2006; Susanto, Goodwin, & Calder, 2008).

The banking verification gives an option to mobile banking's users for verifying information. So, the user has access to their bank account information. The verification messages in EWS help people, who live in disaster prone areas, to confirm warning information from the authority.

Therefore, the author recommends employing verification services using a *pull* method to clarify the information delivered in early warning messages. When verifying messages using the *pull* messaging method, each user can access the information. The users do not need to be pre-registered to access the verification service, but it is essential, that users understand the procedure to access them. The advantage of using verification services is that it gives the user freedom to control the information that goes to their mobile-phone (Wu, Qu, & Preece, 2008).

The effectiveness of verification services in early warning messages is described in Chapter 7.

2. 6 Elements that Contribute to the effectiveness of Technology Used to Deliver Early Warning Messages

Along with the increased number of mobile phone users, many researchers have suggested using technology available in mobile phones to deliver early warning messages. For example short text messages like SMS (Abdul Aziz et al., 2008), email, and web browser or messenger applications (APCICT, 2010; Chanawongse & Wattegama, 2007).

The following section identifies several factors from prior studies suggested as indicators that influence the effectiveness of technology to deliver early warning messages. Prior studies have shown that an effective technology should: be able to disseminate the messages to many users or groups (Aloudat, 2010); be able to deliver warning messages in local languages (Chanawongse & Wattegama, 2007; Meier & Munro, 2010; Velasquez . J et al., 2015); have no limitation on the amount of information (Aloudat, 2010; ETSI, 2006; Kesper, 2007; Velasquez . J et al., 2015); be able to be accessed from any type of mobile phone handset (Aloudat, 2010) , and be able to deliver early warning messages to users in any location (Aloudat, 2010; Susanto et al., 2008).

By using the previous studies' suggestions for indicators that contribute to the effectiveness of technology for delivering early warning messages, a comparison of three technologies that can reasonably be used to deliver early warning messages is shown in Table 2-1.

Table 2-1: Comparison of SMS and other mobile phone applications for delivering early warning messages

No.	Indicators for an effective technology to deliver early warning messages	SMS	Email	Web browser
1	Messages can be sent to a group (Aloudat, 2010)	yes	yes	yes
2	Language format will be identical for all recipients	yes	yes	yes
3	The amount of information is limited (Aloudat, 2010; ETSI, 2006; Kesper, 2007; Velasquez . J et al., 2015)	yes	no	no
4	All mobile phone handsets are supported (Aloudat, 2010)	yes	no	no
5	Can read and receive the messages in any location (Aloudat, 2010; Susanto et al., 2008)	yes	yes	yes
6	Messages are received as soon as the mobile phone switched *ON* (Sagun et al., 2009)	yes	yes	yes

As shown in Table 2-1, sending warning messages using SMS has limitations on the amount of information (Ismail & Husen, 2013). Email and web browsers require a smartphone and internet connection to access the warning messages.

Prior research shows that from a user's perspective, there are three factors that should be considered to ensure that the technology is effective for delivering early warning messages. The indicators for effective technology from the users' perspective are described below:

- The first is that it is essential that users own and prepare the devices that will be used to receive and access the information (Sagun et al., 2009).
- The second is technical skill for using the technology (El-Kiki & Lawrence, 2006).
- The third, is the user has positive perception towards receiving public service announcements such as early warning messages, users need to be registered with the service (Samarajiva & Waidyanatha, 2009).

Extracting the factors from previous studies, the effectiveness of technology for delivering early warning messaging is influenced by the

condition and readiness of a user's device, the nature of their current skill to use the technology and their positive perception of the system (See Figure 2-4)

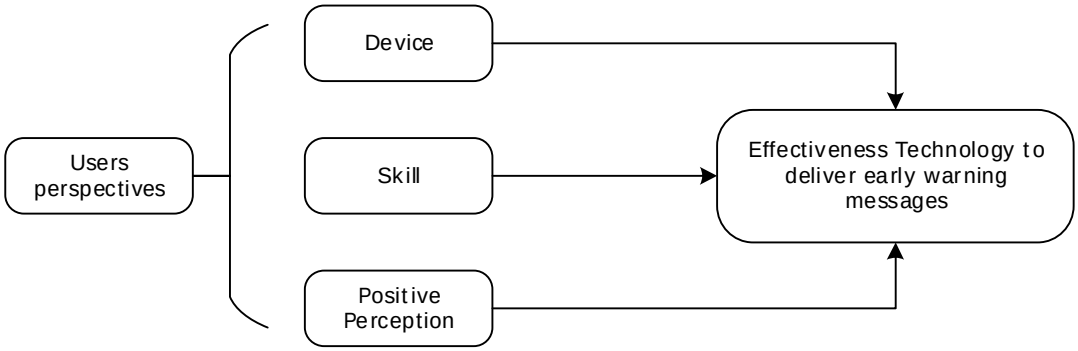

Figure 2-4: Indicators for the effectiveness of technology for delivering early warning messages (from the users' perspective)

Those three elements require further study, so they can be used to evaluate the mobile technology that will be used to deliver early warning messages. This is explored and explained more in Chapter 3.

2.7 Summary

This chapter has discussed:

Two techniques to notify people in emergency conditions, which are alerts and early warning messages. Then, problems with the use of notification services in early warning messages are hoax messages and the *multiplication phenomenon*. A solution to address hoax messages and the *multiplication phenomenon* is provision of verification services in early warning messages.

Related research suggests that the effectiveness of technology to deliver early warning messages should: send the messages to many users; deliver the messages in local languages; have no limitations on the amount of characters. Technology that delivers early warning messages should be accessible in different locations and for different types of mobile phones. Technology user-centric approach to early warning message delivery systems has not yet been explored.

It is essential to recognise a user's device, their skill level in using technology, and their positive perception towards the technology to

effectively deliver early warning messages. Three indicators (device, skill and positive perception) were used to develop a user centred evaluation model of mobile technology to deliver early warning messages.

CHAPTER 3 : METRICS FOR EVALUATION

3.1 Introduction

The previous chapter showed that a user's devices, skill, and positive perception influences their interaction with technology used to deliver early warning messages. When examining technology, Bevan and Macleod (1994) suggested there are three areas that influence the evaluation: the technology, the context the technology will be used and the user. To create user profiles, and measure the effectiveness of verification services, this chapter proposes metrics that appropriate for the user.

The aim of this chapter is to find metrics, which can be used to assess a user's device, a user's skill and a user's positive perception. This chapter reviews a user-centred evaluation model, such as Technology Acceptance Model, Task Technology Fit, and usability theory. Then, this chapter describes methods to assess a user and to define metrics for a user's device preparedness, skill level and positive perception and determinate the independent variables.

3.2 An Overview Technology Acceptance Model

This study reviews the TAM model to understand the elements that influence the user when using the technology to access the information.

The Technology Acceptance Model (TAM) is a model used to explain and predict the user acceptance or intention of use for technology or information system. The TAM assumes user's acceptance technology is influenced by two main factors: *perceived usefulness* and *perceived ease of use* (Y. Lee, Kozar, & Larsen, 2003).

Perceived usefulness defines as user's opinion that presents if the technology or the information system is useful to the user using the technology (Fred D Davis, Bagozzi, & Warshaw, 1989). *Perceived ease of use* refers to a user's belief that they can use the technology without any additional assistance (Fred D. Davis & Venkatesh, 1996).

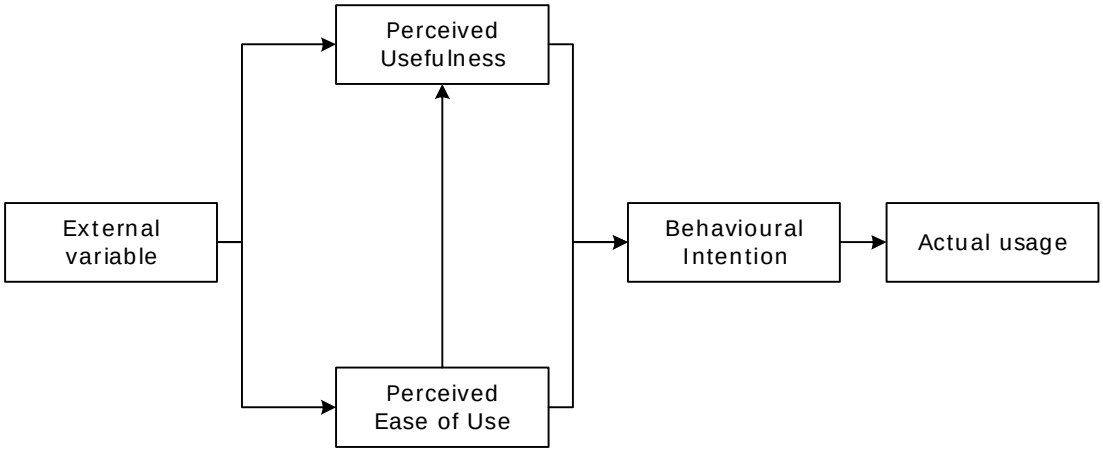

Figure 3-1: The Technology Acceptance Model 2 (TAM2)(Fred D. Davis & Venkatesh, 1996)

Figure 3-1 shows that the user intention of use for technology influences with the usefulness and ease of use (Fred D. Davis & Venkatesh, 1996). The user's ease of use only influences the usefulness but the usefulness does not influence the ease of use. To investigate the user's intention of use, it is essential to understand the correlation between the ease of use and usefulness, as the correlation represents the user's intention of use (Dillon & Morris, 1996).

By understanding the correlation in TAM factors, the authority and information system designer can make a decision on which factors need to be considered to improve the users' acceptance of the technology (Fred D Davis, 1989). The TAM connection factor is focused on a single result where the user accepts the technology. One of example of a tool used to investigate the TAM correlation is Structural Equation Modelling (SEM) (Chau, 1997; Suki & Ramayah, 2010).

Several studies have found the TAM to be useful to identify factors that contribute to a user's intention to use electronic public services (Chen, Vogel, & Wang, 2016; Cigdem & Topcu, 2015; Hung, Chang, & Kuo, 2013; Ozkan & Kanat, 2011; Shareef, Kumar, Kumar, & Dwivedi, 2011; Suki & Ramayah, 2010). The other benefits of the TAM, besides being useful for identifying a user's intention to use electronic public services, were to understand users' needs and expectations for electronic services (Bertot et al., 2008), and helping the authority and information system designer make decisions regarding the continuity of electronic public services

(Alawneh, Al-Refai, & Batiha, 2013; Mahmood, Burn, Gemoets, & Jacquez, 2000; Pereira, Ramos, Gouvêa, & da Costa, 2015).

Furthermore, analysis of the impact resulting from the adoption of new information system also benefited from the use of TAM (Hung, Chang, & Yu, 2006).

However, concern for using TAM was flagged by Nugroho (2015) who suggested that TAM was based on a business setting and the model developed in the context of the user's situation being in a good economic situation and having higher level education, so there will be no obstacle for the user using the technology. In line with Nugroho's opinion (2015) the context of this research investigates the user's readiness when he/she lives in disaster prone area, so, the information system designer understands the user situations and suggests a new model to measure the user's readiness for using a technology.

3.3 An Overview Task Technology Fit

Task Technology Fit (TTF) is a model that focuses on understanding the user task to the impact of technology performance (Goodhue & Thompson, 1995). A Task is the user's action for using the technology. Technology is the tool that is used by the user. Fit is the positive impact on user performance on the technology.

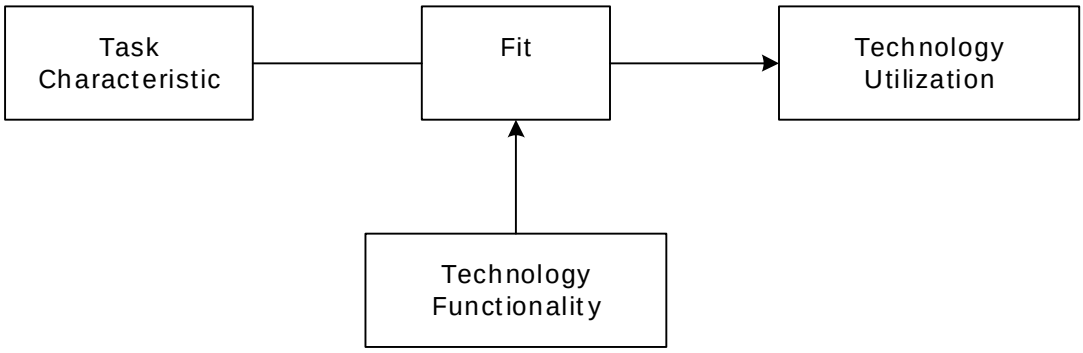

Figure 3-2: Basic TTF Model (Strong, Dishaw, & Bandy, 2006)

Users task characteristics are measured from individual users (Goodhue & Thompson, 1995) or from the user activities group (Zigurs & Buckland,

1998). The TTF model shows that the user's task influences the technology performance.

Other research on the TTF model, provide a deeper understanding of the influence of variable task characteristics and technology characteristics in user willingness to use services that deliver by technology (Füller, J., Mühlbacher, H., Matzler, K., & Jawecki, G, 2009; Oliveira, T., Faria, M., Thomas, M. A., & Popovič, A, 2014; Yen, D. C., Wu, C. S., Cheng, F. F., & Huang, Y. W. 2010).

As a consequence of reviewing the TTF model, it is clear that elements of tasks must be considered when constructing a user profile. In this project, the task characteristics of Ease of Use, Frequency of Use and Confidence with Skill must be taken into account in the survey.

3.4 An Overview Usability Framework

Usability is defined as a method to help the information system designers so they can provide a usable, effective, and quality system for the user (Folmer & Bosch, 2004). . Usability is also known as *quality of use* and is one of the attributes of software quality (Bevan, 1995b).

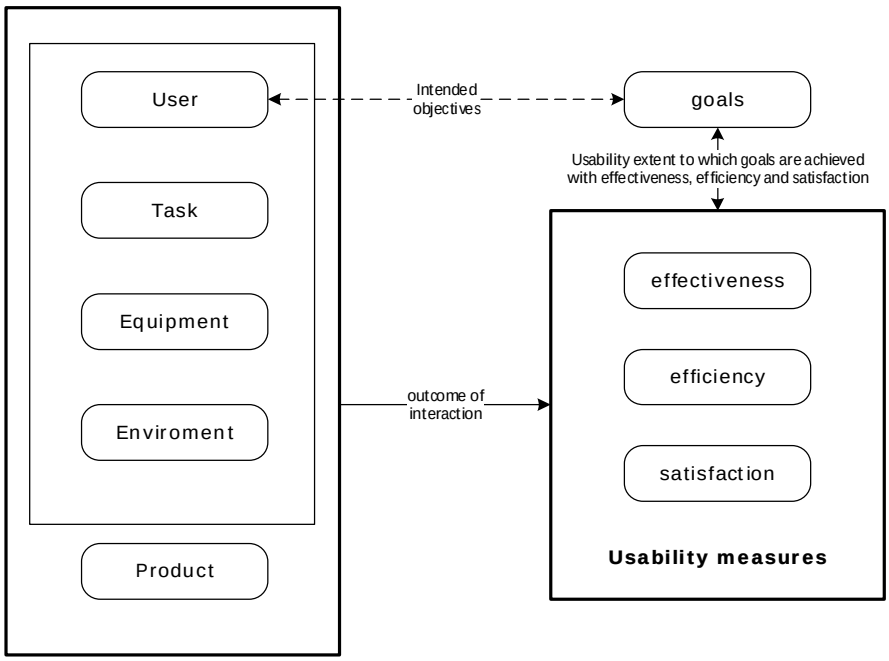

Figure 3-3 : Usability framework (Bevan, 1995a)

As shown in Figure 3-3, a user's characteristics, task, equipment and environment influences the technology's usability (Bevan, 1995a). It is essential to recognise the users' characteristics when applying the usability method (Bevan & Macleod, 1994; Maguire, 2001a). Furthermore, using a real condition or location will be beneficial to achieving accurate results when conducting usability tests (Bevan & Curson, 1997).

By focusing on what makes the technology effective for the user Shackel (2009) recommended several approaches to include users in the information system development process. The first is *user centred design* (UCD). In UCD, it is essential that users recognise their task when using the technology (Shackel, 2009). UCD is about understanding that users will be using the technology (Gulliksen et al., 2003). The UCD process requires two evaluations: pre-user data collection, which aims to identify the users, and post- user data collection, which assesses the technology or system. A user profile is one of the outcomes from implementing UCD that helps to understand the user's task and characteristics with respect to technology (Vredenburg, Mao, Smith, & Carey, 2002). Usability is a method used for identifying the user and testing the technology in UCD.

The second is *participative design, which refers to* a user being involved with the system design team (Shackel, 2009), so they can contribute to design of the system, particularly when creating the usability specification. User participation incorporates electronic services development and the electronics that need to be achieved (Karlsson, Holgersson, Söderström, & Hedström, 2012). This provides many benefits, especially when it comes to the system development phase.

The third is *experimental design*. Users are only involved in the testing phase when they test the system in a secure environment (laboratory) and evaluate only the system prototype.

The last is user *supportive design*. An approach where a developer adds an additional feature to the system such as a "help system" to assist the user when using the system.

It should be noted that the usability system depends on user variables and the current task (Eason, 1984). In usability theory, when examining the technology, it should be considered whether the users can use the system successfully (Shackel, 2009). Therefore, the usability focus will be on determining users' skill for using the technology or the information system. In the usability specification, this is represented by the users' success rate when using the system (Rosson & Carroll, 2009).

The Pew Research Center survey data in 2016 showed that people in Indonesia with higher education owned a smartphone compared with people with less education (Poushter, 2016). The data about the ownership and level education actually do not correlate. The data showed that the education level gap encourages the ownership of smartphone or latest devices. However, the ownership of the technological devices can not present the user's skill for using the technology. Consequently, specifically investigating the user's skill with technology can help the authority and information system designers identify the potential user of services and select an appropriate technology for delivering public services.

In technology used to deliver early warning messages there is no methodological tool or data on the **user's skill.**

This research considers, that usability elements theory are more suited to understanding the user's profile of those that will potentially use technology to receive early warning messages.

3.5 Measuring Users

User's interactions with a system are influenced by physical context (situation and location) (Bradley & Dunlop, 2005; Jumisko-Pyykkö & Vainio, 2012). When evaluating a technology for emergency situations, it is essential to understand non-technical characteristics such as the type of hazard and condition of the area (Asimakopoulou, 2010). Furthermore, different situations and conditions influence the evaluation result (Maguire, 2001a).

With the acknowledgment that users should be at the centre of evaluation, there are two measurement methods that can be used.

3.5.1 Performance Measurements

Performance measurements can be observed directly by the researcher and are based on the users' physical activity. For example, recording how long it takes a user to complete or finish a task when using the system, or counting how many errors the user makes while using the system (Jokela et al., 2006; G. Peevers, Douglas, & Jack, 2008).

Generally, when measuring user performance, it is recommended to use a laboratory to conduct the testing (Eason, 1984). The use of a laboratory or secure environment is useful to avoid interruptions that can affect the user's performance when testing the system (Kaikkonen, Kekäläinen, Cankar, Kallio, & Kankainen, 2005; Roto et al., 2004).

3.5.2 User Perception

User perception is another measurement commonly used when users are at the centre of the system evaluation and refers to users' opinions and judgements (Nielsen & Levy, 1994). The user's perception of technology use is essential because it can influence the system information (G. G. Chowdhury & Chowdhury, 2011; Wilson, 2000)

In the context of interactions with the system, the user's task also influences their perception of the system (Bradley & Dunlop, 2005). To use user perception as a measurement, it is essential that the user has an understanding about the technology. The users' perception is beneficial to the evaluation of technology that is reused to deliver public services; such as SMS, email or messenger applications; because the user already uses the application under normal conditions for communication.

User's perception is also affected by the users' experience when they interact with the system (Kuniavsky, 2007). By using user perception as measurement, the researcher should be careful when analysing the data (Karat, Campbell, & Fiegel, 1992; Nielsen, 1995). Environmental conditions also influence users' perception of the technology usage. The users' perception of using technology in emergency situations can be

different from their perception for using technology under normal conditions (D. J. Parker et al., 2009).

By using the users' perception in the investigation of a technology that will be used to deliver early warning messages, is appropriate for this study. Using user perception as a measurement tool is beneficial to conducting experiments in the field or on location (Roto et al., 2004). Therefore, it is essential to select a suitable location in which to collect data for the users' profile and to examine the effectiveness of verification services.

3.6 Metrics Used for Measuring Users

This section, defines the elements that need to be measured to understand the users' device preparedness, the users' task and the users' positive perception of technology used for delivering an early warning messages.

3.6.1 Device Preparedness

Device preparedness is essential in emergency situations. Users should own and prepare devices capable of accessing technology to deliver early warning messages.

Devices such as mobile phones should be in ready to use condition. It is critical for this case study to investigate user's skill to prepare their own devices to access early warning messages, because the tools and applications owned by the users will influence their perception of the services (Alshehri & Freeman, 2012; Jokela, Iivari, Matero, & Karukka, 2003; Petrie & Bevan, 2009).

Device preparedness supports users in accessing the system (Bradley & Dunlop, 2005; Courage, Redish, Wixon, Sears, & Jacko, 2009; Jumisko-Pyykkö & Vainio, 2012; Maguire, 2001a; Seffah, Donyaee, Kline, & Padda, 2006). Device condition influences their interaction with it (Følstad, 2005; Gauld, Goldfinch, & Horsburgh, 2010)

Early warning messages are not be considered effective until the user receives them (Velasquez . J et al., 2015). So, the devices should in the *on* condition (Sagun et al., 2009). The battery needs to be in the *steady* condition.

This case study emphasises device preparedness in the *night-time* as the time when most people are unprepared for disaster.

3.6.2 Users' Tasks

Tasks are defined as user actions involving input to the technology to achieve an output from the system (Goodhue & Thompson, 1995).

Investigating the users' task aims to understand their ability or skill level to use technology to disseminate early warning messages. This case study will use *ease of use* (EOU) and *confidence with skill* to help understand this.

3.6.2.1 Ease of Use

In usability, EOU refers to whether a user can understand the procedures to use the system (Lund, 2001). EOU examines the users' process for using the technology (Nielsen, 1992; Shackel, 2009). The knowledge obtained from understanding of EOU, can help to recognise the users' skill with technology and influences their willingness to reuse the system (Aljukhadar & Senecal, 2009).

The author defines EOU as the users' perception of their ability to complete the task to obtain information in an emergency condition. This definition is adapted from Keil, Beranek, and Konsynski (1995), who defined EOU as the users' perception of a task's complexity and its completion to achieve the goal of obtaining information from information system. EOU will contribute more to task assessment (Keil et al., 1995). For this case study, the EOU question was adapted from u*sefulness*, s*atisfaction* and *ease of use* (USE) questionnaire that created by Lund (2001).

3.6.2.2 Confidence with Skill When Using Technology

This thesis investigates the users' perception of their personal skill-level when using technology to deliver early warning messages in emergency situations. A user's confidence in their own skill-level with technology helps them to think clearly when using the system in emergency conditions (D. J. Parker et al., 2009). Moreover, a user's confidence with their own skill-level when using technology influences their intention to use the system

(Parasuraman, 2000), the process of completing a task (Lund, 2001) and the technology performance (Strong et al., 2006). A user's perception of their own skill is also known as *self-efficacy* (Suki & Ramayah, 2010). Previous studies have shown a positive relation between *self-efficacy* and EOU, so confidence with skill and EOU influences each other in the positive direction. The question of understanding the users' confidence with skill when using technology to deliver early warning messages was adapted from Parasuraman (2000) and USE questionnaire from Lund (2001).

3.6.3 Users' Positive Perceptions

It is essential to explore the users' positive perception of the system used to deliver the public services. The author identifies the users' positive perceptions as *usefulness* and *satisfaction*.

3.6.3.1 Usefulness

Lund (2001) and Nielsen (1992) describe *usefulness* as a user's perception of the system being beneficial and warranting the further use of the system. By centring the user in the system design, it is essential that users perceive the *usefulness* of the system (Mao, Vredenburg, Smith, & Carey, 2005). It is also suggested that the *usefulness* of a system is an important metric when using the user's perception to assess the effectiveness of a system (Adams, Nelson, & Todd, 1992).

The second survey will assess the effectiveness of verification services in early warning messages by incorporating the *usefulness* element. Users will also test the technology used to verify the early warning messages. The evaluation of *usefulness* for this case study is adapted from Lund (2001) and Legris, Ingham, and Collerette (2003).

3.6.3.2 Satisfaction

User's satisfaction is assessed after the user uses the system. The reason for investigating the users' perception of *satisfaction* is due to the delivery of early warning messages mostly occurring via existing technology, such as SMS, Facebook, or Twitter (APCTT, 2011; Dugdale et al., 2012), that users already use for daily communications.

Satisfaction refers to the user's positive attitude towards the use of a system (Bevan, 1999). *Satisfaction* is attained when users enjoy using the system and their expectation for the system is real when using the system (Lund, 2001). In addition, *satisfaction* and EOU exhibit a strong correlation in the positive direction (Nielsen & Levy, 1994).

Satisfaction is also considered a significant element that encourages users to use technology (El-Kiki & Lawrence, 2006) and influence their use of electronic public services (Verdegem & Verleye, 2009). The question from USE questionnaire (Lund, 2001) has been adapted to examine user's satisfaction.

3.7 Independent User Variables

Independent variables were used, such as a user's demographic profile and prior knowledge.

3.7.1 Demographic Profile

The demographic profile is useful for describing specific users that potentially use a technology (Mayhew, 2002; Qiao, Rahman, Li, & Yu, 2016). Furthermore, a user's characteristics influence their interactions with technology (Jumisko-Pyykkö & Vainio, 2012; Maguire, 2001b). Acknowledging users by gender, age, and level of education, will help information system designers to provide information systems that all users can use (Shneiderman, 2000).

3.7.2 Gender

Several studies report that gender affects a user's intentions towards the use or acceptance of technology (S. A. Brown, Dennis, & Venkatesh, 2010; Gefen & Straub, 1997; Wang, Wu, & Wang, 2009). As noted by Cooper and Kugler (2009), identifying the user's gender, can show prior knowledge with the use of technology and help understand the societal characteristics. Males and females have different perception of technology (Goh, 2011).

With respect to emergencies conditions, prior research showed there was a difference in trust between males and females when it came to warning

messages information (Mileti, 1995). In addition, there was also a difference between males and females when responding to warning messages for flood disasters (D. J. Parker et al., 2009).

Gender is included to understand whether there is any difference between males and females when using technology to deliver early warning messages.

3.7.3 Age

A user's age can influence their task performance when using technology (Sara J Czaja & Lee, 2009). Several studies into technology adoption showed age as a significant factor that influences technology use (Sara J. Czaja, 2005; Michael G. Morris & Venkatesh, 2000; Michael G Morris, Venkatesh, & Ackerman, 2005). Research on the use of SMS as a communication tool showed that there was no obstacle for a middle aged user group using SMS for daily communication (Soriano, Raikundalia, & Szajman, 2006).

The use of age as an independent variable is essential as an input measurement to understand the users' characteristics for technology used to deliver early warning messages. Therefore, the user's age is included to identify the effectiveness of technology used to deliver early warning messages.

3.7.4 Education

In terms of public services, prior research showed a user's level of education influences their behaviours when accessing e-government information and services (Gauld et al., 2010). Furthermore, data showed that the level of education also influences SMS use (Statista, 2016b, 2016c). Prior research also showed that the educational level of the population affects how technology can be adopted by a country (J.-W. Lee, 2001). In addition, the level of educational also influences the utilisation of the technology (Poushter, 2016).

Users are grouped based on their level of education as governed by the 2003 Indonesian regulation of national education. In Indonesia, the level of education is determined based on the age and ability of students. In

addition, each level of education has differences in the age range and length of education (Noviana, 2014).

The first level is basic education. Basic education is a general education and is conducted for nine years: six years in Elementary School, or *Sekolah Dasar* (SD) and three years in junior high school, or *Sekolah Menengah Pertama* (SMP).

The second level is secondary education. Secondary education is education for primary education graduates. The aim is to prepare students to be members of the community. It is expected that the students will finish secondary education, and will have the ability to establish mutual relationships based on society, culture and the surrounding environment. In addition, students are expected to develop further skills for a working environment or university education. The duration of secondary level of education is three years. The secondary level of education is also known as senior high school or *Sekolah Menengah Umum* (SMU).

The third level is higher degree education. In Indonesia, higher degree education is conducted at a university level. To be eligible for higher degree education students should finish secondary education. The aim of higher degree education is to prepare students to become members of the community with academic and professional skills where they will be expected to apply, develop, and create science, technology or art. A person that studies to this level of education achieves a Bachelor degree or *Strata Satu* (S1). Higher degree education is otherwise known as undergraduate education.

Respondents are grouped based on the Indonesian levels of education. They are divided into four groups: no level of education the participants able to read and write in Indonesian and using a mobile phone, elementary school, junior high school, senior high school, and undergraduate.

3.7.5 Prior Knowledge

It is expected that users will be familiar with technology and can return to the information system whenever necessary without prior training (Dishaw & Strong, 1999; Nielsen, 1992).

In usability, the user experience is influenced by subjective attitudes and feelings towards the system (Lund, 2006). In 2010, ISO 9241-110 Ergonomics of human-system interaction: Human-centred design for interactive systems defined user experience as 'a person's perceptions and responses resulting from the use of a product, system, or service' (ISO, 2010; Vermeeren et al., 2010). The users' experience influences their perception of the system (Lund, 2006).

To investigate prior knowledge and to assess the effectiveness of technology for delivering early warning messages, Frequency of Use of technology (FOU) and users' prior knowledge in disaster preparedness is used. The users' FOU will be used in the first evaluation and users' prior knowledge in disaster preparedness will be used in the second evaluation.

3.7.5.1 User Frequency of Use

Frequency of Use (FOU) refers to how often a user uses the technology under normal conditions and leads to the user's technology use rate. Eason (1984) and Nielsen (1992) suggested that it is essential to understand how often users use technology because their task characteristics influence their usage frequency. So it is essential, to include the users' FOU in the first evaluation. By identifying the FOU is expected that the user is familiar with technology and do not need training for using it (Strong et al., 2006)

Six options were used to identify respondents' FOU. The options were: *once a month; once a week; more than once a week; once a day; more than once a day*.

3.7.5.2 Disaster Preparedness

It is suggested that people who works in regional disaster management agencies or disaster preparedness groups have the skill and confidence to deal with tasks in emergency situations. Furthermore, users' prior knowledge in organisations influence their perception of the system (E. Brown, Fisher, & Brailsford, 2007).

The Indonesian authority that handles disaster coordination for regional areas, is the BPBD (Badan *Penanggulangan Bencana Daerah*) or Regional Disaster Management Agency. The BPBD is an institution that is

responsible for the implementation of disaster management in provinces and cities. BPBD was established based to Presidential Decree number 8 in 2008 (Wikipedia, 2017). The BPBD has the role of establishing disaster management policies and handling disaster victims by acting quickly, accurately, effectively and efficiently; they also coordinate the implementation of disaster management activities; and execute other tasks given by the mayor or head of the region. In disaster prone areas, the KSB (Kelompok Siaga Bencana) or disaster preparedness group helps the BPBD. The KSB is a local community group that voluntarily assists the government.

The KSB members are from the communities that live in disaster-prone areas. The KSB has an important role in helping the BPBD because its members are more knowledgeable about their living conditions and situations (Seftiani, 2014). The aim of establishing the KSB group is to make sure communities that live in disaster-prone areas are able to be the part of the disaster management process.

KSB members participated in the both surveys to help identify the effectiveness of verification services for early warning messages.

3.8 Research Model

3.8.1 Profiling Typical Users of Technology used for Delivering Early Warning Messages

As noted previously, the aim of this study to include the users' demographic variables and prior knowledge understand the typical users of the technology that is used deliver the early warning messages. Figure 3-4 shows a diagram of the process used to investigate the typical user of technology using device, task, and positive perception as assessment.

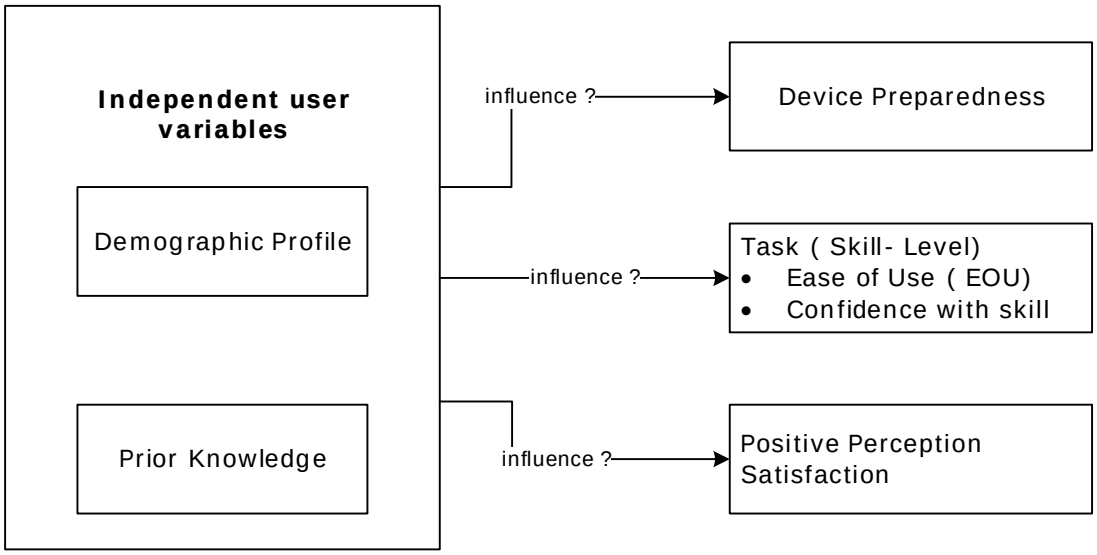

Figure 3-4 : Research components used to capture user profiles and examine the effectiveness of verification services

3.8.2 The Effectiveness of Verification services in Early Warning Messages

The effectiveness of verification services is used to support the notification services as confirmation services to avoid dubious information such as hoax messages and multiplication of information. So, the design for the information system was tested in this study.

To investigate the effectiveness of verification services in early warning messages the correlation between the notification and verification services using *task* and *positive perception* was calculated. This was done to show if the verification services supports the notification services from the user's perceptive. Figure 3-5 presents the factors that were used to investigate a possible correlation.

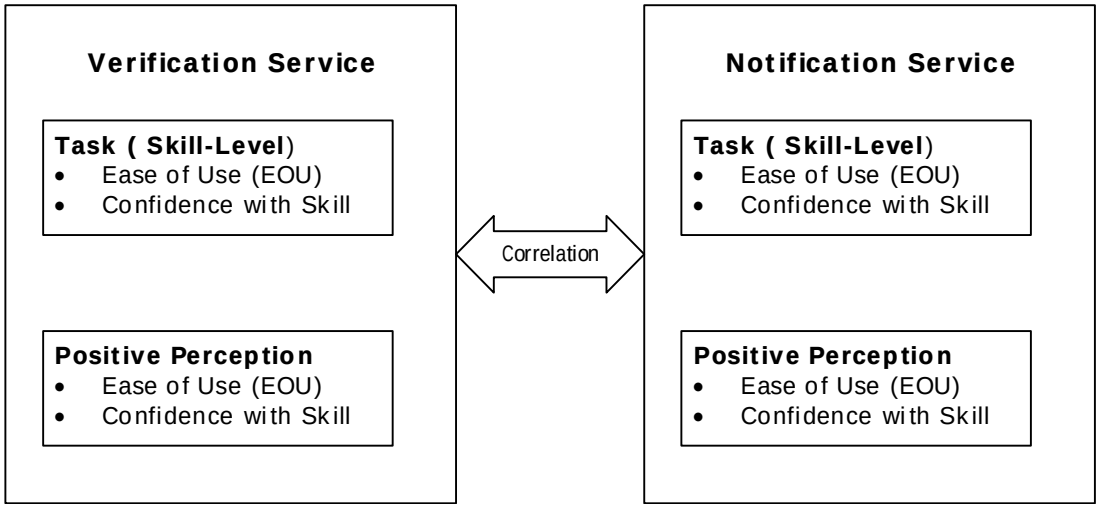

Figure 3-5: Research diagram for investigating the effectiveness of verification services in early warning messages

3.9 Summary

To understand the effectiveness of technology for delivering early warning messages from the user's perspective, elements used were device preparedness, user's task, and positive perception. The measurements were recorded for the area where the user lives.

The effectiveness of technology used to deliver early warning messages is measured by each of the following elements:

- Device preparedness: users own and prepare devices to access the early warning messages;
- Ease of use (EOU): the user can use the technology that delivers early warning messages;
- Confidence with skill: users have confidence with their own skills when using the technology in emergency conditions;
- Usefulness: users gain a benefit from the system and feel they must continue to use the system;
- Satisfaction: users appreciate and enjoy using the technology that delivers early warning messages.

The independent variables that were used as an input to establish user characteristics with using the technology to deliver early warning messages comprise the users' demographic variables (gender, age and education) and prior knowledge (frequency of use for SMS under normal conditions and prior knowledge in disaster preparedness groups /KSB).

CHAPTER 4 : RESEARCH METHOD

4.1 Introduction

From the user's perspective, this study has identified that mobile technology is influenced by the device, level of skill, and the positive perception of using the technology (refer Chapter 2).

In response, appropriate metrics have been defined to investigate the device, skill, and positive perception based on related literature that places user at centre of evaluation (refer Chapter 3).

This chapter describes the selection process for data collection, participant selection, and the methods used for analysing the data. This chapter also addresses the ethical issues that could occur when presenting the data.

4.2 Data Collection Methods.

There are two methods commonly used to collect user responses when evaluating the technology, which are questionnaires and interviews.

Prior studies have suggested the use of questionnaires as an appropriate method of collecting information about a system as well as the user's perception of electronic public services (Hallahan, 2001; Hanna, Risden, Czerwinski, & Alexander, 1998; Zaharias, 2006). The benefits of using questionnaires to collect information from users are the ability to gather many responses in timely and to easily scale the respondent feedback (Humayoun, 2012; Zaharias & Poylymenakou, 2009). It is recommended to use questionnaires that relate to the perception of using electronic public services, such as school, hospital, or government services (Hamborg, Vehse, & Bludau, 2004).

Interview techniques are another method that is commonly used during the requirements and analysis phases when gathering user information. Conducting an interview is a low cost and effective means of identifying a user's needs (Humayoun, 2012).

As this study measures user's perception of technology as metric, the scale that commonly used is Likert Scale. Likert scale is the common scale to be used for identifying a user's perception of technology (De Angeli, Sutcliffe, & Hartmann, 2006; Kuan & Chau, 2001; Lewis, 1995; Sonderegger & Sauer, 2010; Li, 2013).

This study used six options Likert scale, which were: strongly agree, agree, somewhat agree, somewhat disagree, disagree, and strongly disagree. Neutral options were omitted, because clear results were required to assess the participant's tendency to use the technology for delivering early warning messages The neutral options with somewhat agree and somewhat disagree.

The participants in this study were recruited using a direct approach where a questionnaire was handed out to potential participants at a community meeting. The researcher explained the research process, after the questionnaire was handed to the participants, the researcher gave time for the participants to digest the questionnaire and ask for explanations, if required (Appendix C and Appendix D).

The selection of participants to facilitate capturing user profiles for certain technology is a crucial element (Sohaib & Khan, 2010). For this case study, selection was based on each user's location, device ownership, age and skill with reading and understanding Bahasa Indonesian.

4.2.1 Location

When examining the technology used in emergency situations, the user's location is essential because the results represent the user's real perception of the technology (Smith & Dowell, 2000). Furthermore, the user's real situation and location, influence their perception of using technology (Hallahan, 2001; Voss & Carolan, 2012). Location and situation of the user when accessing the information system is included as one of factors in *Physical Context* in the Context of Use in Human-Mobile Computer Interaction (CoU-HMCI model) as shown in Figure 4-1.

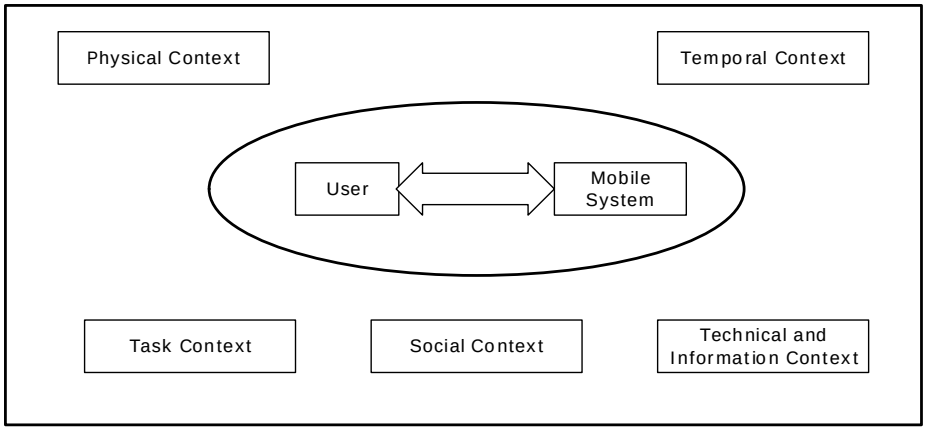

Figure 4-1: A Model of Context of Use in Human-Mobile Computer Interaction (CoU-HMCI)

When recruiting participants, flood-prone areas in Semarang, Indonesia were selected. Figure 4-2 shows that 34.2% of areas in Semarang have a high risk of flooding and 18.12% have a moderate risk. Therefore, Semarang was considered a perfect place for this study to be conducted and data collection to occur.

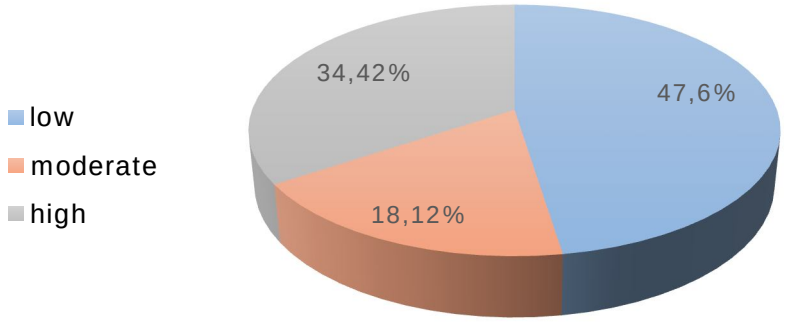

Figure 4-2: The graph represents the risk of flooding in Semarang (Nugraha, Awaluddin, Yuwono, & Aribowo, 2015)

4.2.1.1 First Survey Location

The first survey performs as formative study to aid this study to capture the specific user variables that influence the effectiveness of technology use in emergency conditions. In addition, it also contributes to the validation process of three metrics and user independent variables that will be applied in the User Readiness for Technology (URT) model.

For the first survey, participants were recruited from Bandar Harjo, Semarang, Central Java, Indonesia. The population of Bandar Harjo is classified as 'low-income' (Sulistyaningsih, 2017). The location is near the Java Sea (Figure 4-3),and the area is essential in terms administrative governance in Semarang (Harwitasari & Van Ast, 2011).

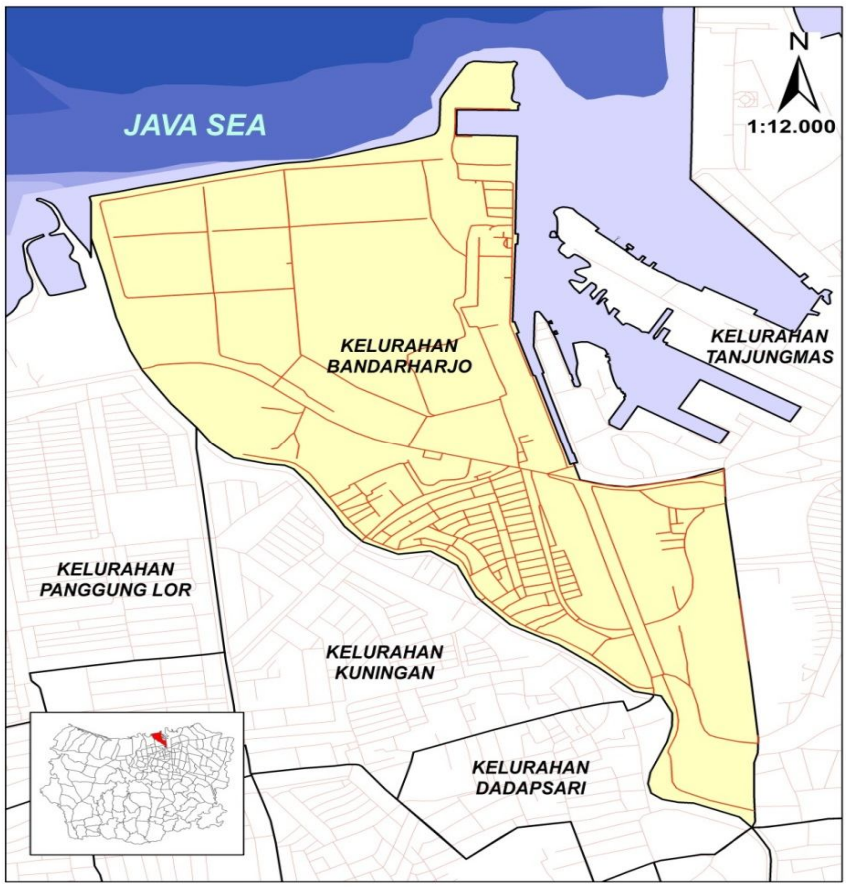

Figure 4-3: Administrative map of Bandar Harjo (shaded yellow) (Praktino, 2014)

Furthermore, Bandar Harjo is an old settlement so, most of people that live in Bandar Harjo are people that can adapt to flooding. Without technology, they are naturally aware when flood will strike their settlements. Using Bandar Harjo's people as a preliminary test project to profile the use of mobile SMS in emergency, was considered to be useful before conducting the second survey and experiment.

Another reason Bandar Harjo was selected for the first survey to investigate the profile of a typical user of mobile SMS in emergency

conditions is the location of Bandar Harjo which is near to Semarang Old Town (Kota Lama Semarang) which recently became a Semarang authority priority for preserving the old buildings of Dutch architecture (Figure 4-4).

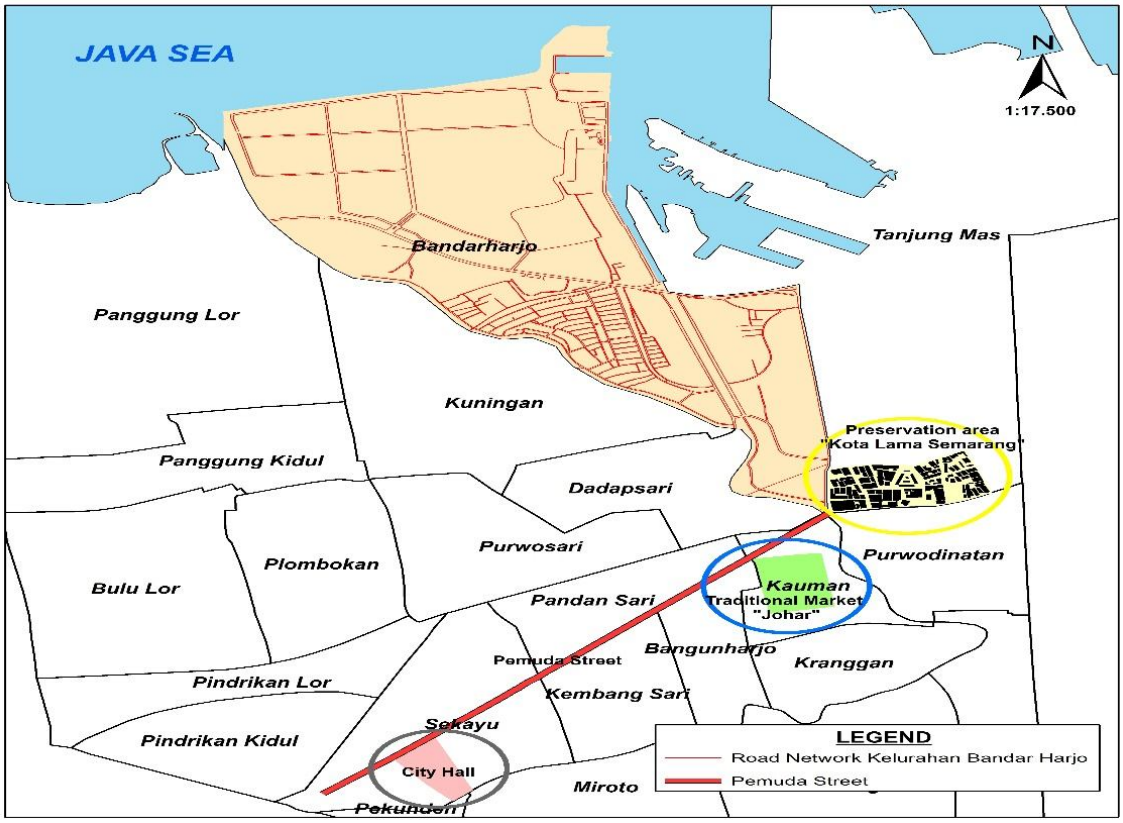

Figure 4-4 : Location of Bandar Harjo and preservation area "Kota Lama Semarang" (BAPPEDA, 2017)

This study conducted a first survey to ensure that SMS and metrics that would be used in the second survey would be successful. The second survey consisted of an experiment, so before conducting the experiment in eight flood prone areas, there was evidence that SMS was an appropriate technology to disseminate an early warning message and the first survey elicited the profile of a typical user of mobile SMS in emergency situations.

In summary, by selecting Bandar Harjo for the first survey, due to Bandar Harjo experiencing flood conditions over many years, the first survey results would be a guide to another areas of Semarang that also experience flooding.

4.2.1.2 Second Survey Location

The second survey was a summative study to examine the effectiveness of SMS to deliver verification messages and contributed to the validation process of three metrics and user independent variables that were applied in URT model.

For the second survey, participants were recruited from eight flood-prone areas in Semarang. The selection of areas was based on data from Regional Disaster Management Agency (BPBD) in Semarang with flood risk percentages which are rated low to high risk for flood risk.

Figure 4-5 shows the eight areas selected for the trial and survey were in Semarang (Nugraha et al., 2015).

Table 4-1: Flood-prone areas in Semarang selected for second survey

Area	Area with risk flood In Percentage (%)			Total area (Ha/ Hectare)
	Low-risk	Moderate-risk	High-risk	
Bandar Harjo	-	7.2%	92.8%	222.836
Mangkang Wetan	-	3.7 %	96.3%	399.844
Mangunharjo	-	2.1 %	97.9 %	457.361
Beringin	7.34%	92.6 %	-	298.715
Gondoriyo	2 %	97.3%	0.07%	520.851
Tambak Aji	3.6%	77.6 %	18.78%	442.522
Wates	2.1%	97.9 %	-	503.191
Wonosari	0.06 %	66.33%	33.04%	558.722
Note : 1 Ha = 10.000 m^2				

The location of flood-prone areas in Semarang which were selected for the second survey can be seen in Figure 4-5.

The positions of six areas are close to each other (Mangkang Wetan , Wonosari, Tambak Aji, Gondoriyo, Bringin dan Wates). Bandar Harjo and Mangun Harjo locations are distant from these six areas. The eight areas have similar characteristics that are identified by BPBD as areas prone to flooding with a moderate to high risk.

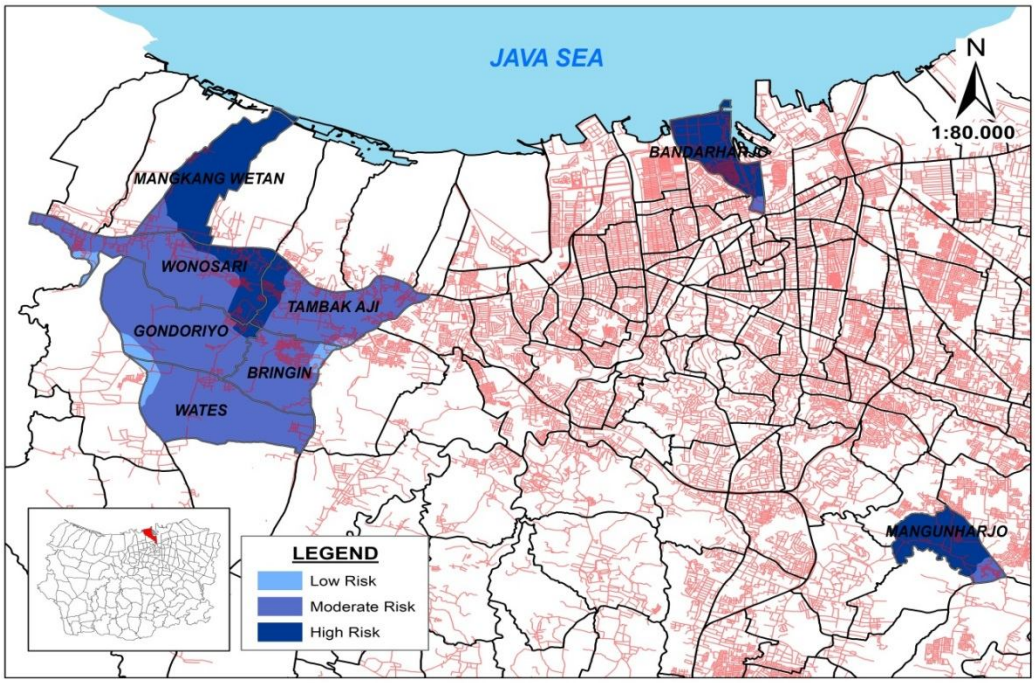

Figure 4-5 : Flood-prone areas in Semarang selected for second survey (Nugraha et al., 2015)

Hence, the first survey was to get users' profiles regarding the use of SMS as a technology to disseminate the early warning messages (Appendix C). The second survey was to investigate perceptions about the effectiveness of SMS notification and verification (Appendix D).

The results from the first survey provide justification for SMS use to disseminate the flood early warning message, and these results then justify the aims of the second survey that SMS be used to trial the effectiveness of SMS verification to support SMS notification as technology to disseminate early warning messages.

The justification of using the results from 1 place to the other places needs to be about the similarities of the populations (same socio-economic group, similar education, culture etc)

4.2.2 Device Ownership

Another criterion that needed to be considered when recruiting participants is their ownership of a mobile phone, their skill with using SMS and their reading and writing ability in Indonesian language in SMS format.

To gauge whether the participants were able to use SMS, the first survey questionnaire asked about participant's Frequency of Use (FOU) for using SMS(Appendix C). The FOU metric was used in the second survey regarding the usage of SMS as notification and verification (Appendix D).

As, shown in Figure 4-6, it is predicted that mobile phone use in Indonesia, will increase annually between 10-15 million mobile phone users (Statista, 2017). In addition, when using electronic services in emergency conditions, it is preferable for users to have their own device to access the services.

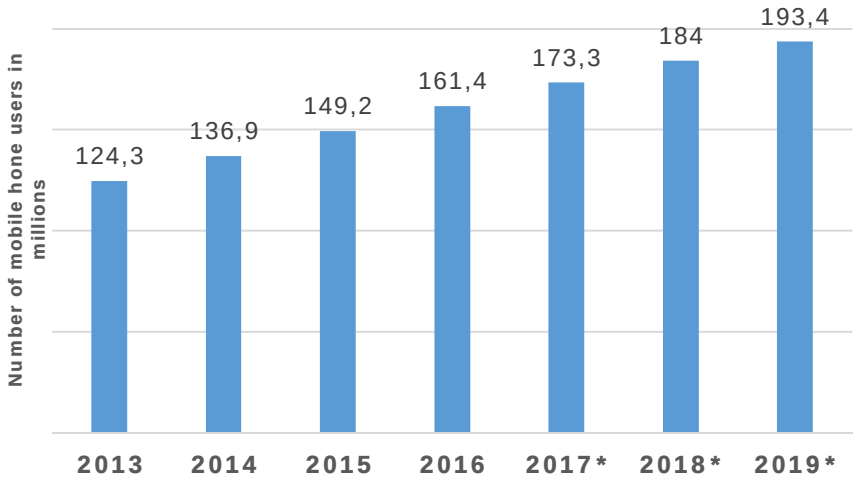

Figure 4-6: Mobile Phone users in Indonesia from 2013- 2019 (Statista, 2017)

4.2.3 The user type of mobile phone owned

To investigate the user type of mobile phone owned, the devices were categorised as either *non-smartphones* or *smartphones*. Non-smartphones are a basic mobile phone and can only make telephone calls and send or receive SMS. On the other hand, smartphones refer to mobile phones that can make telephone calls, send or receive SMS, and access the Internet.

4.2.4 Age Requirement

As guided by the Flinders University Social and Behavioural Research Ethical Committee (SBREC) the minimum age requirement of participants for this research was over 19 years old. Any participants recruited outside of an Australian university under the age of 18 requires parental consent.

Ethical approval was granted by the SBREC with project number 6817on 14 April 2015. Participation is anonymous.

4.3 Data Analysis

The IBM Statistic Package for Social Science /SPSS tool (version 22) was used to analyse the data. Microsoft Excel 2013 was employed to produce tables and graphs for the descriptive analysis of participant responses.

The data in first survey were collected without the respondent trialling the technology. The data in second survey were collected after the respondent trialled the technology.

The data in first survey were not used in the second survey. The two datasets contribute to the discussion section in Chapter 7 and the creation of the URT model. The data from the first survey were compared to the second survey's data to investigate which metric had influence on other metrics.

To generate the result, the data were analysed using statistical tools. The sequence for using the statistical tools to generate the result for first survey and second survey is shown in Figure 4-7.

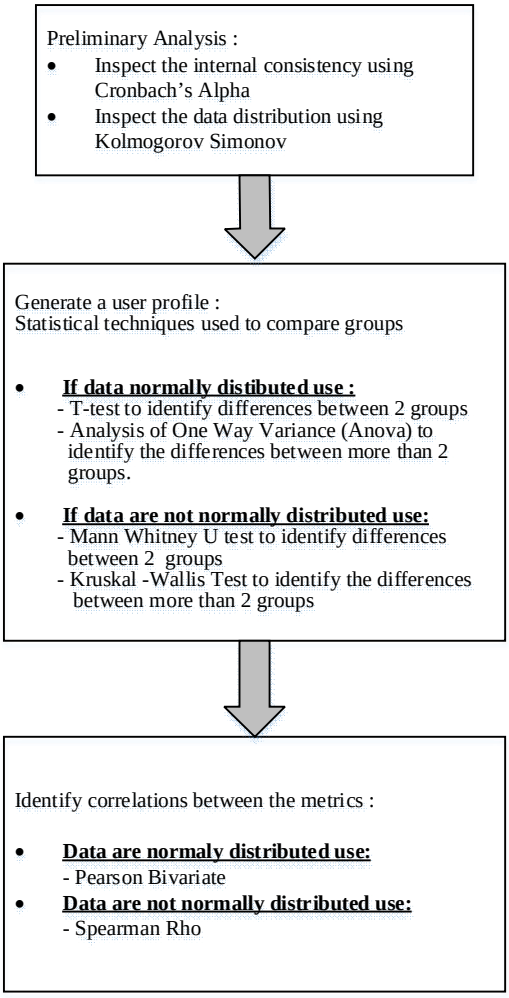

Figure 4-7: The statistical tools used to generate a user profile of a technology

4.3.1 Internal Consistency of Elements / Cronbach's Alpha

Cronbach's alpha (α) measures internal consistency of responses in a survey or questionnaire (Gliem & Gliem, 2003). In Cronbach's alpha, the overall item correlation values range is between 0 and 1. The data can be considered acceptable, when the Cronbach's alpha is greater than or equal to 0.7. The rule for interpreting Cronbach's alpha is shown in Table 4-2 (Tavakol & Dennick, 2011). Cronbach's alpha is most widely used to measure internal consistency among variables in a summated scale (Zaharias & Poylymenakou, 2009). Cronbach's alpha was applied to investigate the consistency of participants' responses to the question regarding technology assessment from the users' perspective.

Table 4-2 : Table values range for Cronbach's alpha

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

4.3.2 Data Distribution

The Kolmogorov-Smirnov test is used to investigate data distribution. Testing data distribution is beneficial when deciding which statistical tools should be used next for data analysis. When testing data distribution, the aim is to select between parametric and non-parametric analysis to investigate the significant differences among the users' variables and their correlation with the users' perception. Data with a normal distribution will have a significant value greater than 0.05 (sig > 0 .05) (Pallant & Florence, 2013).

4.3.3 Generate a profile user of technology

To generate a user profile of technology, it is essential to compare two or more independent groups.

When the data are normally distributed, a T-test can be used to identify significant differences between the two groups (the respondent group with the prior knowledge and the group of respondents without prior knowledge) and the analysis of one way variance (ANOVA) to explore significant differences between more than two groups.

But, when the data are not normally distributed, the Mann-Whitney U test is used to compare two independent groups and discover significant differences.

The Mann-Whitney U test was also used to measure the effect size of the group that showed significant differences. The Kruskal-Wallis test was used to compare more than two independent groups. The Mann-Whitney U and Kruskal-Wallis test are both recommended for testing unequal variances

and discovering differences between groups in behavioural studies (Kasuya, 2001; Ruxton & Beauchamp, 2008).

4.3.4 Generate a correlation between metrics

To identify the correlation between the metrics, Pearson bivariate should be used when the data are normal distributed or Spearman rho when data are not normally distributed. Correlation analysis is used to describe the strength and directions of the linear relationship between two variables (Pallant & Florence, 2013). The guidelines to interpret the correlation between 0 and 1 suggested by Cohen (1988) as following guidelines: small is between 0.10 to 0.29; medium is between 0.30 to 0.49 and large is between 0.50 to 1 (Pallant & Florence, 2013). In addition, if a correlation value shows a negative or positive sign, it refers to the direction of the relationship.

4.4 Summary

This chapter has discussed:

- The data collection method determined to be appropriate, for this study, was paper-based questionnaires. This chapter also discussed methods commonly used for data collection to aid in investigating a user's perception; these are questionnaires and interviews. The advantages of using questionnaires are that they are not time-consuming and can be completed by many respondents simultaneously. For understanding electronic public services, such as government public services, the use of questionnaires is preferable. The limitations of using interviews are they can only collect information from users individually and they are time consuming.

- The user's location was a factor that needed to be considered to assessing the technology used for emergency situations. This study selected flood-prone areas in Semarang, Indonesia to recruit participants. In addition, participants needed to own a mobile phone. In Indonesia, mobile phone ownership has been predicted to increase by 10-15 million per year until 2019.

- The ethical issues that needed to be anticipated for this study. The data based on individual responses cannot be reported or analysed to ensure anonymity. Only aggregated data based on groups such as gender, age, and level of education will be reported.

- The tool that used for data analysis is IBM SPSS Statistic 22 was used to validate the internal consistency and normality of the data as well as assessing the user's influence on device preparedness, level of skill and positive perception.

CHAPTER 5 : FIRST SURVEY (FINDING AND DISCUSSION)

The results of the first survey of data collected were published in the following conference proceedings:

- Nugraheni, D.M.K., and de Vries, D., 'Profile of a typical mobile SMS user in emergency situations (empirical study in an urban flood prone area)', Proceeding of the 2nd International Conference on Science in Information Technology (ICISITech), Balikpapan, Indonesia, 2016, 97-102.© IEEE. doi: 10.1109/ICSITech.2016.7852615]

- Nugraheni, D.M.K., and de Vries, D., 'Users' perception of ease of use (EOU) and confidence with skill using SMS in emergency conditions'. Proceeding of the 3rd International Conference on Human-Computer Interaction and User Experience in Indonesia, Jakarta, Indonesia, 2017. © ACM. doi: 10.1145/3077343.3077350

5.1 Introduction

As the aim of this study to include the users' demographic variables and prior knowledge understand the typical users of the technology that is used deliver the early warning messages. In Chapter 3, three metrics were defined that influence the effectiveness of mobile technology to deliver early warning messages: device preparedness, user's task (user's level of skill) and satisfaction. By using these three metrics, the evaluation captured typical users using mobile technology in emergency situations and investigated the correlation between ease of use (EOU) and confidence with skill for using mobile technology. In addition, the research components used to capture user profiles can be seen in Figure 3-4.

Capturing user profiles, has proven useful in the design and development of diabetic treatment information-system for elderly people in China (LeRouge & Ma, 2010). In addition, studies conducted in e-commerce to determine the typical users of mobile technology have shown it is helpful for information system designers to focus on the requirements of potential

buyers in order to provide them with an appropriate system (Miaskiewicz & Kozar, 2011).

Based on these prior research projects, it is deemed important to find a method to measure the user's readiness of technology that can be used to understand the user's condition when early warning messages will be used to disseminate warning message.

It was found that when designing an Emergency Warning System, user profiles for technology had not been identified. Therefore, by determining the typical user of the technology to deliver early warning messages can help to predict the success of the technology to deliver the early warning messages.

The method for conducting the first survey such as: the selection process for data collection, participant selection, and the methods used for analysing the data are explained in Chapter 4.

This chapter contains the findings and discussion of the first survey conducted in Bandar Harjo, Central Java, Semarang. The aim of this first survey was to capture a typical mobile SMS user in emergency situations (an empirical study in an urban flood prone area).

Furthermore, it is essential for the information system designer and authorities to take into account the potential users' skills and positive perceptions with technology before employing new technology to deliver early warning messages.

It should be noted that the findings and implications presented in this chapter were obtained from a single study that targeted a specific user group in Bandar Harjo, Semarang, Indonesia.

5.2 Work Procedure

Data was collected between May and June 2015. The survey focused on respondents that owned a mobile phone; the respondents were required to be over the age of 19 familiar with SMS and able to read and write in Indonesia.

The questionnaire comprised three sections. The first section questioned which type of mobile phone was owned. To investigate responses to the first section on the type of mobile phone owned, the devices were categorised as either *non-smartphones* or *smartphones*. Non-smartphones are a basic mobile phone and can only make telephone calls and send or receive SMS. On the other hand, smartphones refer to mobile phones that can make telephone calls, send or receive SMS, and access the Internet.

The second section asked about the perception of device preparation to access early warning messages in emergency conditions. For the second section, participants were evaluated using the survey questions in Table 5-1 to access devices preparedness. It is essential that users have high confidence in mobile phone readiness for the emergency conditions. Four options were given to respondents *never*, *rarely*, *sometimes*, and *often*.

Table 5-1: Device preparedness questions

ID	Question	Never	Rarely	Sometimes	Often
A1	I would turn my phone *on* at night				
A2	My mobile phone is accessible at night				
A3	My mobile phone is turned *on* all day				
A4	My mobile phone battery is fully charged at night				

The last section asked about the perception of EOU, confidence with skill and satisfaction with using SMS in emergency conditions. For the third section, the questions in Table 5-2 were used to assess the skill level (EOU and confidence with skill) and satisfaction. A Likert scale was used in this section of questions.

Table 5-2: Survey questions on EOU, confidence with skill, and satisfaction

ID	Ease of use assessment
B1.1	It is easy to use and read messages in emergency situation
B1.2	It needs a few steps to use mobile phone to access SMS
B1.3	I need instructions to use SMS
B1.4	I can receive messages successfully
B1.5	I can identify the sender of messages

ID	Confidence with skill assessment
B2.1	It is easy for me to remember how to use SMS
B2.2	I consider myself skilful in using a mobile phone for sending and receiving SMS
B2.3	I learned to use SMS quickly
B2.4	I can identify the difference between official and unofficial disaster early warning messages using SMS
ID	**Satisfaction assessment**
C1	I am satisfied with SMS for sending and receiving early warning messages.
C2	I would recommend using SMS as early warning messages to a friend
C3	I prefer to use SMS for disaster early warning messages compared to other applications

5.3 Demographic Profiles

The survey involved 350 participants. Table 5-3 indicates the demographic characteristics of the respondents who volunteered participate. The respondents consisted of 55.4% males and 44.6% females. In terms of age, 21.4 % of participants were between 20-30, 39.4% of participants were between 31—40, 27.4 % between 41—50 years, and 11.4% over 50.

With regards to the level of education, 3.7% of participants taking part in the survey were educated at an undergraduate level, 39.7% at senior high school level, 24.9% at a junior high school level, and 30.6% at an elementary level. Participants who could use SMS but had no formal education comprised 1.1%.

Table 5-3: Demographic characteristic of respondent (N = 350)

Gender	N	%
Male	194	55.4
Female	156	44.6
Age in years at the time of the survey	N	%
20–30	75	21.4
31–40	138	39.4
41–50	97	27.7
Over 50	40	11.4
Level of education	n	%
No education	4	1.1
Elementary	107	30.6
Junior high school	87	24.9
Senior high school	139	39.7
Undergraduate	13	3.7
Frequency of use	N	%
No answer	3	0.86
Once a month	2	.57
Once a week	13	3.71
More than once a week	44	12.57
Once a day	206	58.86
More than once a day	82	23.43

The results of mobile phone ownership are presented in Figure 5-1 . Of the 350 respondents, 27.4% (96 participants) used a smartphone and 72.6% (254 participants) used a non-smartphone.

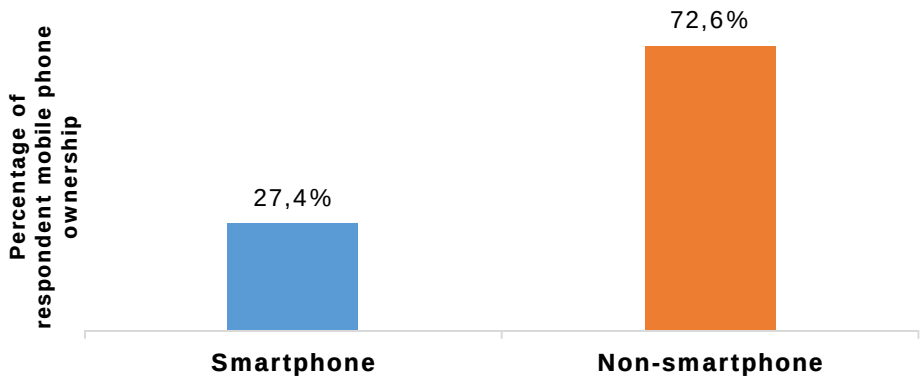

Figure 5-1: Graph of respondent mobile phone ownership

5.4 Preliminary Results Analysis

Cronbach's alpha was used to analyse the consistency of respondent answers. The details can be seen in Table 5-4. The results show that the

internal consistency was at an acceptable range and very good. Therefore, the data could be used for further analysis.

Table 5-4: Cronbach's alpha (α) assessment of profiles for typical users of SMS

Assessment of typical SMS user	n	α	Consistency
Devices preparedness	4	0.99	Excellent
EOU	5	0.85	Good
Confidence with skill	4	0.87	Good
Satisfaction	3	0.72	Acceptable
Note : α ≥ 0.7 is acceptable			

The analysis also tested the data distribution normality using the Kolmogorov – Smirnov test. The results showed that all data variables were not normally distributed ($p<0.01$) (Table 5-5).

Table 5-5: Result for test data distribution

Assessment for typical SMS user	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
Devices preparedness	0.269	350	0.000
EOU	0.161	350	0.000
Confidence with skill	0.129	350	0.000
Satisfaction	0.116	350	0.000
Note : Sig < 0.001 not normally distributed			
[a.] **Lilliefors Significance Correction**			

Because the data was not normally distributed (Table 5-5), the Mann-Whitney U test was used to compare two independent groups and discover significant differences. Furthermore, the Kruskal-Wallis test was used to compare more than two independent groups. The Mann-Whitney U and Kruskal-Wallis test are both recommended for testing unequal variances and discovering differences between groups in behavioural studies (Kasuya, 2001; Ruxton & Beauchamp, 2008). The Mann-Whitney U test was also used to measure the effect size of the group that showed significant differences.

5.5 Typical Users of SMS in Emergency Situations.

5.5.1 Gender

Before starting the data analysis, the following null hypothesis (**H_1**) was proposed: *there will be no significant statistical differences in device preparedness, task (EOU and confidence with skill) and satisfaction with using SMS in emergency conditions between male and female user*.

This evaluation includes null hypotheses, to help understand the types of errors and the results of the statistical analysis (Frick, 1996; Tomczak & Tomczak, 2014).

The effect size between male and female groups was calculated. Effect size emphasises the size of differences between groups (Coe, 2002). To find the effect size, the formula given in Equation 5-1 was used where N is the total number of participants (Pallant & Florence, 2013).

$$r = Z \div \sqrt{N}$$

Equation 5-1: Equation for measuring the effect size.

Table 5-6 shows the results of the statistical data analysis. The difference between males and females for using SMS in emergency situations is shown by the confidence with skill (p= 0.011) and satisfaction perception (p=0.001). Therefore, the null hypothesis (**H_1**) is partially rejected. The effect size for the confidence with skill was 0.14 and 0.17 for satisfaction, which can be categorised as a small effect.

Table 5-6: Mann- Whitney U results for significant difference between male and female groups

Assessment for typical SMS user	Males		Females		U	*z*	*p*	*r*
	Mean rank	Median	Mean rank	Median				
Devices preparedness	179.80	15	170.16	12	14298.5	0.938	0.348	0.05
EOU	184.02	24	164.91	22.5	13480	1.765	0.078	0.09
Confidence with skill	187.71	20	160.32	18	12763.5	2.529	0.011	0.14
Satisfaction	191.08	12	156.13	11	12109.5	3.236	0.001	0.17
Note : Sig (p) ≤ 0.05 for a significant difference								
r =0.1(small effect); 0 .3 (medium effect); 0.5 (large effect)								

Figure 5-2 shows the mean rank of males is higher than females. For the confidence with skill level, the mean rank was 187.71 for males and was 160.32 for females. For the satisfaction with using SMS in emergency conditions, the mean rank was 191.08 for males and was 156.13 for females.

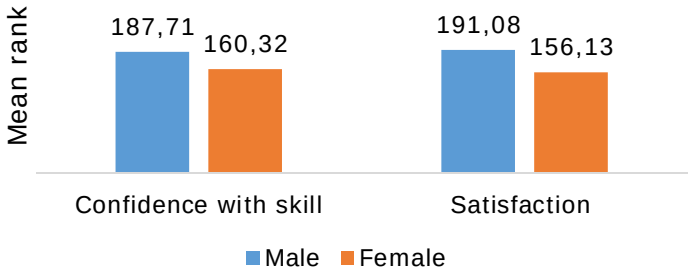

Figure 5-2: Mean rank of male and female groups.

The user's gender influenced their confidence with skill and satisfaction with using SMS in emergency conditions. However, it should be noted that there was no significant difference in EOU between male and female groups. Based on the skill level recorded with the use of SMS in emergency situations, it is suggested that female users will have no problems.

Based on analysis of gender, it was found that a user's gender does not influence their confidence with skill for using SMS or satisfaction perception due to the small effect size for these attributes.

5.5.2 Age

A second null hypothesis was posited ($\mathbf{H_2}$): *there will be no statistically significant difference in device preparedness, EOU and confidence with skill and satisfaction with using SMS in emergency conditions among users of different ages*.

Table 5-7 shows a significant difference between age groups in EOU (p=0.002) and confidence with skill (p= 0.000). In terms of device preparedness and satisfaction, there was no significant difference among age groups (p > 0.05).

Table 5-7: Kruskal- Wallis test for differences between age groups

Assessment for typical SMS user	Ages Group	Mean rank	Median	df	X^2	*p*
Devices preparedness	20 –30	187.96	13	3	1.885	0.597
	31 –40	170.06	12			
	41 – 50	176.08	12			
	> 50	169.50	12			
EOU	20 –30	201.73	26	3	14.711	0.002
	31 –40	161.46	21			
	41 – 50	160.73	23			
	> 50	210.56	26.5			
Confidence with skill	20 –30	210.80	21	3	40.660	0.000
	31 –40	197.14	21			
	41 – 50	126.13	17			
	> 50	154.39	19			
Satisfaction	20 –30	179.45	12	3	1.486	0.686
	31 –40	176.57	12			
	41 – 50	178.32	12			
	> 50	157.55	12			
Note : Sig (p) ≤ 0.05 for a significance difference						

In terms of mean rank, the 20–30 age group had the highest rank for device preparedness, confidence with skill, and satisfaction.

For EOU, Figure 5-3 shows that age groups over 50 achieved the highest mean rank (210.56). For comparison, the 20–30 age group mean rank was 201.73. For confidence with skill, the over 50 age group achieved a mean rank 154.39 while the 20–30 age group achieved a mean rank of 210.8.

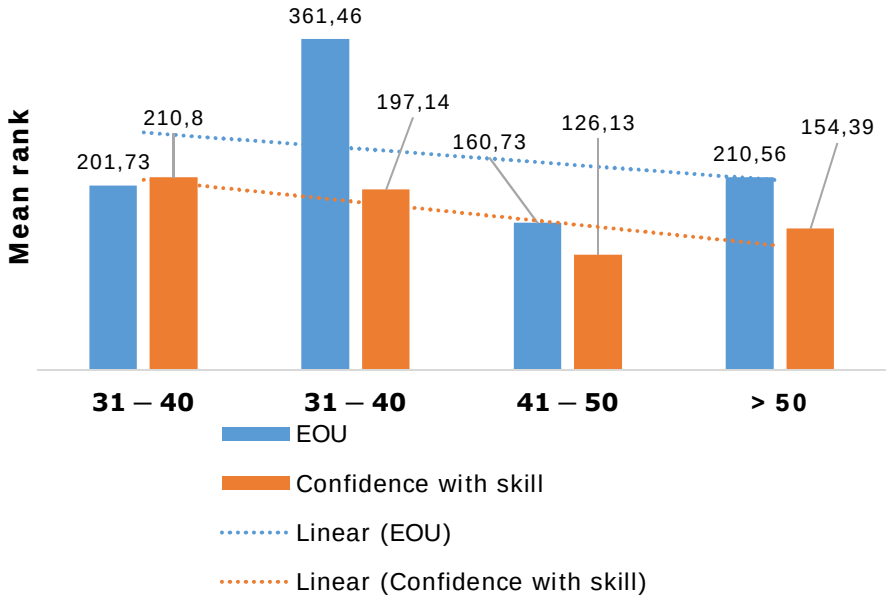

Figure 5-3: Mean rank of users in difference level of age

A Mann- Whitney U test was used to understand the effect size of user's age in device preparedness, EOU, confidence with skill, and satisfaction with using SMS in emergency situations (Table 5-8). This evaluation compared the users in the 20-30 age group and users in the over 50 age group.

Table 5-8: Mann- Whitney U result for significant differences between 20–30 and > 50 age groups.

Assessment of typical SMS user	20-30 (N= 75)		> 50 (N= 40)		U	z	p	r
	Mean rank	Median	Mean rank	Median				
Devices preparedness	59.73	13	54.75	12	1370	-0.83	0.40	0.07
EOU	55.71	26	62.29	26.5	1328.5	-1.018	0.30	0.09
Confidence with skill	63.76	21	47.20	19	1068	-2.552	0.01	0.24
Satisfaction	60.39	12	53.53	12	1321	-1.064	0.30	0.01
Note : Sig (p) ≤ 0.05 for a significant difference								
r =0.1(small effect); 0.3 (medium effect); 0.5 (large effect)								

Based on the data shown in Table 5-7 and Table 5-8, the second null hypothesis (H_2) is rejected because there was a significant difference between users of different ages. The user's age influences EOU and confidence with skill for using SMS as shown in Table 5-7. However, as seen in Table 5-8, the user's age only influences the confidence with skill

for using SMS. Table 5-8, shows that the effect size for confidence with skill was 0.24 (a small effect size). Furthermore, EOU between the 20—30 age group and the over 50 age group revealed no significant difference.

It can be concluded from results, that there will be no problem for users over 50 using SMS in emergency conditions. Therefore, a user's age does not influence their device preparedness, EOU, confidence with skill and satisfaction when using SMS in emergency conditions.

5.5.3 Level of Education

A third null hypothesis was posited (**H_3**): *there will be no statistically significant difference in device preparedness, task (EOU and confidence with skill), and satisfaction with using SMS in emergency condition between users with different levels of education*.

The data analysis presented in Table 5-9 shows a statistically significant difference between different levels of education among all attributes. Therefore, the null hypotheses (**H_3**) is rejected.

Table 5-9: Kruskal – Wallis Test for comparison among levels of education group

Assessment of typical SMS user	Level of education	Mean rank	Median	df	X^2	*p*
Devices preparedness	None	4.50	4	4	37.034	0.000
	Elementary	145.38	11			
	Junior High School	200.57	16			
	Senior High School	181.33	13			
	Undergraduate	245.96	16			
EOU	None	20.50	15	4	15.675	0.000
	Elementary	161.42	21			
	Junior High School	179.54	24			
	Senior High School	183.73	24			
	Undergraduate	224.12	23			
Confidence with skill	None	35.50	12	4	35.892	0.000
	Elementary	137.62	17			
	Junior High School	198.36	21			
	Senior High School	187.72	20			
	Undergraduate	246.65	20			
Satisfaction	None	98.00	10	4	37.605	0.000
	Elementary	135.73	11			
	Junior High School	171.54	11			
	Senior High School	203.79	13			
	Undergraduate	250.73	13			

Note : Sig (p) ≤ 0.05 for a significance difference

Figure 5-4 indicates that in terms of EOU, the lowest mean rank was achieved by the group with no education with (20.50) followed by the group with an elementary level of education (224.12).

For confidence with skill, the lowest mean rank was achieved by users in the group with no education (35.50). The highest mean rank was achieved by the undergraduate group with a score of 246.65 (Figure 5-4).

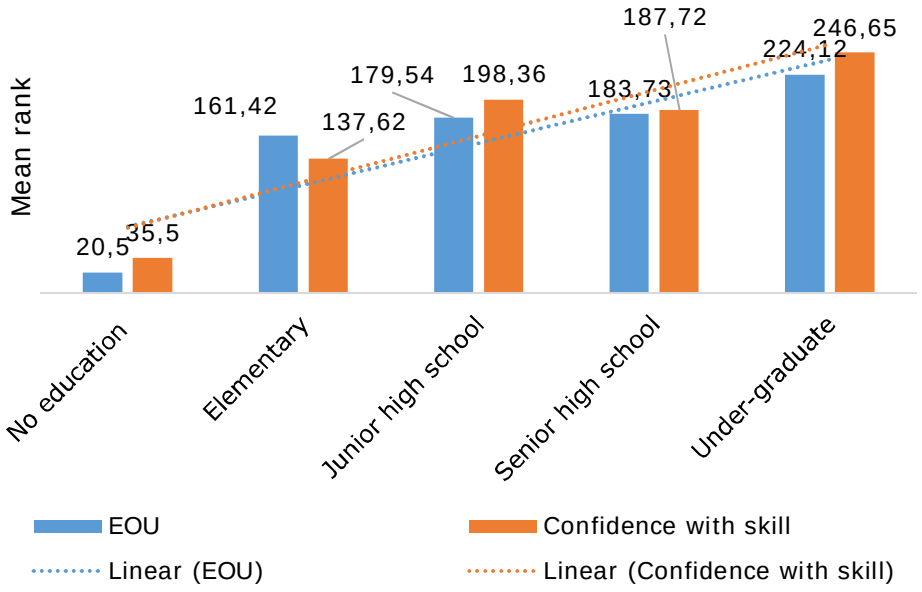

Figure 5-4: Mean rank of EOU and confidence with skill for users' with different level of education group

Next, the data were examined for users in the elementary and undergraduate groups with the aim of understanding the effect of level of education on the effectiveness of SMS usage in emergency conditions (Table 5-10).

Table 5-10 shows a significant difference in device preparedness (p= 0.00); EOU (p=0.02); confidence with skill (p= 0.00) and satisfaction (p=.00). The effect size shows that device preparedness (r = 0.33); confidence with skill (r = 0.33) and satisfaction (r = 0.35) recorded a medium effect. In terms of EOU, the effect size showed small effect (r = 0.21).

Table 5-10: Mann- Whitney U test result for significant differences between elementary and undergraduate groups

Assessment for typical SMS user	Elementary (N= 107)		Under graduate (N= 13)		U	*z*	*p*	*r*
	Mean rank	Median	Mean rank	Median				
Devices preparedness	56.66	11	92.12	16	284.5	-3.655	0.00	0.33
EOU	57.96	21	81.42	23	423.5	-2.314	0.02	0.21
Confidence with skill	56.42	17	94.08	20	259	-3.708	0.00	0.33
Satisfaction	56.29	11	95.12	13	245	-3.837	0.00	0.35
Note : Sig (p) ≤ 0.05 for a significant difference								
r =0.1(small effect); 0.3 (medium effect); 0.5 (large effect)								

Table 5-9 and Table 5-10 shows that there was a significant difference among users in groups with different levels of education for device preparedness, task (EOU and confidence with skill), and satisfaction.

It has been discovered that a user's level of education influences device preparedness, task and satisfaction with using SMS in emergency conditions. Typical users who use SMS in emergency condition are educated users.

5.5.4 Frequency of SMS Use

Out of the 350 participants, 3 provided an incomplete response to the question of frequency of use (FOU). Consequently, when analysing users based on FOU of SMS, only 99.14% (or 347 responses) of the complete dataset could be used.

A null hypothesis was posited ($\mathbf{H_4}$): *there will be no statistically significant difference in device preparedness, task (EOU and confidence with skill) and satisfaction with using SMS in emergency condition among user with different frequency of use for SMS.*

Based on the results presented in Table 5-11, device preparedness, EOU, confidence with skill, and satisfaction all recorded a significant difference ($p \leq 0.05$) among users with different routines for using SMS. Therefore, the null hypothesis ($\mathbf{H_4}$) is rejected**.** It is clear that a user's frequency for using SMS influenced the device preparedness, EOU, confidence with skill, and satisfaction with using SMS in emergency conditions.

Table 5-11: Kruskal- Wallis test result for comparison among FOU group

Assessment of typical SMS user	FOU	Mean rank	Median	df	X^2	*p*
Devices preparedness	Once a month	149.5	12	4	49.75	0.000
	Once a week	45.35	8			
	More than once a week	116.52	8			
	Once a day	193.87	16			
	More than once a day	175.91	12			
EOU	Once a month	64.00	15	4	38.426	0.000
	Once a week	88.81	19			
	More than once a week	107.44	15			
	Once a day	185.81	24			
	More than once a day	196.24	24			
Confidence with skill	Once a month	120	17	4	61.090	0.000
	Once a week	69.31	12			
	More than once a week	116.64	18			
	Once a day	168.90	18			
	More than once a day	235.52	21.5			
Satisfaction	Once a month	181.5	12	4	29.944	0.000
	Once a week	110.12	10			
	More than once a week	110.28	10			
	Once a day	181.35	12.5			
	More than once a day	199.66	12			
Note : Sig (p) ≤ 0.05 for a significance difference						

Figure 5-5 shows the EOU and confidence with skill mean rank for users with different FOU for using SMS. The highest mean rank for EOU and confidence with skill was achieved by users in the *more than once a day* group 196.24 for EOU and 235.52 for confidence with skill. The trend in FOU for SMS influenced user perception of EOU and confidence with skill for using SMS in emergency conditions is shown in Figure 5-5.

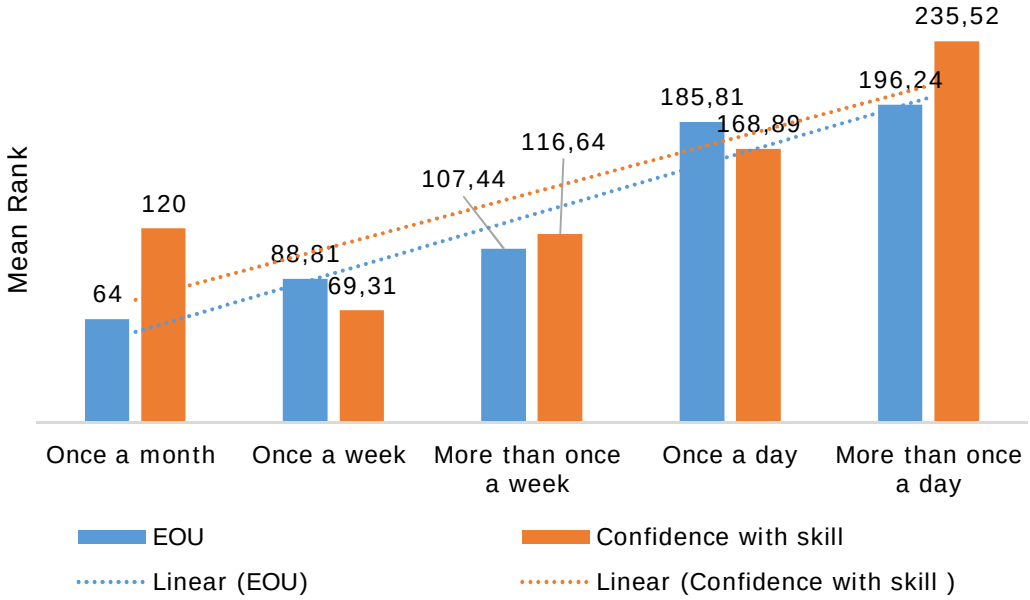

Figure 5-5: Mean rank on EOU and confidence with skill for users' with different FOU levels for using SMS in emergency conditions

A comparison between users in the *once a week* and m*ore than once a day* group was performed to investigate the effect size. Table 5-12 shows a significant difference between device preparedness, EOU, confidence with skill and satisfaction. The effect size showed that device preparedness (r = 0.5) and confidence with skill (r=0.53) had the largest effect. Also, EOU (r = 0.35) and satisfaction (r=0.33) had a medium effect.

Table 5-12: Table Mann- Whitney U test results for significant difference between once a week and more than once a day groups

Assessment of typical SMS user	Once a week (N=13)		More than once a day (N=82)		U	z	p	r
	Mean rank	Median	Mean rank	Median				
Devices preparedness	13.92	8	53.40	12	90	-0.5025	0.000	0.05
EOU	23.50	19	51.88	24	214.5	-3.471	0.001	0.35
Confidence with skill	11.62	12	53.77	21.5	60	-5.182	0.000	0.53
Satisfaction	25.46	10	51.57	12	240	-3.243	0.001	0.33
Note : Sig (p) ≤0 .05 for a significant difference								
r =0.1(small effect); 0.3 (medium effect); 0.5 (large effect)								

The results in Table 5-11 and Table 5-12 indicate that the user's FOU for SMS influenced their device preparedness, EOU, confidence with skill, and satisfaction.

Consequently, it is proposed that a user's FOU for SMS influences their perception of device preparedness, EOU, confidence with skill, and satisfaction with using SMS in emergency conditions. A typical user of SMS in emergency situations is a user who frequently uses SMS under normal conditions.

The next section, includes data analysis to investigate the correlation between a user's EOU and confidence with skill as well as the user variables that influence the correlation.

5.6 Correlation Between EOU and Confidence With Skill

To investigating the correlation between EOU and confidence with skill when using SMS in emergency conditions, a non-parametric correlation was employed (Spearman rho).

The null hypothesis for the correlation analysis (**H_5**) was: *there will be no correlation between EOU and confidence with skill*.

Data analysis shows that the relationship between EOU and confidence with skills for using SMS has a significant correlation ($p < 0.01$). The results showed a large positive correlation ($r = 0.59$).

The null hypotheses (H_5) was rejected as EOU and confidence with skill were found to influence each other. If users find using SMS in emergency conditions easy, their confidence with skill for using SMS in emergency conditions also improves.

Because there was a large correlation between EOU and self-confidence with the skill for using SMS in emergency situations, the correlation coefficient was used to determine if there was an influence on user variables (gender, age, level of education, and FOU in SMS). To determine the existence of a significant difference, the following formula Equation 5-2

was used where N_1 represents the number of first respondent, N_2 the number of second respondent, and Z_1 *and* Z_2 the *r* values converted to standard scores (Pallant & Florence, 2013).

$$z_{obs} = \frac{Z_1 - Z_2}{\sqrt{\frac{1}{N_1 - 3} + \frac{1}{N_2 - 3}}}$$

Equation 5-2: Formula for measuring correlation coefficients (Z_{obs})

5.6.1 Gender Influences

The correlation between the EOU and confidence with skill among male respondents, was 0.466 and categorised as a medium relationship. Meanwhile, the correlation between EOU and confidence with skill for female respondents was 0.758. Both correlations were in the positive direction (Table 5-13).

Table 5-13: Correlation (*r*) between EOU and confidence with skill for males and females

Gender	Correlation(*r*)	Strength of relationship
Males	0.466**	Medium
Females	0.758**	Large
Note: r = Small (0.1 – 0.29); Medium (0.3– 0.49); Large (0.5–1)		
****Correlation is significant at the 0 .01 level (2-tailed).***		

To investigate the difference in correlation between genders for EOU and confidence with skill, the correlation coefficients (Z_{obs}) were calculated. If the Z_{obs} value between -1.96 and 1.96 is obtained there is no significant value. (Pallant & Florence, 2013).

From the calculation of male and female groups, a Z_{obs} value of -4.53 was obtained. It is concluded that a user's gender influences the correlation between EOU and confidence with skills for using SMS in emergency condition.

5.6.2 Age Influences

Table 5-14 shows the correlation values of each age group. For users in 20–30 age group, the correlation value (*r*) was 0.563. For user in the over

50 age group, the correlation value (*r*) was 0.550, and for the 31—40 age group, the correlation value (*r*) was 0.707. The strength of the correlation for users in 41—50 age group was moderate; in the other groups it was large.

Table 5-14: Correlation (*r*) between EOU and confidence with skill for users' level age groups

Age groups	Correlation (*r*)	Strength of relationship
20—30	0.563**	Large
31—40	0.707**	Large
41—50	0.397**	Medium
> 50	0.550**	Large
Note: r = Small (0.1 – 0.29); Medium (0.3– 0.49); Large (0.5—1)		
*****Correlation is significant at the 0 .01 level (2-tailed).***		

Table 5-15 the correlation coefficients for the various age groups. The data showed that the significant difference was between the 31—40 age group and 41—50 age group. For the other groups, a Z_{obs} value between -1.96 and 1.96 was obtained, showing that there was no significant difference. The estimation shows an unusual result.

Table 5-15: Correlation coefficients between different users' age groups

Z_{obs}	20—30	31—40	41—50	>50
20—30	–			
31—40	-1.672	–		
41—50	-1.373	3.417	–	
> 50	0.074	-1.396	-1.031	–
Note: -1. 96< Z_{obs}< 1.96 is non-significant difference				

Further investigation revealed the number of participants in the 31—40 group was larger than the other groups (Figure 5-6). It is acknowledged that using data different sized data as well as age as input measurement could lead to the *Simpson paradox* (Berman, DalleMule, Greene, & Lucker, 2012; David & Edwards, 2001). As noted by Fabris and Freitas (2000), this paradox refers to a surprising pattern that demonstrates the kinds of problems resulted from combining data from several groups. To address the problem with the Simpsons' paradox, it is suggested to mix the distribution of the classification, because it can help reveal the data and

understand the patterns (Hayashi & Yamaoka, 1998). So, this evaluation mixed the categorical data and compared two age groups; the data was categorized into the 20–40 age group and the over 40 age group.

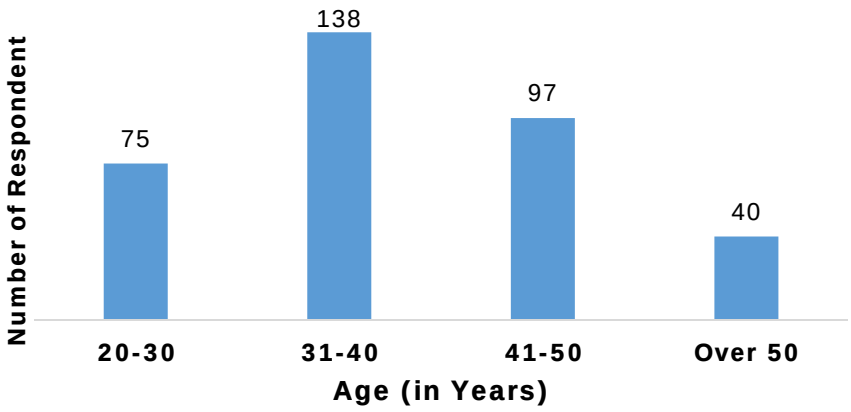

Figure 5-6: Distribution of participant ages

Correlations among respondents in the 20–40 age group showed a significant correlation with r= 0.662. Respondents in over 40 age group showed a significant correlation with r = 0.651. Both age groups showed large correlation in the positive direction (Table 5-16).

Table 5-16: Correlation (r) between EOU and confidence with skill for ages' groups

Ages' group	N	Correlation (r)	Strength of relationship
20 – 40	213	0.662**	Large
> 40	137	0.651**	Large
Note: r = Small (0.1 – 0.29); Medium (0.3– 0.49); Large (0.5–1)			
****Correlation is significant at the 0 .01 level (2-tailed).***			

The comparison of age groups 20-40 and over age group showed that the Z_{obs} value was 0.16. Consequently, there is no significant difference between the two groups.

Therefore, this study concludes that a user's age does not influence the correlation between EOU and confidence with skill.

5.6.3 Level of Education Influences

To measure the correlation coefficients (Z_{obs}), the number of data that used to analysis need to be higher than 20 (Pallant & Florence, 2013).

This study did not include no-education and undergraduate groups because the number respondents in each group was less than 20.

Table 5-17: Correlation (r) between EOU and confidence with skill for distinct level of education

Level of education	Correlation (*r*)	Strength of relationship
No education	–	–
Elementary	0.671**	Large
Junior high school	0.583**	large
Senior high school	0.495**	Medium
Undergraduate	–	–
Note: r = Small (0.1 – 0.29); Medium (0.3– 0.49); Large (0.5–1)		
****Correlation is significant at the 0 .01 level (2-tailed).***		

From Table 5-17 it can be seen that there was a correlation between EOU and confidence with skill among respondents in the elementary, junior and senior high school groups. The correlation value for respondents in the elementary school group was r = 0.671. The correlation value of the participants in the junior high school group was 0.583. The correlations for participants in the senior high school group reached r = 0.495.

The result of calculating the Z_{obs} shows there was a significant difference groups between the elementary and senior high school groups with a Z_{obs} value of 2.057 (Table 5-18).

Table 5-18 : Correlation coefficients between different users' background levels of education groups

Z_{obs}	Elementary School	Junior High School	Senior High School
Elementary school	–		
Junior high school	0.961	–	
Senior high Schools	2.057	0.915	–
Note: -1. 96< Z_{obs}< 1.96 is non-significant difference			

This study concludes that a user's level of education influences the correlation between EOU and confidence sith skill for using SMS in emergency situations.

5.6.4 FOU Influences

The *once a month* and *once a week* FOU groups were not included, because the number of participants in each group was less than 20.

The statistical data analysis presented in Table 5-19 shows that the *more than once a week* group had a significant correlation with value of 0.456. Participants in the *once a day* group recorded correlation an *r* value of 0.522 and participants in the *more than a day* group recorded an *r* value of 0.453.

Table 5-19: Correlation (r) between EOU and Confidence with skill for FOU groups

FOU	Correlation (*r*)	Strength of relationship
Once a month	–	–
Once a week	–	–
More than once a week	0.456**	Medium
Once a day	0.522**	Large
More than once a day	0.453**	Medium
Note: r = Small (0.1 – 0.29); Medium (0.3– 0.49); Large (0.5–1)		
****Correlation is significant at the 0 0.01 level (2-tailed).***		

Table 5-20 presents no significant difference between the three FOU groups. The user's FOU did not influences the correlation between EOU and confidence with skills.

Table 5-20: Correlation coefficients between different levels of FOU groups

Z_{obs}	More than once a day	Once a day	More than once a week
More than once a day	–		
Once a day	- 0.496	–	
More than once a week	0.686	0.031	–
Note: -1. 96< Z_{obs}< 1.96 is non-significant difference			

5.7 Discussion

The first questionnaire gathered information about user's device ownership; device preparedness, user's task and user's satisfaction. This evaluation investigated the mobile devices owned by people who live in flood-prone areas. It found that the majority of respondents in Bandar Harjo, Semarang, Indonesia owned a non-smartphone (73% of 350

participants). This is in line with national data that indicate that only 21% of Indonesians own a smartphones, 56% own a non-smartphone, and 23% do not own mobile phones (Poushter, 2016). From the data, this evaluation regards SMS as a technology that can be accessed either using a smartphones or non-smartphone.

The remainder of this section will discuss the evaluation result based on device preparedness, EOU and confidence with skill, and satisfaction for using SMS in emergency conditions.

5.7.1 Device preparedness

Gender and age did not influence the device preparation for using SMS in emergency situations ($p > 0.05$). The evaluation showed that a user's FOU for SMS and their level of education influences the device preparedness for using SMS in emergency conditions.

Therefore, the device preparedness for using SMS in emergency conditions is influenced by the user's FOU for SMS as well as their user's level of education.

5.7.2 EOU and Confidence With Skill

The correlation between EOU and confidence with skill showed a significant large correlation ($r = 0.5$). Therefore, in terms of the skill level for using SMS in emergency conditions, the EOU and confidence with skill influence each other.

There was no significant difference between male and female users in the EOU. But, there was significant difference between male and female users in the confidence with skill for SMS. Moreover, gender influenced the correlation between EOU and confidence with skill for using SMS in emergency condition.

In terms of age, there was a significant difference for EOU and confidence with skill for using SMS in emergency condition. The data showed that the over 50 age group achieved the highest mean rank in EOU (210.56). Therefore, there will be no problem for users over 50 using SMS in emergency conditions. Furthermore, age did not influence the correlation

between EOU and confidence with skill for using SMS in emergency conditions.

In terms of education, the mean rank showed that users with higher levels of education (undergraduate group) achieved higher values on EOU and confidence with skill for using SMS in emergency conditions. The level of education influenced the correlation between EOU and confidence with skill for using SMS in emergency conditions.

The EOU and confidence with skill for using SMS in emergency conditions was influenced by the frequency of use (or FOU). However, frequency of use did not influence the correlation between EOU and confidence with skill for using SMS in emergency condition.

Consequently, it is proposed that level of education and FOU for SMS influence the EOU and confidence with skill for using SMS in emergency conditions. In addition, gender and level of education are user variables that influenced the correlation between EOU and confidence with skill for using SMS in emergency condition.

Based on the EOU and confidence with skill for using SMS in emergency conditions, it can be summarised that

- the typical user for SMS in emergency conditions is a user who frequently uses SMS and is educated;
- a female, a user with no education that can read SMS, and a user over the age of 50 years can still use SMS in emergency conditions.

User variables that influence SMS use in emergency conditions was FOU for SMS and a user's level of education.

A user's gender and level of education are user variables that influence the correlation between EOU and confidence with skill for using SMS in emergency conditions.

5.7.3 Satisfaction

It was shown that a user's gender, level of education, and FOU influenced the satisfaction with using SMS in emergency conditions.

5.7.4 User variables that Influence SMS Use in emergency Conditions

Device preparedness, user's task (user's level of skill) and satisfaction are the three metrics used to examine the effectiveness of SMS use in emergency conditions. It was found that FOU and level of education has an influence on these factors, whereas a user's gender influences only confidence with skills and satisfaction.

This evaluation used the framework shown in Figure 5-7 to compare the effect size between level of education and FOU with SMS in device preparedness, EOU, confidence with skill, and satisfaction for using SMS in emergency conditions.

Using FOU as an input variable, the effect size was large for device preparedness, medium for EOU, large for confidence with skill, and medium for satisfaction.

Using level of education as an input variable, the effect size was medium for device preparedness, small for EOU, medium for confidence with skill, and medium for satisfaction.

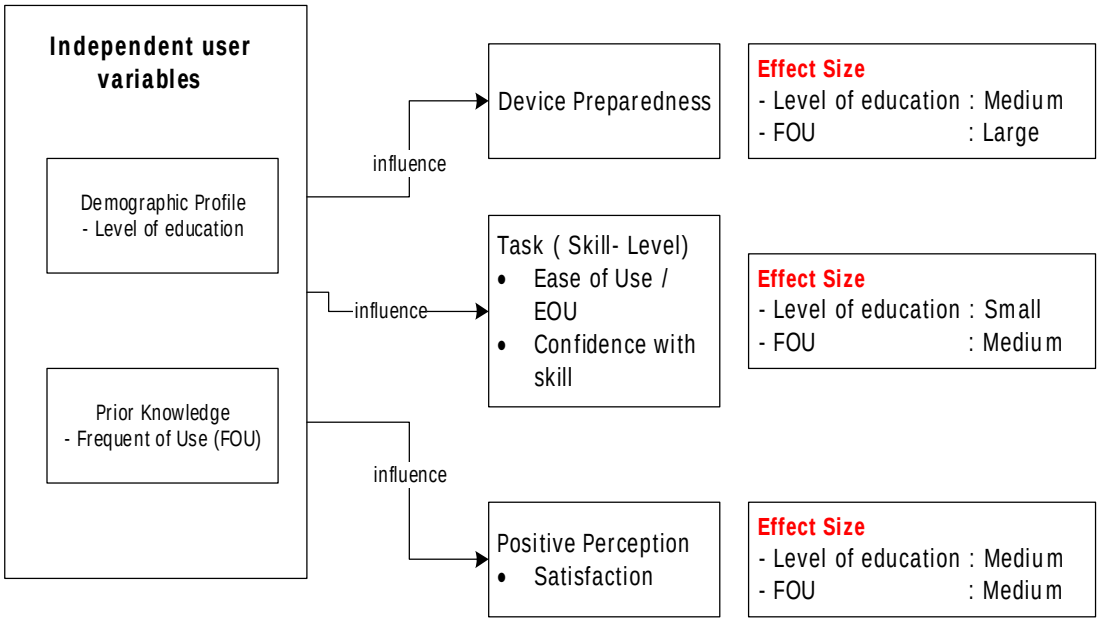

Figure 5-7: Framework of user characteristic that influenced the effectiveness of SMS in emergency situations

The results indicate that SMS is a technology that appropriate for use to deliver early warning message in emergency condition based on the user's device preparedness, EOU, confidence with skill, and satisfaction. To make technology usable for users, it is important to assess the technology from their perspective; furthermore, the assessment must not only use a single assessment (Nunes, 2006).

This investigation shows that users' perceptions were beneficial to investigating the *typical* user of SMS in emergency condition. In line with Nielsen and Levy (1994) a product designed based on users' perceptions will be more efficient and satisfying. In addition, the results show that FOU with SMS influenced the use of SMS in emergency condition.

The analysis has validated that device preparedness, EOU, confidence with skill, and satisfaction contribute to the effectiveness of SMS use in emergency conditions. This research has demonstrated that a user-centred approach enables the evaluation of the *receiver's* readiness for technology used to deliver early warning messages.

When examining the technology that will be used to deliver early warning messages, it is recommended that the user's FOU with technology and level of education are important user variables.

5.8 Conclusion

From the evaluation, the following conclusions can be drawn:

Firstly, typical users of SMS in emergency conditions are users who frequently use SMS or have a higher level of education. Secondly, in terms of EOU and confidence with skill, there were no significant problems for female users, users without an education, or users over 50 for using SMS under emergency conditions. Thirdly, there was a correlation between EOU and confidence with skill for using SMS. Gender and level of education influenced the correlation between the EOU and confidence with skill for using SMS under emergency conditions. Age and FOU with SMS did not influence the correlation between the EOU and confidence with skill.

Device preparedness, EOU and confidence with skill for using technology are the appropriate factors that influence the effectiveness of technology for delivering early warning messages from user's perspective. Next, user variables that influence the three metrics for using SMS in emergency conditions are user's FOU for SMS and user's level of education. In addition, User variables that influence the device preparedness, EOU, confidence with skill, and satisfaction are user's FOU and level of education. Finally, in the case study area (Bandar Harjo, Semarang- Indonesia), it has been shown that SMS is the appropriate technology for delivering early warning messages based on the survey participants' device preparedness, EOU, confidence with skill, and satisfaction.

The first survey captured the specific user variables that influence the effectiveness of technology use in emergency conditions. It has contributed to the validation process of three metrics and user variables. It placed the user at the centre of readiness evaluation, and demonstrated that a user's ability for device preparedness and skill with using technology are important and these factors are recommended for use in the selection process of technology that will be used for delivering early warning messages. In addition, the results highlight the importance of the user-centred approach when evaluating technology for delivery of early warning messages. It is essential for good design of an information system to ensure that the technology fits the users' ability.

CHAPTER 6 : SECOND SURVEY (FINDINGS AND DISCUSSION)

These results were published in the following conference proceedings:

- Nugraheni, D.M.K., and deVries, D., 'The effectiveness of SMS as verification of flood early warning messages from users' perception ', Proceedings 1st International Conference on Informatics and Computational Science (ICISCos), Semarang, Indonesia, 2017, 77-81 .© IEEE. doi: 10.1109/ICICOS.2017.8276341

6.1 Introduction

Chapter 2 explored that verification services in early warning messages have been suggested as a way to address the problem related to the notification services in early warning messages. However, it is essential to examine and validate the effectiveness of verification services as an addition to notification services in early warning messages. The aim of verification services is to provide additional services that avoid the multiplication phenomena and hoax messages that occur in emergency conditions. The technology used to deliver notification and verification services was SMS.

In Chapter 3, the research components used to capture user profiles can be seen in Figure 3-5 and research diagram for investigating the effectiveness of verification services in early warning messages can be seen in Figure 3-6.

The method for conducting the second survey such as: the selection process for data collection, participant selection, and the methods used for analysing the data explained in Chapter 4.

The first survey results (Chapter 5), showed that 72.6% of the respondents owned and used a non-smartphone (in the disaster-prone area in Semarang). In addition, 58.86% people who live in Bandar Harjo used SMS once a day, and the frequency of use of SMS influences the typical user of SMS in emergency condition, so it is reasonable to conduct further research

investigating the effectiveness of verification services to confirm notification services using SMS.

Considering prior studies on verification services as confirmation information, it was found that verification messages are generally used in m-banking and e-learning. The use of verification messages for m-banking in Bangladesh has shown that effective verification services improve user satisfaction in the m-banking system (Mousumi & Jamil, 2010). E-learning research on users' perceptions of the technology for delivering verification services has shown that verification services are beneficial for the staff as they help to provide academic information (Richardson & Lenarcic, 2009). Therefore, verification services have improved the users' satisfaction with the use of m-banking and e-learning. But, the impact of verification services to verify the messages in the notification services for early warning messages has not yet been investigated.

This chapter contains the findings and discussion of the second survey that was conducted in eight flood prone areas in Semarang. The aim of this second survey was to capture a typical mobile SMS notification and verification user in emergency situations (empirical study in an urban flood prone area). Furthermore, the second survey was to assess the effectiveness of verification services by capturing the correlation between notification and verification. The correlation was used to find out if there was any link between EOU, confidence with skill, usefulness and satisfaction in notification and verification services.

6.2 Work Procedure

The participants were recruited from eight areas in Semarang, Indonesia: Bandar Harjo, Mangkang Wetan, Mangun Harjo, Beringin, Gondoriyo, Tambak Aji, Wates and Wonosari. The areas selected were based on data from BPBD Semarang that shows the flood-prone area (Nugraha et al., 2015).

Participants were required to be over the age of 19, own a mobile phone and be able to use SMS. Ownership of a mobile phone was required to receive and verify messages using SMS.

6.2.1 SMS Verification Test

In order to obtain the participants' perceptions of notification and verification SMS, a SMS gateway (Gammu1.33.0) was used during the experiment. The SMS gateway was used because they are the fastest and most reliable way of delivering bulk SMS (Katankar & Thakare, 2010).

Figure 6-1 shows the process of SMS verification and notification. This evaluation, used a laptop configured with Intel Core i3 CPU, 16 GB RAM and Windows 7 as the SMS centre to deliver the early warning messages. The SMS centre was connected via USB GSM modem (Huawei Mobile Broadband E173) using an Indonesian SIM card.

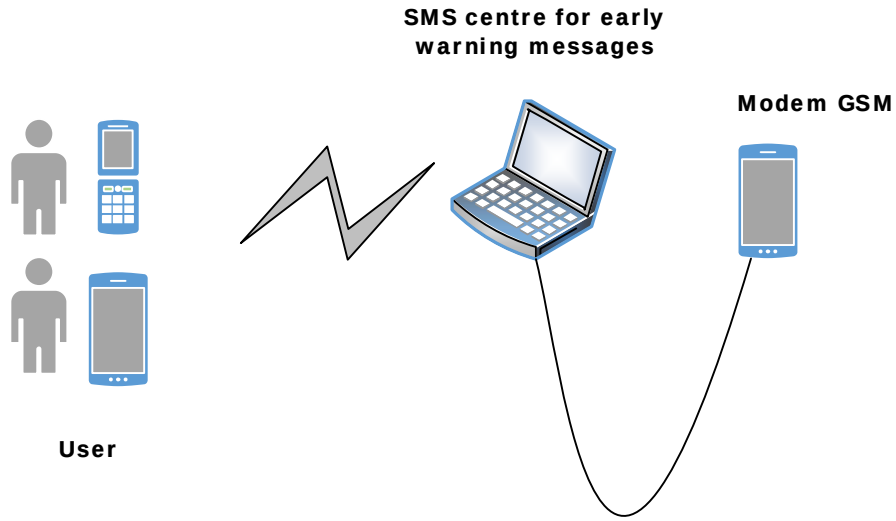

Figure 6-1 : The process of sending and receiving warning messages

Participants used their own mobile phone to conduct the experiment of experiencing the SMS notification and verification. The SMS message contents for notification and verification were identical. The language used was Bahasa Indonesian. The information delivered was "*ketinggian banjir sudah di tingkat waspada*" (meaning the height of the flood is already at the alert level) (Figure 6-2).

Figure 6-2: Display of SMS on the user mobile phone

6.2.2 Sessions for Notification and Verification Experiment

Experiments and surveys were conducted between November 2015 and February 2016. These were both conducted after the participants finished the community meeting in each area where the participants live. The natural setting that this study wanted was to make sure that the SMS services functionally worked in the eight flood prone areas. The experiments and survey were conducted after the community meeting to help set up the system that was going to be trialled by the participants.

It was important that the SMS notification and verification was accessed by the participant's own mobile phone in their normal environment. This was to be sure that the participants could examine the effectiveness of SMS as notification and verification for delivering the flood early warning messages.

There were three sessions in the experiment. The first session was related to SMS notifications. The early warning service provider sent the SMS notification to the participants. Participants did not need to reply to messages; however they were expected to read and save them on their mobile phone. The content of the message was the height of the flood is already at the alert level. When they received the SMS notification, the first session was complete.

In the second session, the researcher wrote the mobile phone number 62812255XXX on the white board. The participants were required to send

the message *Info* messages using SMS to this number. After sending the message, the participants waited for messages from the server. By receiving an SMS verification (Figure 6-2), the second session finished.

In the last session, the participants answered the paper based survey. The survey questions are outlined in Table 6-1, Table 6-2, and Table 6-3. After completing the survey questions, the session and the experiment were completed.

The trial took 20 minutes (10 minutes for SMS notification and 10 minutes for SMS verification) and to answer the questionnaire took 20 minutes (Appendix D)

Table 6-1: Questions for device preparedness

ID	Question
A1	I would turn on my phone at night
A2	My mobile phone is accessible at night
A3	My mobile phone is *on* all day
A4	My mobile phone is fully charged at night.

Table 6-2: Questions for EOU, confidence with skill, usefulness, and satisfaction for notification services

ID	Ease of use of SMS notification
B1.1	It is easy to use and read in emergency situations
B1.2	It needs a few steps to use mobile phone to receive SMS notification
B1.3	I can receive messages successfully
B1.4	I can identify the sender of messages
ID	**Confidence with skill for using SMS notification**
B2.1	I easily remember how to use SMS
B2.2	I consider myself skilful at sending and receiving SMS
B2.3	I learned to use SMS quickly
B2.4	I can identify the difference between official or unofficial disaster early warning messages using SMS
ID	**Usefulness of SMS notification**
C1.1	SMS is useful to notify me about disaster situations
C1.2	SMS notification is useful to quickly access information about disaster situations
C1.3	SMS notification is my preference to receive early warning messages.
C1.4	SMS notification is useful to receive information on current disaster situations
C1.5	SMS is useful to receive information about disaster situations compared to Twitter or Facebook
ID	**Satisfaction on SMS notification**
C2.1	I am satisfied with SMS to deliver early warning messages
C2.2	I would recommend it to a friend
C2.3	I prefer to use SMS for receiving early warning messages compared to Twitter or Facebook

Table 6-3: Questions for EOU, confidence with skill, usefulness, and satisfaction for verification services

ID	Ease of use for SMS verification
B1.1	It is easy to use and read in emergency situations
B1.2	It needs a few steps to use mobile phone to access SMS verification
B1.3	I can send the request for the verification messages successfully
B1.4	I can receive messages successfully
B1.5	I can identify the sender of messages
B1.6	SMS verification is easy to use
ID	**Confidence with skill for using SMS verification**
B2.1	I easily remember how to use SMS
B2.2	I consider myself skilful at using SMS Verification
B2.3	I learned to use SMS verification quickly
B2.4	I can identify the difference between official or unofficial SMS that delivers early warning messages
ID	**Usefulness on verification SMS**
C1.1	SMS verification is useful to confirm the information in SMS notification
C1.2	The verification message is useful to access information on current disaster situations
C1.3	The verification message is useful to confirm information compared to Twitter or Facebook
ID	**Satisfaction SMS as disaster early warning messages**

C2.1	I am satisfied with SMS to verify information on early warning messages
C2.2	I would recommend it to a friend
C2.3	I prefer to use SMS to verify disaster information compared to Twitter or Facebook

6.3 Demographic Profiles

This section provides information on the respondents based on their gender, age, education level, and involvement in disaster preparedness groups. The study involved 100 participants who attempted the SMS notification and verification experiment, and filled out the survey.

Table 6-4: Table Demographic characteristic of respondents (N= 100)

Gender	**N**	**%**
Male	60	60
Female	40	40
Age at the time of the survey (in years)	**N**	**%**
20–30	26	26
31–40	22	22
41–50	33	33
Over 50	19	19
Level of education	**N**	**%**
None	3	3
Elementary	24	24
Junior high school	26	26
Senior high school	33	33
Under-graduate	14	14
Participants in disaster preparedness group	**N**	**%**
Disaster preparedness group	18	18
Non- disaster preparedness group	82	82

In terms of gender, male participants comprised 60% and female participants 40%. Based on the age groups, Table 6-4 shows that participants in the 41–50 age group represented 33% and participants in

the 20–30 age group represented 26%. The smallest age group of participants was the over 50 group with only 19%.

In terms of the level of education, participants involved in the evaluation consisted of the following: 3 individuals that had no education but were able to use SMS, 24 participants with an elementary education background; 26 with a junior high school background, 33 with a senior high school background, and 14 with an undergraduate background.

Of the 100 participants, 18% were allocated to the disaster preparedness group with the remaining 82% being allocated to the non-disaster preparedness group.

6.4 Preliminary Results Analysis

The Cronbach's alpha (α) value shows that the respondents were consistent when answering the questions in the survey. Analysis showed that the internal consistency for the device preparedness question was *good*. The internal consistency for questions related to SMS verification messages showed results between *good* and *very good*. Internal consistency for the question regarding SMS notification showed consistency between *good* and *excellent*. The details can be seen in Table 6-5. As there were no errors with the users' survey responses. The data could be used for further analysis.

Table 6-5: Respondents' consistency for answering the survey questions for SMS verification and notification (Cronbach's alpha/ α)

Effectiveness elements for early warning messages	Verification			Notification		
	n	α	Consistency	N	α	Consistency
Device preparedness	4	0.879	good			
Ease of use (EOU)	6	0.938	excellent	4	0.896	good
Confidence with skill	4	0.957	excellent	4	0.916	excellent
Usefulness	3	0.906	excellent	5	0.929	excellent
Satisfaction	3	0.948	excellent	3	0.938	excellent
Note : $\alpha \geq 0.7$ is acceptable						

Additional preliminary analysis tested the data distribution. The Kolmogorov-Smirnov test was used to assess the data distribution. Table 6-6 shows that the data was not normally distributed ($p<0.01$).

Table 6-6: Test of normality

Effectiveness elements for early warning messages	Verification			Notification		
	Kolmogorov-Smirnov[a]			Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.	Statistic	df	Sig.
Ease of use (EOU)	0.210	100	0.000	0.153	100	0.000
Confidence with skill	0.195	100	0.000	0.137	100	0.000
Usefulness	0.156	100	0.000	0.163	100	0.000
Satisfaction	0.157	100	0.000	0.151	100	0.000
Note : Sig < 0.001 not normally distributed						
[a]. Lilliefors Significance Correction						

Therefore, a non-parametric correlation (Spearman's rho) was used in a correlation analysis.

6.5 Effectiveness of SMS Verification

The null hypothesis for correlation between notification messages and verification is posited (**H_6**): *there will be no correlation between notification messages (in EOU, confidence with skill, usefulness, and satisfaction) and verification messages (in EOU, confidence with skill, usefulness, and satisfaction).*

Table 6-7 : Correlation between confidence with skill in notification messaging services and user perception in the verification messaging services.

Notification / Verification	EOU	Confidence with skill	Usefulness	Satisfaction
EOU	0.016	0.195	-0.062	- 0.116
Confidence with skill	0.193	0.326**	0.037	- 0.028
Usefulness	-0.024	0.101	0.009	- 0.138
Satisfaction	-0.046	0.078	- 0.147	- 0.173
Note : r = Small (0.1 - 0.29) ; Medium (0.3- 0.49); Large (0.5- 1)				
***** Correlation is significant at the 0.01 level (2-tailed).***				

Table 6-7 shows that the users' confidence with skill between SMS verification and SMS notification was correlated with a value (*r*) of 0.326. The correlation was medium and in the positive direction. Because there was a significant correlation between notification and verification messages in confidence with skill, the null hypothesis (**H_6**) is rejected. A significant correlation was only recorded for confidence with skill.

The results demonstrate that users who are confident in their ability to use SMS notifications will feel confident in using SMS verification for early warning messages. So, there will be no problem implementing verification messages in addition to notification messages.

6.6 Correlation within Device preparedness, Task and Positive Perception

The aim of this analysis was to understand the correlation for device preparedness, a user's task, and a user's positive perception for both SMS notification and verification services.

The null hypothesis for the correlation between device preparedness, a user's task and a user's positive perception was posited (**H_7**): *there will be no correlation between device preparedness, task and positive perception.*

6.6.1 SMS Notification

With regards to the notification services (Table 6-8), the results showed the following correlations: 0.411 between device preparedness and EOU (medium effect size), 0.515 between device preparedness and confidence with skill is (large effect size), 0.226 between device preparedness and usefulness (small effect size), and 0.221 between device preparedness and satisfaction (small effect size).

In terms of the user's task between EOU and confidence with skill, there is a large positive correlation (r = 0.837). For the user's positive perception, the correlation between usefulness and satisfaction is also large and in the positive direction (r =0 .814).

Between EOU and usefulness, the correlation was positive with a strength is 0.667. Between EOU and satisfaction, the correlation also showed a large relationship (r = 0.721).

Table 6-8: Correlation between the elements in the effectiveness of SMS for notification early warning messages

Notification	Device preparedness	EOU	Confidence with skill	Usefulness
EOU	0.411**			
Confidence with skill	0.515**	0.837**		
Usefulness	0.226**	0.677**	0.648**	
Satisfaction	0.221**	0.721**	0.711**	0.814**
Note : r = Small (0.1 - 0.29) ; Medium (0.3- 0.49); Large (0.5- 1)				
***** Correlation is significant at the 0.01 level (2-tailed).***				

To achieve a clear correlation between device preparedness, user's task and user's positive perception, the correlation between three metrics was analysed. The results are shown in Table 6-9.

Device preparedness, task and positive perception correlated to each other in positive direction. The value of correlation shows that device preparedness has a greater value when correlated with the user's task (r= 0 .483) compared with the user's positive perception (r = 0.228). Between the user's task and positive, the correlation was large (r= 0.739) and in the positive direction.

Table 6-8 shows the correlation of each element correlation before being merged into one element. As shown in Table 6-8, the EOU and confidence with skill has a high correlation with satisfaction. In addition, EOU and confidence with skill also has a high correlation with usefulness.

Therefore, the EOU and confidence with skill element was merged into user's task construction in Table 6-9. The user's satisfaction and usefulness was also merged into one element which is known as user's positive perception. In Table 6-9, the user's task has a high correlation with user's positive perception.

Table 6.8 and Table 6.9 show the correlation of the elements in the effectiveness of SMS for notification in early warning messages.

Table 6-9: Correlation within the elements in the effectiveness of SMS for notification early warning messages

Notification	Device preparedness	Users' tasks
Users' tasks	0.483**	
Users' positive perception	0.228**	0.739**
Note : r = Small (0.1 - 0.29) ; Medium (0.3- 0.49); Large (0.5- 1)		
***** Correlation is a significant at the 0.01 level (2-tailed).***		

Thus, for using SMS notifications, the user's device preparedness has more influence on their task than the user's positive perception.

6.6.2 SMS Verification

In terms of the verification services for using SMS, Table 6-10 shows that the correlation between device preparedness and EOU (*r*= 0.296) and device preparedness and confidence with skill (*r* = 0.382) was of medium strength. The correlation between device preparedness and usefulness (*r*= 0.312), and device preparedness and satisfaction (*r* = 0.308) was also in medium strength.

The correlation between EOU and confidence with skill was 0.865 (large correlation strength). The correlation between usefulness and satisfaction showed an *r* value of 0.878.

Table 6-10-: Correlation between the elements in the effectiveness of SMS for verification early warning messages

Verification	Device preparedness	EOU	Confidence with skill	Usefulness
EOU	0.296**			
Confidence with skill	0.382**	0.865**		
Usefulness	0.312**	0.811**	0.712**	
Satisfaction	0.308**	0.796**	0.743**	0.878**
Note : r = Small (0.1 - 0.29) ; Medium (0.3- 0.49); Large (0.5- 1)				
*****Correlation is a significant at the 0.01 level (2-tailed).***				

Table 6-11 shows the correlation between device preparedness and the users' task (r = 0.366) or user's positive perception (r = 0.310) which both recorded a medium correlation. The correlation between the user's task and positive perception was 0.841 (large correlation).

Table 6.10 examined correlation in each element used between user's task and user's positive perception. As Table 6.11 shows the correlation between user's task (in which the user's ease of use and confidence with skill was merged into user's task) and user's positive perception (in which user's usefulness and satisfaction was merged into positive perception)

Table 6-11: Correlation between the elements in the effectiveness of SMS for verification early warning messages

Verification	Device preparedness	Users' task
Users' task	0.366**	
Users' positive perception	0.310**	0.841**
Note : r = Small (0.1 - 0.29) ; Medium (0.3- 0.49); Large (0.5- 1)		
***** Correlation is a significant at the 0.01 level (2-tailed).***		

The results reject the null hypothesis (**H_7**) because there was a correlation among device preparedness, the users' task and the users' positive perception.

When using the notification services, the user's perception of device preparedness had a stronger correlation with the user's task compared with the user's positive perception. As with the use of verification services, the device preparedness had a medium strength correlation with the users' task and the users' positive perception.

In the use of notification services, the results indicate that the user's device preparedness has more influence on the user's task. As for using the verification services, the user's device preparedness has less influence on the user's task. The user's task is influenced by the user's positive perception of either notification services or verification services.

6.7 Typical User for SMS Verification as Flood Early Warning Messages

This section presents the results for the typical users of verification messages with regards to early warning messages. The results compare typical users of SMS notifications to typical users of SMS verification.

To understand the users' profile of SMS verification and notification, the Man-Whitney U test was used to explore whether there was any difference between the two groups(female and male ; non KSB and KSB). The Kruskal-Wallis test was used to investigate whether there is any difference for more than two groups.

6.7.1 Gender

As shown in Table 6-12, there was no significant difference in device preparedness (p = 0.18) between male and female users. The male group's mean rank was higher (53.64) than the female group (45.97). The effect size for devices preparedness was 0.13 (small).

In terms of the user's task of using verification services, a significant difference was shown for EOU with p=0.009. However, a significant difference was not shown in the user's confidence with skill (p= 0.119). The mean rank for confidence with skill for the verification messages was 54.18 for males and 44.99 for females. The effect size on EOU for verification messages between male and female groups was 0.26, which is categorised as a small effect size. For the user's task, there were no obstacles for female users using the verification messages as early warning messages. For the users' positive perception of using SMS verification for verifying flood information, there was a significant difference in usefulness (p=0.001) and satisfaction (p=0.008) between male and female groups.

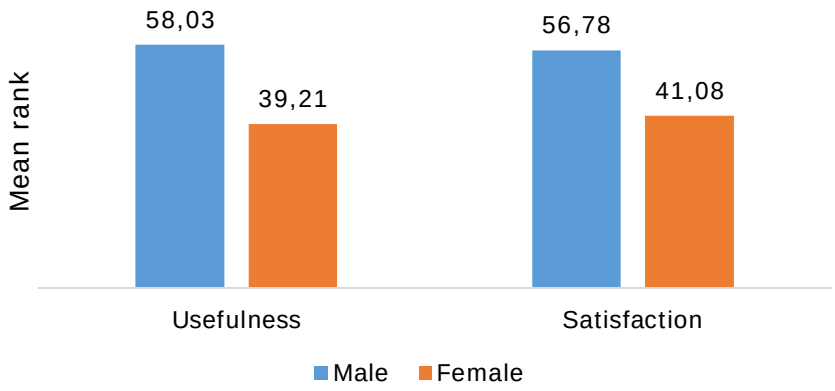

Figure 6-3: User positive perception between male and female group for using verification services.

As shown in Figure 6-3, mean rank for males (58.03) was higher than females (39.21). This indicates that male participants were more satisfied with the verification messages usage (56.78) compared with female participants (41.08).

The effect size for the usefulness of verification messages was 0.32 (medium). The satisfaction for using verification services was 0.27 (medium). In terms of the user's positive perception in using SMS verification, the effect size between males and female is medium.

In the usage of SMS as notification services in early warning messages, there was no significance difference between male and female groups.

Based on gender, it can be surmised that a user's gender does not influence the usage of SMS notification services. However, the user's genders does influence their positive perception of using SMS as verification services. For using SMS verification services, the user's gender influences the EOU with a medium effect size. But, it does not influence the confidence with skill for using SMS verification. Therefore, female users can use the SMS verification services to confirm early warning messages information.

Table 6-12: Mann-Whitney U test result for comparison between males and females in the usage of verification and notification messages

Effectiveness elements for early warning messages	Males				Females				U		z		*p*		*r*	
	Mean rank		Median		Mean rank		Median									
	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN
Device preparedness	53.64		19.00		45.79		17.00		1011.5		-133		0.183		0.13	
EOU	56.63	48.40	26.50	20.00	41.31	53.65	17.00	20.50	832.5	1074	-2.597	-.894	0.009	0.371	0.26	0.89
Confidence with skill	54.18	52.73	17.00	20.00	44.99	47.16	12.00	18.00	979.5	1066.50	-1.561	-9.45	0.119	0.344	0.16	0.95
Usefulness	58.03	50.53	13.00	24.50	39.21	50.46	8.50	23.00	748.5	1198.50	-3.202	-0.011	0.001	0.992	0.32	0.01
Satisfaction	56.78	49.75	12.00	15.00	41.08	51.63	8.00	14.00	823.0	1155.00	-2.671	-0.320	0.008	0.749	0.27	0.03

Note : Sig (p) ≤ 0.05 for a significant difference

r=0.1 (small effect); 0.3(medium effect); 0.5 (large effect)

SMS verification (SV); SMS notification (SN)

6.7.2 Ages

Table 6-13 shows that a significant difference between age group was only recorded for device preparedness (p = 0.002). A higher mean rank rating was achieved by the youngest age group (20—30 years) with 66.63, followed by the 31—40 years (51.52) and the 41—50 age group (45.95). The lowest mean rank was recorded by the over 50 age group with a mean rank of 35.13. In terms of the users' task and positive perception of using SMS verification, the data in Table 6-13 shows that there was no significant difference.

The two groups were compared using the Mann Whitney U test; users in the 20—30 age group and users in the over 50 age group. The results in Table 6-14 shows that in terms of the user's task and positive perception, there was no significant difference in using SMS verification or notification messages as early flood warning messages.

The data showed that age did not influence the user's task and positive perception of using SMS verification or notification for early warning messages. However, the data showed that age influenced the device preparedness in using SMS as early flood warning messages. The effect size for device preparedness was 0.51 which can be categorised as a large effect size (Table 6-14).

This evaluation conclude that a user's age is the only influence on device preparedness. However, age does not influence the task and positive perception for using notification or verification services using SMS as early warning messages.

Table 6-13: Kruskal- Wallis test result for comparison of age groups in the usage of SMS verification and SMS notification

Effectiveness elements for early warning messages	Ages group	Mean rank		Median		df	X^2		*p* value	
		SV	SN	SV	SN		SV	SN	SV	SN
Devices preparedness	20–30 31–40 41–50 >50	66.63 51.52 45.95 35.13		20 19 16 15		3	14.345		0.002	
EOU	20–30 31–40 41–50 >50	43.94 48.23 57.55 49.87	52.04 53.95 54.97 36.63	16.5 18.5 27 25	21 21 21 19	3	3.448	5.604	0.328	0.133
Confidence with skill	20–30 31–40 41–50 >50	47.63 51.32 55.36 45.03	54.06 48.64 53.52 42.55	12 14.5 19 13	21 20 21 18	3	1.897	2.293	0.594	0.514
Usefulness	20–30 31–40 41–50 >50	48.42 48.25 53.09 51.45	55.40 48.84 54.08 39.50	10 11 12 10	26 23.5 25 22	3	0.558	4.078	0.906	0.253
Satisfaction	20–30 31–40 41–50 >50	46.63 48.16 53.02 54.13	57.69 42.64 54.77 42.34	9.5 10 11 12	17 13.5 15 14	3	1.167	5.558	0.761	0.135
Note : Sig (p) ≤ 0.05 for a significant difference										
SMS verification (SV); SMS notification (SN)										

Table 6-14: Mann-Whitney U test results for comparison between the 20–30 age group and the over 50 age group in the usage of SMS verification and SMS notification

Effectiveness elements for early warning messages	20–30 age group (N= 26)				Over 50 age group (N=19)				U		z		p		r	
	Mean rank		Median		Mean rank		Median									
	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN
Device preparedness	28.75		20		15.13		15		97.5		-3.458		0.001		0.51	
EOU	22	25.9	16.5	21	24.37	19.03	25	19	221	171.5	-0.603	-1.750	0.54	0.08	0.09	0.26
Confidence with skill	23.54	25.08	12	21	22.26	20.16	13	18	233	193	-0.324	-1.249	0.74	0.212	0.04	0.18
Usefulness	22.77	26.15	10	26	23.32	18.68	10	22	241	165	-0.14	-1.895	0.88	0.058	0.1	0.28
Satisfaction	21.73	26.04	9.5	17	24.74	18.84	12	14	214	168	-0.767	-1.837	0.44	0.066	0.02	0.27
Note : Sig (p) ≤ 0.05 for a significant difference																
r=0.1 (small effect); 0.3(medium effect); 0.5 (large effect)																
SMS verification (SV); SMS notification (SN)																

6.7.3 Level of Education

Table 6-15 shows that there was a statistically significant difference among users with different levels of education in terms of device preparedness with a *p* value of less than 0.05. Users in the undergraduate group reached the highest mean rank in device preparedness with 83.50. The lowest mean rank in device preparedness was achieved by users without a formal education (10.50).

In terms of the user's task, the data showed that for verification services using SMS, there was a significant difference among users with different levels of education (Table 6-15). For EOU, the significant difference was < 0.001 and the confidence with skill it was 0.001. The higher mean rank for EOU and confidence with skill was achieved by users in the undergraduate group. The lowest mean rank for EOU and confidence with skill was recorded by users with no education.

In terms of the user's positive perceptions, there was a significant difference among groups (Table 6-15) with *p* values of 0.008 for usefulness and 0.018 for satisfaction. Figure 6-4 shows the mean rank trend line for the perception of SMS usefulness for verifying early flood early warning messages. The trend line shows that usefulness was considered most important by users in the undergraduate with a mean rank of 70.18.

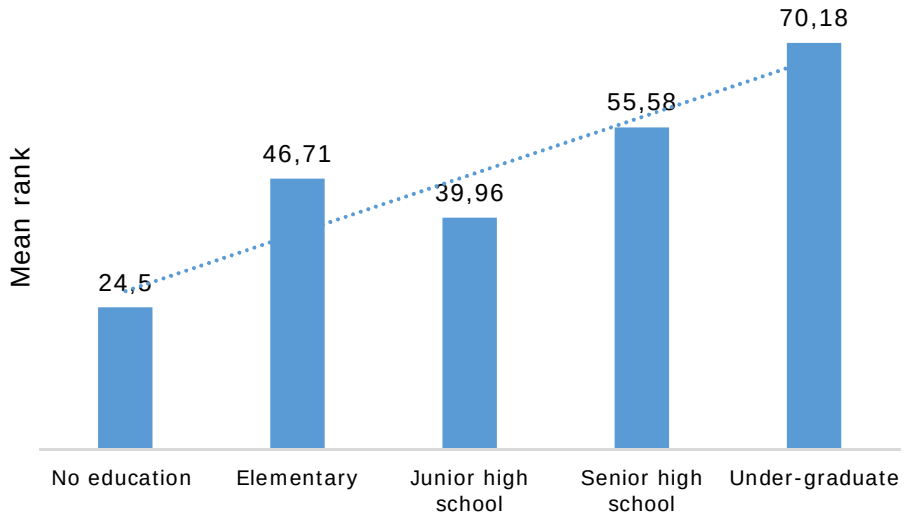

Figure 6-4: The usefulness of SMS verification as flood early warning messages among different level of education

For the user's perception of satisfaction, those in the undergraduate group reflected that they were satisfied with the verification services using SMS (Figure 6-5).

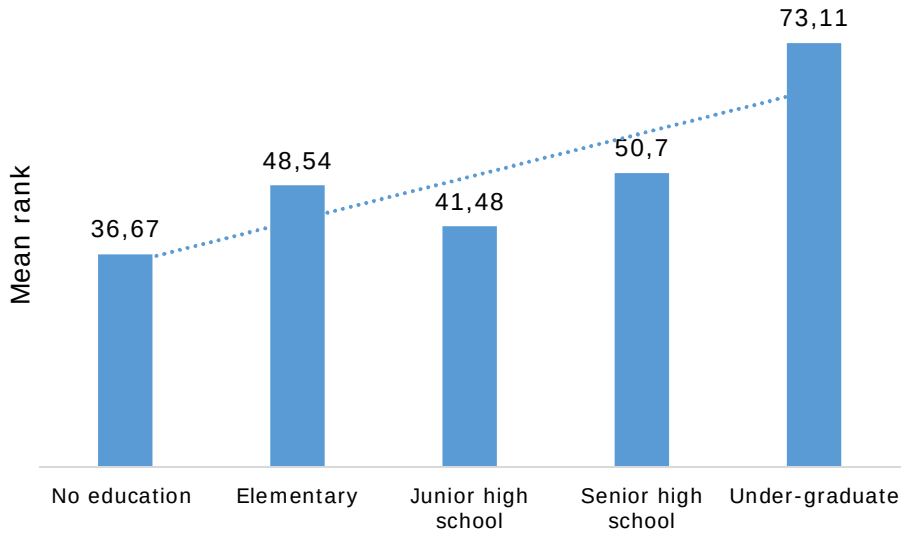

Figure 6-5: The satisfaction of SMS verification as flood early warning messages among different levels of education

For the notification messages, a significant difference was recorded for EOU (p = 0.13) and confidence with skill (p= 0.001). In terms of users' positive perception, there is no significant difference in the usefulness (p = 0.315) and satisfaction (p =0.404).

To investigate the effect size, users from elementary and undergraduate groups were compared. Table 6-16 shows the results of the comparison. The effect size for device preparedness was 0.68, which is a large effect size. The effect size for SMS verification EOU was 0.58 and confidence with skill it was 0.55. Both can be categorised as a large effect size (Table 6-16). The effect size for SMS notification was 0.54 for EOU and 0.62 for confidence with skill; these are also categorised as a large effect size. The effect size for SMS verification usefulness between users in elementary and undergraduate groups is 0.4 which is categorised as a medium effect size (Table 6-16). For satisfaction between users in the elementary and under-graduate groups, there was no significant difference.

It can be concluded that a user's level of education influences their ability to prepare their device to receive verification/ notification device preparedness early warning messages.

In terms of using verification and notification services, the user's level of education influences the EOU and their confidence with skill. Users with higher level of education will experience fewer problems than those with lower level of education when using SMS verification and notification messages as early warning messages. However, users with lower levels of education can use notification and verification services in the form of SMS as early warning messages.

With regards to a user's positive perceptions (usefulness and satisfaction), their level of education influences the use of SMS verification for early flood warning messages. But, a user's level of education does not influence their positive perception for receiving SMS notification as early flood warning messages.

Table 6-15: Kruskal- Wallis test results for comparison of different levels of education for the usage of SMS verification and SMS notification

Effectiveness elements for early warning messages	Level of education	Mean rank		Median		df	X^2		*p*	
		SV	SN	SV	SN		SV	SN	SV	SN
Devices preparedness	No education	10.50		12		4	27.305	12.689	0.000	
	Elementary	41.06		15						
	Junior high school	45.77		18						
	Senior high school	50.73		18						
	Undergraduate	83.50		23						
EOU	No education	20.50	37.33	14	19	4	22.619	19.577	0.000	0.013
	Elementary	37.02	43.88	15.5	19					
	Junior high school	43.21	45.54	16.5	20					
	Senior high school	58.39	50.11	26	20					
	Undergraduate	74.96	74.82	29.5	22					
Confidence with skill	No education	21.33	31.17	10	18	4	18.703	4.736	0.001	0.001
	Elementary	40.00	44.00	11.5	18.5					
	Junior high school	42.38	44.46	12	19					
	Senior high school	57.76	48.77	18	20					
	Undergraduate	72.71	81.07	21	23.5					
Usefulness	No education	24.50	52.00	7	24	4	13.918	11.975	0.008	0.315
	Elementary	46.71	47.08	10	23					
	Junior high school	39.96	42.98	9.5	22					
	Senior high school	55.58	53.95	13	25					
	Undergraduate	70.18	61.86	16	26.5					
Satisfaction	No education	36.67	51.67	8	15	4	11.975	4.014	0.018	0.404
	Elementary	48.54	49.38	10	13.5					
	Junior high school	41.48	44.62	8	13					
	Senior high school	50.70	50.33	13	15					
	Undergraduate	73.11	63.50	16.5	17					

Note : Sig (p) ≤ 0.05 for a significant difference; SMS verification (SV); SMS notification (SN)

Table 6-16: Mann-Whitney U test results for comparison of elementary and undergraduate groups in the usage of SMS verification and SMS notification

Effectiveness elements for early warning messages	Elementary (N= 26)				Undergraduate (N=19)				U		z		*p*		*r*	
	Mean Rank		Median		Mean Rank		Median									
	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN
Device preparedness	14.17		15		28.64		23		40		-3.907		0.000		0.63	
EOU	14.54	15.04	15.50	19	28	27.14	29.5	22	49	61	-3.625	-3.315	0.000	0.001	0.58	0.54
Confidence with skill	14.9	14.27	11.50	18.5	27.39	28.46	21	23.5	57.5	42.5	-3.374	-3.827	0.001	0.000	0.55	0.62
Usefulness	16.31	16.92	10	23	25.79	23.93	16	26.5	91.5	106	-2.338	-1.889	0.019	0.17	0.4	0.2
Satisfaction	15.83	17.67	10	13.5	24.96	22.64	16.5	17	80	124	-2.697	-1.354	0.007	0.59	0.44	0.3

Note : Sig (p) ≤ 0.05 for a significant difference

r=0.1 (small effect); 0.3(medium effect); 0.5 (large effect)

SMS Verification (SV); SMS notification (SN)

6.7.4 User's Knowledge as a Member of the Disaster Preparedness Group

Table 6-17 shows that a user's knowledge in disaster preparedness organisation influences device preparedness. Between users that were members of the disaster preparedness group and users who were not, there was a significant difference in device preparedness with a *p* value of <0.001. In addition, the effect size was 0.5 which can be categorised as a large effect size.

In the user's task, of using SMS verification, there was a significant difference in EOU ($p<0.001$) with an effect size of 0.49 (large effect size). Confidence with skill also showed a significant difference with a *p* value of <0.001 with effect size 0.46 (large effect size).

The user's positive perception of using verification services showed a significant difference in usefulness with a *p* value of <0.001 and an effect size of 0.47 (large effect size). For satisfaction, the *p* value was < 0.001 and an effect size was 0.42 (medium effect size).

The mean rank shows that users involved in disaster preparedness group perceived more usefulness (76.63) compared with users who were not involved in the disaster preparedness group (44.82). Similar results were also shown for the user's satisfaction perception; the mean rank for members of the disaster preparedness group was 76.63 compared with 44.82 for non-members.

In terms of SMS notification, a significant difference was recorded for EOU ($p = 0.002$), confidence with skill ($p <0.001$) and usefulness ($p =0.048$) between members and non-members of the disaster preparedness group. However, there was no significant difference in satisfaction.

As a members of a disaster preparedness group (KSB Member), it can be concluded that a user's knowledge influences their perception of the device preparedness, task (EOU and confidence with skill) and positive perception (usefulness and satisfaction) of using SMS verification and notification.

Table 6-17 : Mann-Whitney U test results for comparison of SMS verification and SMS notification between members and non-members of disaster preparedness groups

Effectiveness elements for early warning messages	Member of disaster preparedness group				Non- member of disaster preparedness group				U		z		*p*		*r*	
	Mean rank		Median		Mean rank		Median									
	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN	SV	SN
Device preparedness	81.72		22		43.65		17.5		176		-5.066		0.000		0.50	
EOU	81.08	69.31	32.50	22.00	43.79	46.37	17.00	20.00	187.50	399.5	-4.96	-3.063	0.000	0.002	0.49	0.30
Confidence with skill	79.03	77.14	22.00	23.00	44.24	44.65	12.00	19.00	224.50	258.5	-4.634	-4.330	0.000	0.000	0.46	0.43
Usefulness	79.53	62.69	17.00	26.50	44.13	47.82	10.00	23.00	215.50	518.5	-4.725	-1.977	0.000	0.048	0.47	0.19
Satisfaction	76.63	55.17	17.00	16.00	44.82	49.48	9.00	14.00	272.00	654.0	-4.211	-.762	0.000	0.446	0.42	0.76
Note : Sig (p) ≤ 0.05 for a significant difference																
r = 0.1 (small effect); 0.3(medium effect); 0.5 (large effect)																
SMS verification (SV); SMS notification (SN)																

6.8 Discussion

The statistical data analysis showed that the effectiveness of SMS verification services was correlated with SMS notification services in the user's task element (confidence with skill). Statistical data analysis using Spearman-rho showed that there was a correlation between verification and notification services. Therefore, users who felt confident in using SMS notifications also felt confident in using SMS verification as early flood warning messages.

In terms of the correlation between device preparedness, users' task and users' positive perception, there was a correlation for using either SMS verification or notification service. Section 6.6.1 reported that device preparedness has a large correlation with task compared to the correlation with positive perception when users are using the notification services. In the notification services, the user's device preparedness had the greatest influence on the users' task.

Section 6.6.2 reported that device preparedness has a same strength correlation with task or positive perception (medium size effect) when a user is using the verification services. Therefore, in the verification services, the user's device preparedness had a moderate influence on a user's task or positive perception.

The user's task and positive perception influenced each other in a positive direction for both the notification or verification services. It can be concluded that between the user's task and positive perception, there was a strong correlation in a positive direction. This is in line with previous research on usability that a user's perceptions of satisfaction with user performance is correlated with a strong and positive direction (Nielsen & Levy, 1994).

Typical users of SMS verification and notification are users with a higher level of education or users who have experience as members of a disaster preparedness group. These results were correspond with prior research in e-government services which has suggested that the user's level of education influences the user's behaviour in using technology for accessing

information and services (Gauld et al., 2010). It is also in line with my own evaluation of typical SMS users in emergency conditions.

These findings suggest that policymakers and designers of information systems should consider a users' level of education and prior knowledge (as members of a disaster preparedness group) when designing and implementing a system for early warning messages. Understanding the user's contribution to the system can also be used as the requirement to improve the system in public services (Mao et al., 2005).

6.9 Conclusion

From the analysis described in this chapter, the following conclusions can be drawn:

- Verification services are effective to confirm the information in notification services. The user's perception of confidence with skill between notification and verification services was correlated, so, the users who are confident in using SMS notifications will be confident in using SMS verification.
- Device preparedness had a greater influence on task than positive perception when using SMS notification services. When using SMS verification services, device preparedness had a moderate influence either on task or positive perception.
- The typical users of SMS verification are people with a higher level of education who are members of a disaster preparedness group.
- A user's gender influences their positive perception of using verification services. A user's age influences their device preparedness.
- This analysis contributes to the user centric evaluation of the testing process regarding the dissemination method for delivering early warning messages.

CHAPTER 7 : THE USER AT THE CENTRE OF READINESS EVALUATION

7.1 Introduction

As mentioned in Chapter 1, the implication of this study is the evaluation method for end user's technology readiness, before the information system is implemented in the community. This chapter presents the validation process for readiness evaluation of mobile technology to deliver early warning messages from the user's perspective (device preparedness, task and positive perception).

Investigating the potential user that will be using electronic public services is essential for the information system designer, particularly in early warning messages services because these can save people's lives and their belongings before the disaster strikes.

The surveys in this study prioritised respondent recruitment from flood-prone areas because people who live in disaster-prone areas are representative of the people who need early warning messages. By focusing on the respondents living in disaster-prone area, the results were expected to provide a useful and reliable evaluation model suitable for the selection and assessment of mobile technology to deliver early warning messages from the user's perspective.

By using data from respondents' perception of their own skill level on device preparedness, task and positive perception, it was discovered there is a link between the user's characteristics and the effectiveness of mobile technology used to deliver early warning messages (device preparedness, task, and positive perception). The links between the user's variable and device preparedness, task and positive perception were used to validate the user's contribution in the effectiveness of mobile technology used to deliver early warning messages.

The process used to validate the indicators included in the readiness evaluation model is outlined below:

- Identification of user variables that influence the user's level of skill for preparing a device;
- Validation of which user variables that influence task and positive perception are associated with verification and notification services on early warning messages.
- Provision of a readiness evaluation model that revolves around the user.

7.2 Device Preparedness

The first indicator used for identifying the effectiveness of mobile technology is device preparedness. The metric used to investigate the user's level skill for preparing the devices is that the device must be ready to access mobile technology used to deliver early warning messages.

The discussion of device preparedness based on the user's variables is discussed in the following subsections:

7.2.1 Gender

The results from the first and second analyses showed that there was no significant difference between male and female user groups ($p > 0.05$) in skill for preparing the devices. Furthermore, the first results showed a mean rank value for male participants was higher (179.8) than the female participants (170.16). The second set of results were similar with the male mean rank value also higher (53.64) compared to the female mean rank value (45.79).

Therefore, this study concludes that gender does not significantly influence the user's skill for preparing the devices.

7.2.2 Age

The influence of a user's age with the level of skill for preparing a device to get access to early warning messages was identified.

Results from the first analysis show there is no significant difference between respondents in different age groups in preparing the devices, with a p value of 0.597. Furthermore, comparing the results of users in the 20-

30 age group with users in the over 50 age group showed no significant difference. Therefore, based on the first results the user's age was not an influence for the user's skill for preparing a device.

The second analysis shows that there was a significant difference in skill for preparing the device between users in different age groups ($p = 0.002$). Younger users (20—30 years) achieved a higher mean rank value of 66.63 compared with a mean rank value of 35.13 for older users (over 50 years). To confirm the influence of age on preparing the devices, the effect size between users in the 20—30 age group and users in over 50 age group was validated. Using the data recorded in the second survey, it was found that there was a significant difference in ($p = 0.001$) and the effect size illustrated a large effect ($r = 0.51$). From these results it is concluded that age influences the user's skill for preparing a device.

Between the two data sets, there is a different result. It should be acknowledged, that for the first survey participants were recruited based only on their previous experience with using mobile technology (SMS) in emergency situations. The second survey conducted a trial for delivering early warning messages, and it simulated respondents' conditions for using mobile technology to access the early warning messages. Therefore, the results from the second survey that suggest age influences the user's skill for preparing devices hold more weight.

Based on the results of the first survey the user's age was not an influence for the user's skill for preparing a device. But in the second result suggested that age influences the user's device preparedness.

These contradictory results suggest further research is necessary. In this study, age is considered an essential element.

7.2.3 Level of Education

The first and second analyses show there are significant differences with p values ≤ 0.05. The results of both show the mean rank a similar pattern. The respondents in the undergraduate group achieved a higher mean rank (the mean rank value in the first evaluation was 245.96; the mean rank value in the second evaluation was 85.30). Respondents with no formal education achieved the lowest mean rank (the mean rank value in the first

evaluation was 4.50; the mean rank value in second evaluation was 10.50). Based on the mean rank, it is suggested that respondents with higher education are more prepared with devices than respondents without formal education.

The results were validated by using the Mann- Whitney U test to compare users in the elementary group with users in undergraduate group. Using data from the first survey, there is a significant difference with a p value ≤ 0.05 and a medium effect size of 0.33. Using data from the second survey, there is a significant difference with a p value ≤ 0.05 and a large effect size of 0.63 between users with an elementary level of education and users with an undergraduate level of education.

It can be concluded that the level of education influences the user's skill level for preparing the devices. Thus, level of education is included as a factor that influences the device preparedness.

7.2.4 Prior Knowledge

Data from the first survey show there is a significant difference between users who frequently use SMS and users who rarely use SMS ($p \leq 0.05$). The second survey also suggested there is a significant difference between users in the disaster preparedness group and users who were not ($p \leq 0.05$).

The mean rank also illustrated a similar pattern between results from the two analyses that show higher mean rank is achieved by users with prior knowledge (the mean rank value in the first evaluation was 175.91; the mean rank value in second evaluation was 81.720). The lowest mean rank values were recorded by users who had no prior knowledge (the mean rank in the first evaluation was 149.5; the mean rank in the second evaluation was 43.65).

The Mann-Whitney U test was used to validate to the comparison of users in the *once a week* and *more than once a day* groups. There is a significant difference with a p value ≤ 0.05 and a small effect size. The data from the second evaluation show there is a significant difference with a p value ≤ 0.05 and a large effect size (0.5).

A user's routine for using SMS only has small influence on the user's skill for preparing a device. However, the respondent's prior knowledge as a member in disaster preparedness group has a large effect on the user's skill for preparing a device.

The user's routine for using the technology under normal conditions had a small influence on the device preparedness. In the scope of this project, a user's prior knowledge is included as a factor that influences the device preparedness.

7.2.5 Discussion

Two types of typical users for device preparedness have been identified. The first type is a user with minimal device preparation. The profile of this type of user is over 50 years old; has minimal formal education and is not a member of a disaster preparedness group.

The second type is a user who prepares the device. This type of user is between 20—30 years old, has a higher level of education, and is involved with a disaster preparedness group.

This study validated the following factors that influence a user in preparing a device for accessing early warning messages are age, level of education, and prior knowledge (involvement in a disaster preparedness group). Figure 7-1 illustrates the factors that should be considered when examining mobile technology from the user's perspective regarding device preparedness.

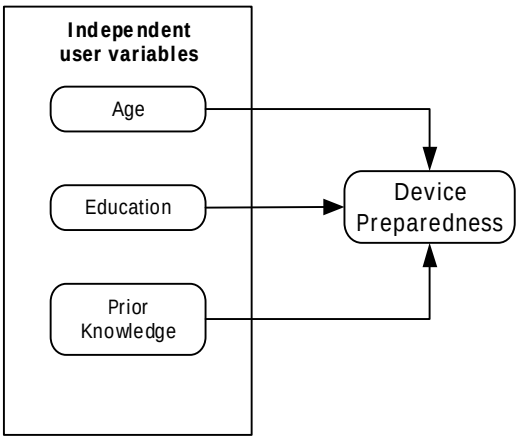

Figure 7-1: Independent user variables that influence devices preparedness

It is confirmed that the types of devices owned by users (people who live in disaster-prone areas) and their skill for preparing them are essential considerations for information system designers and authorities in the selection process and dissemination design of mobile technology that will be used to deliver early warning messages.

7.3 Task

To understand the user's skill level for using mobile technology for early warning messages, ease of use (EOU) and confidence with skill were used. Understanding the user's skill level for interacting with the technology aids the information system designer in designing and developing an appropriate information system that can be used by actual users (Norman, 2005).

Task were assessed using EOU and confidence with skill to identify the user's skill level in using SMS for notification and verification services. Therefore, it was essential to identify the correlation between the EOU and confidence with skill.

EOU refers to how the respondents measure their own ability to complete the task of using mobile technology to obtain information in an emergency condition. Confidence with skill refers to how the respondents rate their confidence in their personal skill when using mobile technology to assess early warning messages.

For notification services, the first evaluation showed there was a correlation between EOU and confidence with skill. The correlation was significant with a strong relationship (r = 0.589) in the positive direction. The correlation results recorded for the first and second evaluation were similar. The second evaluation showed that there was a correlation between EOU and confidence with skill when using notification services as an early warning message. The r value was 0.873.

Table 7-1: Correlation between EOU and confidence with skill.

	Correlation between EOU and confidence with skill (*r*)
SMS usage in early warning messages (notification services)	0.589**
SMS as notification services in early warning messages	0.873**
SMS as verification early warning messages	0.865**
Note : r = Small (0.1 - 0.29); Medium (0.3- 0.49); Large (0.50- 1)	
** ***Correlation is significant at the 0.01 level (2-tailed).***	

The correlation between EOU and confidence with skill for verification services was also correlated with an *r* value of 0.865 (Table 7-1). The conclusion that there is a correlation between EOU and confidence with skill and they influence each other.

This validates the use of mobile technology for delivering early warning messages. It is essential to include EOU and confidence with skill assessment when investigating a user's task or skill level for using mobile technology used to deliver early warning messages.

The next section explains the user variables that influence the user's task for using mobile technology. The user's task when using mobile technology is based on the early warning messages dissemination process, which includes notification services and verification services.

7.3.1 Gender

In the notification service, the first evaluation showed that there was no significant difference in EOU (p = 0.078), but there was a significant difference in confidence with skill ($p \leq 0.05$) between male and female users. The effect size for confidence with skill between a male and female user was small (r=0.14).

In the second evaluation, there was no significant difference between female and male users for EOU (p = 0.371) and confidence with skill (p = 3.44).

For using notification services, a user's gender does not influence task or level of skill. Even though there is a significant difference in confidence with skill in the first evaluation, the effect size was small.

The use of verification services, show a significant difference in EOU (p = 0.009) but no significant difference in confidence with skill (p = 0.119). The effect size was medium for EOU (r = 0.26). As presented in Table 7-1, the result show that EOU and confidence with skill for using verification services are correlated. Therefore, a user's gender does not influence the task or skill for using mobile phone for verification services.

Similar research in terms of gender and task to use computers among Iranian students showed that there was a significant difference between male and female students in confidence with skill but there was no problem with their ability to use computer (Shashaani & Khalili, 2001). Other research also showed that there was no significant difference between male and female users in terms of their ability to use a computer (Busch, 1995).

Therefore, based on gender, there is a significant difference in EOU but not in confidence with skill. As for the notification services, there was no significant difference between male and female users. Consequently, a user's gender does not influence the task (EOU and confidence with skill) of using mobile technology for notification and verification services of early warning messages.

7.3.2 Age

For notification services, the first evaluation shows that between users in 20—30 and over 50 age groups, a significance difference is only present in confidence with skill when using SMS in emergency conditions(p = 0.01); There is no significant difference in EOU (p= 0.3) (Table 5-8). Moreover, a user's age does not influence the correlation between EOU and confidence with skill for using notification services in emergency conditions (Table 5-16).

The second evaluation of using mobile technology with notification services shows that there is no significant difference for users of different ages for EOU (p = 0.133) and confidence with skill (p = 0.514). Therefore, a user's

age does not influence the task of using mobile technology to deliver notification services for early warning messages.

For using mobile technology with verification services for early warning messages, the user's age also has no effect on EOU (p =0.328) and confidence with skill (p = 0.594). This is also validated by a Mann- Whitney U analysis that indicates there is no significant difference between users in the 20—30 age group and in the over 50 age group on task for mobile technology to access notification and verification services of early warning messages.

In the scope of the project, the findings are that the user's age does not affect the user's task (EOU and confidence with skills) for using notification and verification services of early warning messages. Studies done by Ferrer-Roca, Cardenas, Diaz-Cardama, and Pulido (2004) for health information using SMS and by McCloskey (2006) for e-commerce, found that a user's age does not influence skill with using technology.

7.3.3 Level of Education

Using mobile technology to deliver notification services, the first and second surveys show that there is a significant difference in EOU and confidence with the skill among users with different levels of education.

The first survey shows a significant difference in both EOU and confidence with skill ($p \leq 0.05$). Results from the second survey confirm that there is also a significant difference in EOU and confidence with skill ($p \leq 0.05$).

The two surveys also show a similar pattern in mean rank position. The first survey shows that the lowest mean rank is achieved by users without an education with a value of 20.5 in EOU and 35.5 in confidence with skill. The highest mean rank is achieved by users with an undergraduate level of education with a value of 245.96 for EOU and 246.65 for confidence with skill. Similar were obtained from the second survey. The lowest mean rank in the second survey is achieved by the group of users with no education (EOU mean rank of 37.33 and confidence with skill mean rank of 31.17) while the highest mean rank is achieved by the group of users with an undergraduate education (EOU mean rank of 74.82 and confidence with skill mean rank of 81.07).

Using mobile technology to deliver verification services on early warning messages, supports the prior result on assessing mobile technology used to deliver the notification services. The data analysis for the user's task of using mobile technology for delivering verification services shows that there are significant differences among users with different levels of education in terms of EOU and confidence with skill ($p \leq 0.05$). The users with no level of education achieved the lowest mean rank in EOU (20.50) and confidence with skill (21.33) compared with the users in the undergraduate group (EOU mean rank of 74.96 and confidence with skill mean rank of 72.71). The effect size between users in the elementary and undergraduate groups for EOU was found to be large for both early warning message dissemination services ($r_{\text{notification services}} = 0.54$ and $r_{\text{verification services}} = 0.58$). The effect size for confidence with skill was also large for both dissemination services ($r_{\text{notification services}} = 0.62$ and $r_{\text{verification services}} = 0.55$).

Therefore, the user's level of education influences the user's task for using mobile technology in notification and verification services as early warning messages.

7.3.4 Prior Knowledge

The first survey of using notification services in an emergency condition shows that there is a significant difference between users with prior knowledge (SMS frequency of use (FOU)) and users without prior knowledge (infrequent use of SMS) ($p \leq 0.05$). Therefore, the user's frequency of use with technology influences user's task in terms of EOU and confidence with skill for using mobile technology to deliver early warning messages.

The second survey of notification services shows that there is a significant difference between users who are members of a disaster preparedness group and those who were not (EOU and confidence with skill: p value ≤ 0.05); the effect size was 0.3 for EOU (medium effect size) and 0.43 for confidence with skill (medium effect size).

The mean rank recorded in the second survey shows users who have knowledge of disaster preparedness reached a higher mean rank (EOU =

69.31; confidence with skill = 77.14) compared with those who did not (EOU = 46.37; confidence with skill = 44.65).

The verification services study results are similar to the notification services study results. There is a significant difference between the group with EOU and confidence with skill with a *p* value ≤ 0.05. The higher mean rank is achieved by the users who have prior knowledge as a member of disaster preparedness group (the mean rank value in EOU is 81.08 and the mean rank value in confidence with skill is 79.03). Users that are not members of the disaster preparedness group achieved a mean rank value of 43.79 in EOU and 44.24 in confidence with skill. The effect size is 0.49 (large effect size) for EOU and 0.46 for confidence with skill (large effect size).

The result of both analyses, show that prior knowledge (frequency of use of technology and as a member of disaster preparedness group) influences user's *task* or skill level (EOU and confidence with skill) for using technology for early warning messages (notification and verification services).

7.3.5 Discussion

The type of user that has the least problems using mobile technology to access early warning messages is a user with a high level education, who frequently uses a mobile technology and who is involved in a disaster preparedness group.

The user variables that influence the task or skill level for using mobile technology to access early warning messages are the user's level of education and prior knowledge (Figure 7-2).

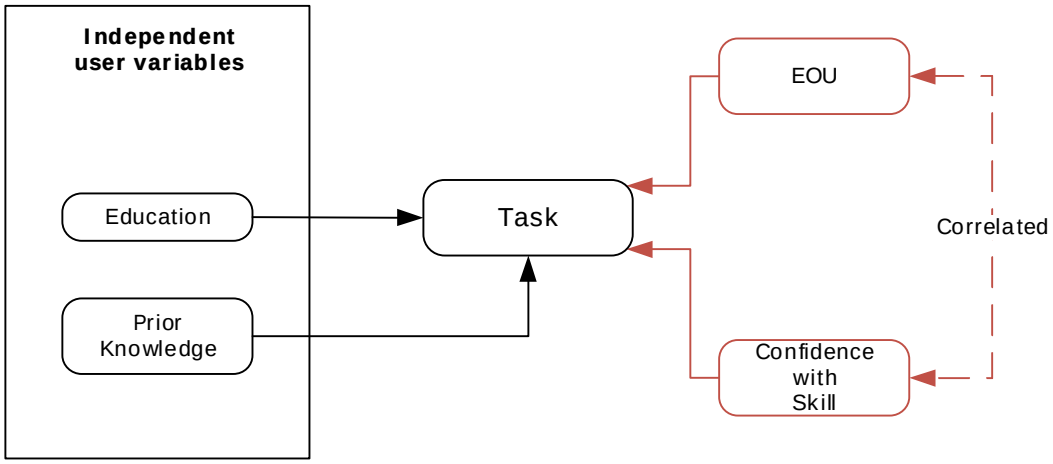

Figure 7-2: User variables that affect the EOU and confidence with skill

It has been validated that gender and age do not influence the task of using mobile technology to get access to early warning messages. Furthermore, it has been confirmed that the user's level of skill is an essential factor that needs to be examined when the information system designer and authority implement mobile technology to deliver early warning messages either in verification or notification services.

7.4 Positive Perception

Positive perceptions are an important factor in this case study. They were used to understand how users perceived the usefulness and satisfaction of using mobile technology to deliver early warning messages.

Usefulness refers to the respondent's ability to assess the system based on their perception of using the mobile technology to obtain an early warning message, whether it was beneficial, and whether they would be use the system again in the future. Satisfaction refers to the respondent's opinion after assessing the mobile technology. It was essential for this study to examine the correlation between usefulness and satisfaction, because the results represent the user's positive perception.

The analysis of the correlation between usefulness and satisfaction is based on the early warning message services, which are notification and verification services. As shown in Table 7-2, the correlation between usefulness and satisfaction for using notification services on early warning messages was in the positive direction and large with a value (r) 0.814.

For verification services, the correlation between usefulness and satisfaction was also large correlation with an *r* value of 0.878.

Table 7-2: Correlation between usefulness and satisfaction (Users' positive perception).

	Correlation between *usefulness* and *satisfaction* (*r*)
SMS as notification early warning messages	0.814**
SMS as Verification early warning messages	0.878**
Note : r = Small (0.1 - 0.29); Medium (0.3- 0.49); Large (0.50- 1)	
** ***Correlation is significant at the 0.01 level (2-tailed).***	

The analysis shows a positive perception of mobile technology and large correlation between usefulness and satisfaction for using mobile technology for notification and verification services.

The next section explains which of the user's variables influence the positive perception of using mobile technology to get access to early warning messages.

7.4.1 Gender

For using mobile technology to get access to early warning messages, the first survey shows that there is a significant difference between male and female users in satisfaction for using SMS in emergency conditions ($p \leq 0.05$); however, the effect size was small ($r = 0.017$).

In terms of usefulness, is shown that using notification services there is no significant difference between male and female users ($p = 0.992$). The satisfaction perception of using notification services also shows that there is no significant difference between male and female users ($p = 0.749$).

For using verification services, there is a significant difference between male and female users ($p \leq 0.05$). The effect size using verification services between male and female users is medium.

While the results in this case study align for verification services which show that gender influences a positive perception, there is no significant difference between males and females for notification services. However,

the data collected suggest that gender influences the user's level of satisfaction of technology that used to disseminate and verify the early warning messages.

As suggested in Nysveen, Pedersen, and Thorbjørnsen (2005) found that gender influences the satisfaction level for using mobile chat. Another study that conducted by Ong and Lai (2006) noted that gender also influences the satisfaction level for the technology that used for e-learning. In an e-government services study by Alawneh et al. (2013) and Pereira et al. (2015) suggest user's level of satisfaction on the technology influences by the gender construction.

This thesis considers that the use of technology that is used to disseminate an early warning message and level of satisfaction for the technology is influenced by gender.

Thus, it is important to consider user's gender when examining the positive perception of mobile technology used to deliver an early warning message because the effect size shows a medium effect when the user is using verification services. In addition, verification services are essential to support the notification services for mobile technology that are used to deliver early warning messages.

7.4.2 Age

For the age variable, the first survey analysis validates that there is no significant difference among users in different age groups for the satisfaction of using SMS in emergency conditions (p = 0.656). This is in line with data analysis performed for the second survey of notification services that shows that there is no significant difference for users of different ages (satisfaction: p = 0.135; usefulness p =0 .253).

The result for verification services, show that age does not influence positive perceptions because there was no significant difference (usefulness: p =0.906; satisfaction p = 0.761).

With regard to technology adoption, other research has suggested to include the user's age when examining the usefulness and satisfaction of technology usage (Michael G. Morris & Venkatesh, 2000).

However, analysis of this case study's data shows that user's age does not influence the user's positive perceptions (in usefulness and satisfaction). This result aligns with previous research that examined the influence of students' age on satisfaction in accessing web based information (Thurmond, Wambach, Connors, & Frey, 2002) and research on the effect of age towards computer usage, (Sara J. Czaja & Sharit, 1998; Igbaria & Nachman, 1990) which both found that age was not an influential factor when assessing perception of user satisfaction.

Thus, it is not established that age influences the positive perception of using mobile technology for notification or verification services on early warning messages. The user's age, however, does influence the skill level on *device preparedness.*

7.4.3 Level of education

The first survey shows that there is a significant difference between users with different education levels on satisfaction ($p \leq 0.05$). The highest mean rank for satisfaction is achieved by users in the undergraduate group (the mean rank value was 250.73) while the lowest mean rank is achieved by users without an education (the mean rank value was 98). The effect size between users in the elementary group and users in the undergraduate is 0.35 (medium effect size). However, the second survey of notification message services shows that there is no significant difference in usefulness ($p = 0.315$) and satisfaction ($p = 0.404$).

For using verification services, the results of data analysis shows that there is a significant difference among groups with different levels of education in usefulness and satisfaction for using SMS verification messages ($p \leq 0.05$). The highest mean rank is achieved by users with an undergraduate background (usefulness mean rank value was 70.18; satisfaction mean rank value was73.11). The effect size between users in the elementary group and users in the undergraduate group shows a large effect size ($r_{EOU} = 0.4$ and $r_{\text{confidence with skill}} = 0.44$)

Schoonenboom (2014) in her research on Learning Management Systems, suggested that users with a higher level of education are not satisfied with the technology that requires a complex task to access the information

system. In line with prior research on Internet usage suggests that user's level of education influences the intention of using the Internet (Nayak, Priest, & White, 2010).

Analysis of the Semarang case study shows that users with a higher level of education had a positive perception of using both services in early warning message.

The user's level of education should be included when examining the user's positive perceptions of using SMS as an early warning message. The user's level of education influences the positive perception of using the mobile technology to access early warning messages.

7.4.4 Prior Knowledge

The first survey shows that there is a significant difference in satisfaction ($p \leq 0.05$) among users with different frequencies of SMS use. The effect size between *once a week* and *more than a day* is 0.33 (medium effect size). It can be concluded that the user's frequency of mobile technology use influences their positive perception.

In the second survey of using the notification services, there is no significant difference of satisfaction between users with prior knowledge and users without prior knowledge ($p = 0.446$). However, in terms of usefulness, there is a significant difference for users with prior knowledge and users without prior knowledge ($p = 0.048$).

For using notification services, the user's technology routine influences their satisfaction of using notification services. For members of the disaster preparedness group, prior knowledge only influences usefulness but not the satisfaction. The correlation between usefulness and satisfaction (see Table 7-2) is strong and in the positive direction. Therefore, the conclusion is that frequency of use of SMS and experience as a member of disaster preparedness group influences the notification services for using mobile technology to deliver early warning messages.

For the verification services, there is a significant difference between users who are members of the disaster preparedness group and users who are

not in terms of usefulness and satisfaction ($p \leq 0.05$). The effect size for the usefulness is 0.47 and for satisfaction is 0.42, which is large effect size.

In this scope of this project, it is suggested that prior knowledge influences the positive perception of using mobile technology to deliver early warning messages.

These results are similar to a prior study that suggested that user's satisfaction is influenced by the user's experience of using the technology (Gatian, 1994). In addition, it is also in line with research in coffee shops, which suggested that users who know how to use the self-service technology impacts on perceptions of usefulness and satisfaction of the self-service technology (Verhoef et al., 2009) .

A user's prior knowledge should be included when examining positive perception for using mobile technology to access early warning messages. Interestingly, the data shows there is a significant difference for notification services for usefulness but not for satisfaction. Therefore, when examining the user's opinion of usefulness and satisfaction for mobile technology used to deliver early warning messages on notification services, the usefulness factor is more important that the satisfaction factor.

7.4.5 Discussion

The profile of a typical user that has a positive perception of using verification and notification services on mobile technology for delivering early warning messages is a user who has higher level of education, who frequently uses SMS, and who is involved in a disaster preparedness group.

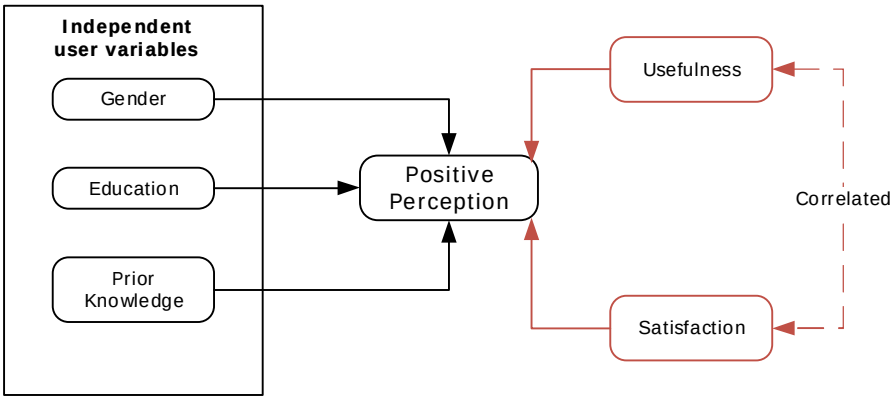

Figure 7-3 : Users' factors that affect the usefulness and satisfaction

Gender, level of education, and prior knowledge are factors that influence a user's positive perception for using mobile technology to access early warning messages (Figure 7-3).

7.5 Device Preparedness, Task, and Positive perception

Previously discussed are the user variables that influence the level of skill and positive perception for using mobile technology to access the early warning messages.

It was essential to examine the data from the second survey to investigate the correlation between level of skill (on *device preparedness* and task) and positive perception, to see if there is any difference when the user used the notification and verification services on mobile technology to deliver early warning messages.

7.5.1 Notification services

For the notification services, the correlation between device preparedness and task shows is strong (r =0.483) compared to the correlation between device preparedness and positive perception (r =0.228). Figure 7-4 shows the correlation between device preparedness, the user's task, and user's positive perception in notification services.

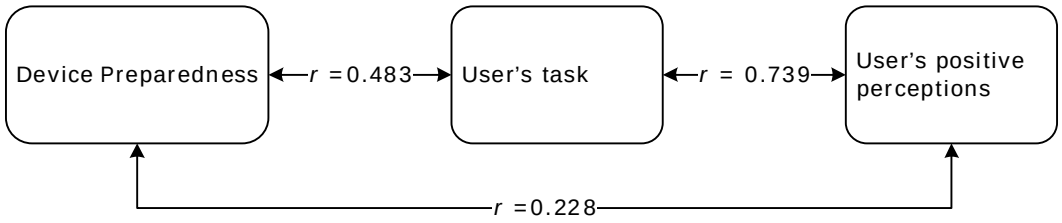

Figure 7-4: Correlation between device preparedness, task and positive perception in SMS notification services

Therefore, device preparedness has a greater influences on the task than the positive perception when the user is using the notification services. The correlation between the *task* and *positive perception* is also significant correlation: strong, and in a positive direction (r=0.739).

7.5.2 Verification Services

For the verification services, Figure 7-5 presents the correlation among device preparedness, task and the user's positive perception.

The *device preparedness* correlation strength with the task is 0.366 (medium effect size) and is similar in strength to the correlation between the *device preparedness* and *positive perception* the r value is 0.310 (medium effect size).

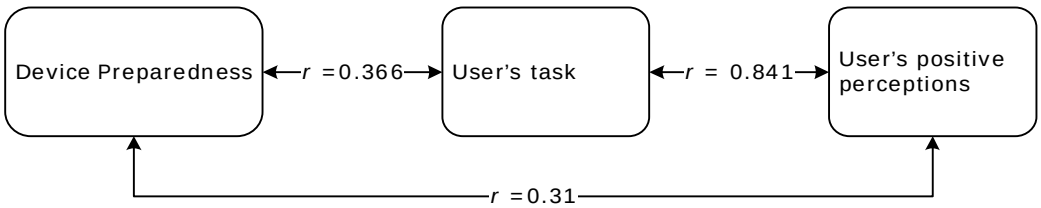

Figure 7-5: Device preparedness, users' task and users' positive perception in SMS verification services

For use of the verification services the device preparedness influences *task* and *positive perception* with the size of effect in medium value(r >0.3).

Figure 7-4 and Figure 7-5 illustrate the validation that device preparedness, users' task (EOU and confidence with skill), and users' positive perception influence each other. In addition, *task* influences the *positive perception* for using mobile technology to access the early warning messages (on notification and verification services).

Device preparedness has more influence on the *task* in the notification services compared to verification services.

7.6 The User at the Centre of Readiness Evaluation

The aim of this thesis is to contribute to the public services assessment for determining the readiness, from the user's perspective, of mobile technology that will be used to deliver early warning messages.

Three metrics were used to investigate the effectiveness of mobile technology that will be used to deliver early warning messages from the user's perspective.

The first metric is *device preparedness*. *Device preparedness* is about understanding the user's skill level for preparing the mobile technology devices. The user's demographic variables that influences *device preparedness* are age, level of education, and prior knowledge (the user's frequency of use for mobile technology and their experience as a member of a disaster preparedness group).

The second metric is user's *task.* The user's *task* is about understanding the user's level of skill on EOU and confidence with skill for using the mobile technology to access the early warning messages. The user's variables that affect the user's *task* (EOU and confidence with skill) are level of education and prior knowledge (the user's frequency of use for mobile technology and their experience as a member of disaster preparedness group).

The third metric is *positive perceptions*. *Positive perception* is about understanding the user's opinion of the system after using it to access the mobile technology. The user's variables that affect *positive perception* (usefulness and satisfaction) are level of education and prior knowledge (the user's frequency of use for mobile technology and their experience as a member of a disaster preparedness group).

To deliver a model that focuses on the user at the centre of readiness evaluation for selecting mobile technology for delivery of early warning messages, three elements are used (device preparedness, user's task, and user's positive perception).

User Readiness for Technology (URT) is an evaluation model that can be used to conduct readiness evaluation based on user's skill and user's positive perception of mobile technology for delivery of early warning messages.

The output of this model is the user's profile for mobile technology for delivery of early warning messages. This output can help the information system designers identify the user, based on their skill and willingness to use the mobile technology to deliver early warning messages.

The user information from the URT can assist the information system designers make decisions for mobile technology that will be implemented to deliver early warning messages.

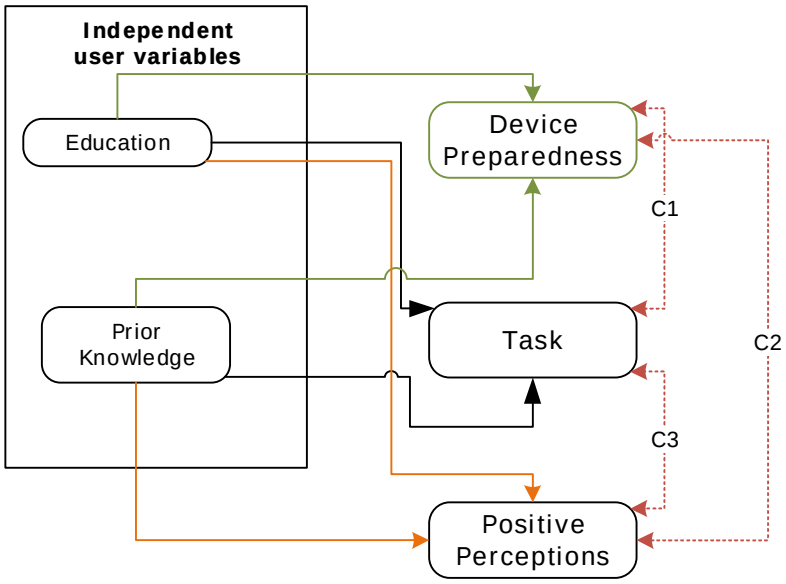

Figure 7-6: User Readiness for Technology (URT)

Legend:

→ : The user's level of education and prior knowledge influence *device preparedness*

→ : The user's level of education and prior knowledge influence *task*

→ : The user's level of education and prior knowledge influence *positive perception*

C1 : *Device preparedness* and *task* are correlated.

C2 : *Device preparedness* and *positive perception* are correlated.

C3 : *T*ask and *positive perception* are correlated.

This is related to the user's prior knowledge of assessing technology used to access information. A user's experience with technology influences ease of use with technology used to access the information (Adams et al., 1992). The result of the study shows that a user's experience or routine with technology was not the only factor that influenced *device preparedness, task,* and *positive perception* in emergency situations. The other factor that

influences the *device preparedness, task, and positive perception* is the user's knowledge as a member of disaster preparedness group.

For the URT evaluation model using the user's frequency of use for mobile technology or their experience in a disaster condition as prior knowledge is necessary when examining the effectiveness of mobile technology used to deliver early warning messages.

The Technology Acceptance Model (TAM) is a model used to explain and predict the user acceptance or intention of use for technology or information system (Y. Lee, Kozar, & Larsen, 2003). Task Technology Fit (TTF) is a model that focuses on understanding the user task to the impact of technology performance (Goodhue & Thompson, 1995). Usability is defined as a method to help the information system designers so they can provide a usable, effective, and quality system for the user (Folmer & Bosch, 2004).

Compared to the TAM model, TTF model and Usability method, the URT model is beneficial in determining the readiness, from the user's perspective, of mobile technology that will be used to deliver early warning messages. The URT model adds a new model to determine user's *readiness* for using a new information system.

7.7 Conclusion

From the discussion chapter, the following conclusions can be drawn:

In this study, a user-centred approach was used to create a readiness evaluation model. The method used was an investigation of user skill levels and user willingness for using mobile technology to deliver early warning messages. This resulted in the URT as a methodological tool for investigating a user's skill level (on device preparedness and task) and positive perception of mobile technology that will be used to deliver early warning messages. The output of URT is a user's profile for the use of mobile technology being assessed.

The users profile from URT provides information about the skill level and positive perception of technology to deliver early warning messages. The

user variables that influence the device preparedness, task and positive perception are user's level of education and prior knowledge.

The user's age only influences the skill level on device preparedness and the user's gender only influences their positive perception.

CHAPTER 8 : GUIDE FOR USING THE URT MODEL

8.1 Introduction

Chapter 1 stated that the aim of this study is to provide methodological tool that can be used to investigate the user's characteristics for interacting with technology that will be used to deliver early warning messages.

Chapter 7 delivered the URT as methodological tool (Figure 8-1) that can produce a profile of a population group incorporating three metrics for mobile technology that may be used to design effective delivery of early warning messages. This chapter continues the results of Chapter 7 to provide a guide for using the URT model to design a system for mobile communication technologies.

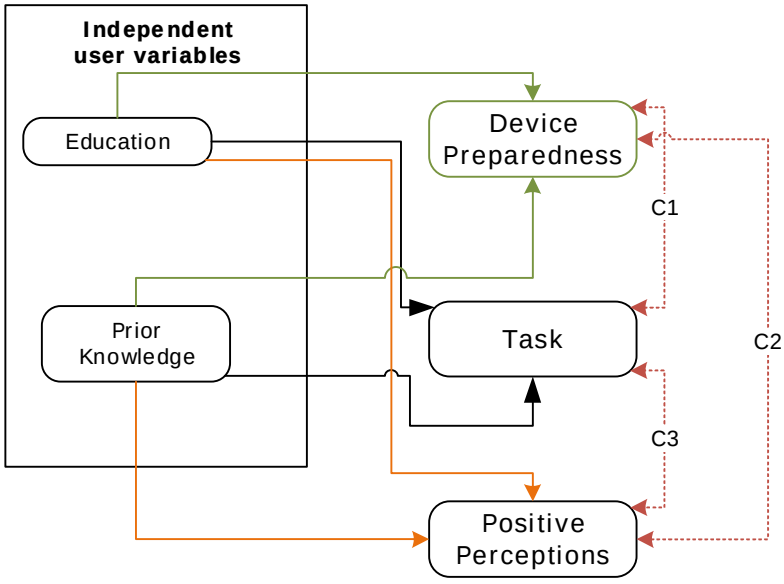

Figure 8-1: User Readiness for Technology (URT)

Legend:

→ : The user's level of education and prior knowledge influence *device preparedness*

→ : The user's level of education and prior knowledge influence *task*

→ : The user's level of education and prior knowledge influence *positive perception*

C1 : *Device preparedness* and *task* are correlated.

C2 : *Device preparedness* and *positive perception* are correlated.

C3 : *T*ask and *positive perception* are correlated.

Device preparedness is about understanding the user's skill level for preparing the technology devices. The user's *task* is about understanding the user's level of skill on EOU and confidence with skill for using the technology to access authority services. Between EOU and confidence with skill is influences each other in positive direction (Figure 8-2).

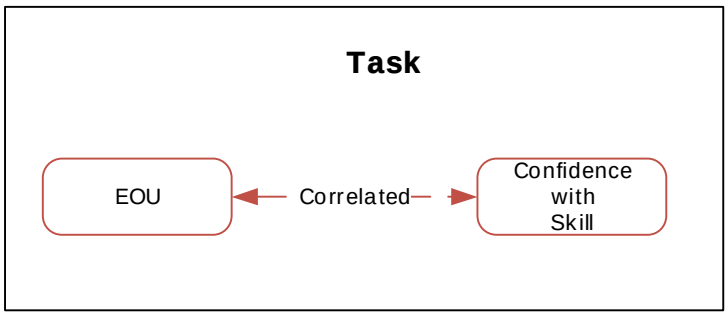

Figure 8-2 : The correlation between EOU and Confidence with skill

Positive perception (usefulness and satisfaction) is about understanding the user's opinion of the technology after using it. Metrics for positive perception is usefulness and satisfaction. Usefulness and satisfaction are also correlated in a positive direction and influence each other (Figure 8-3).

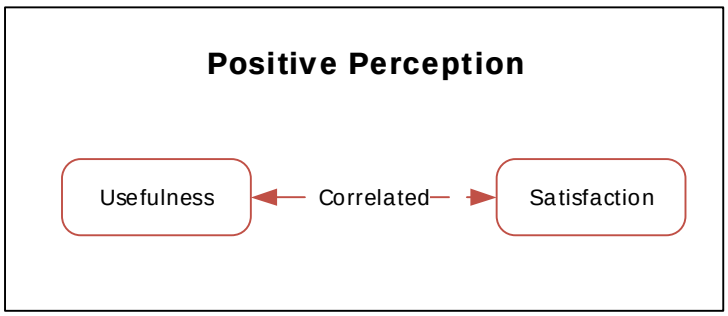

Figure 8-3 : The correlation between Usefulness and Satisfaction

This chapter presents the instructions for applying the URT to produce a profile of a population group when assessing mobile technology.

8.2 Procedure

Figure 8-4 shows the diagram of the step in the URT model.

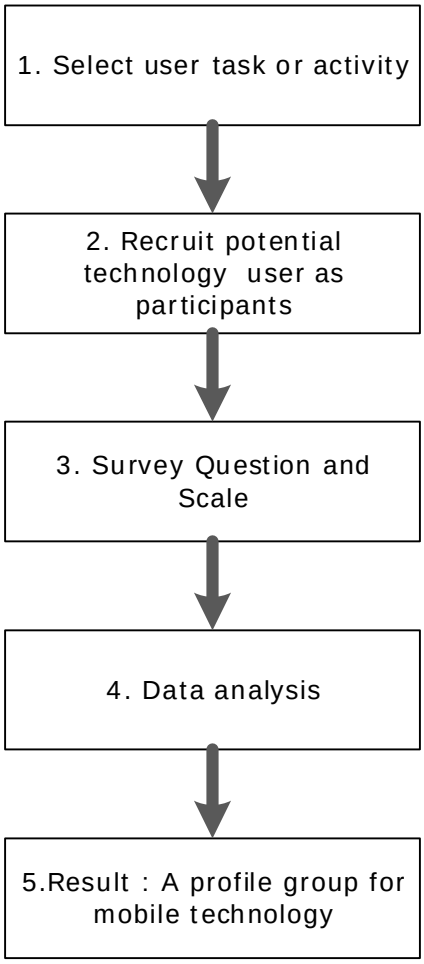

Figure 8-4 : Procedure for URT model

1. **Select the user's task.**

The user's profile that will be produced by the URT model, is based on the user interaction with the technology, so, it is essential to define the type of task or user's activity that will be assessed. In the information system design, is essential that the information system designer provides user's activity when interacting with the system (Rosson & Carroll, 2009)

In this thesis, the activities of sending and receiving SMS were examined, as early warning messages are only effective when the messages are received and interpreted.

2. Recruits potential user of technology as participants.

Understanding a user's task includes the conditions and location in which the task is performed. The data should be collected from participants who are local to the area being assessed (Dumas & Fox, 2009).

Figure 8-5 and Figure 8-6 shows the condition after flooding of the settlement in Mangun Harjo and Mangkang Wetan, Semarang.

Figure 8-5: Mangun Harjo settlements covered with mud after the flood receded, Semarang, Indonesia, in February, 2016

Figure 8-6 : Mangkang Wetan settlements that near with Beringin River, Semarang, Indonesia (February, 2016).

However, a user's location is not of the only factor that can influence a user's profile of technology use. A user's culture can be also become consideration when assessing technology usability (Tedjasaputra & Sari). The user's culture is considered in the process of recruitment, because it can help the researcher know about the user's habits or patterns for using the technology. By understanding the pattern of the technology, it will help the researcher when going to design an information system to deliver service.

3. Survey question and scale.

The essential for using survey as a medium to collect a user's task analysis is the question and the scale (Ozok, 2009).

The URT model uses a user's level of education and user's frequency of use for technology as the independent variables. The scale for measuring the user's frequency of use for technology is once a month; once a week; more than once a week; once a day; more than once a day. The scale for metrics is a Likert scale (with six options: strongly agree, agree, somewhat agree, somewhat disagree, disagree, and strongly disagree).

This model can also be used as a verbal questionnaire over a telephone or for participants with low levels of literacy.

The questionnaire for this tool has been tested in this study (Chapter 5 and Chapter 6)

Table 8-1: URT Questionnaire

Device preparedness
I would turn my [*the technology*] *on* at [*situations*]
My [*the technology*]is accessible at [*situations*]
My [*the technology*]is turned *on* all day
My [*the technology*] electric supply is available at [*situations*]
Ease of use assessment
It is easy to use [*the technology*]
It needs a few steps to use [*the technology*]to access [*services*]
I need instructions to use [*the technology*]
I can receive services from [*authority*] using [*the technology*] successfully
I can identify the information accuracy when using[*the technology*]

Confidence with skill assessment
It is easy for me to remember how to use [*the technology*]
I consider myself skilful in using [*the technology*]
I learned to use [*the technology*] quickly
I can identify the difference between official information or unofficial information using [*the technology*]
Usefulness
[*the technology*] is useful to access it [*services*]
[*the technology*]is useful to quickly access it [*services*]
[*the technology*]is my preference to receive it [*services*]
[*the technology*]is useful to receive it [*services*]
[*the technology*] is useful to receive it [*services*]compared to [other the technologies]
Satisfaction
I am satisfied with [*the technology*] to access [*services*]
I would recommend [the technology] to a friend
I prefer to use [*the technology*] to access [*services*]compared to [*the other technologies*]

Legend:

[*the technology*]	:	can be filled with type of technology to be assessed
[*situations*]	:	can be filled with situations or times relevant to the question.
[*the other technologies*]	:	can be filled with the other technologies
[*services*]	:	can be filled with the type of services that need to be accessed using the technology

8.3 Data Analysis

The following section describes statistical tools to analyse data collected by the survey to become a profile of a population group for technology:

- **Inspect the internal consistency / Cronbach's alpha**

  The consistency of the participants' responses to the questionnaire is very important, to ensure that the data are reliable for use. The statistical tool that measures the consistency of the participants' responses is Cronbach's alpha.

- **Inspect the data distribution**

When testing the distribution of data, the goal is to assist researchers in selecting statistical tools between parametric and non-parametric analyses. These are used to determine any significant differences between independent user variables and identify the correlation strength and direction between the metrics. Data with a normal distribution will have a significant value greater than 0.05 (sig > 0 .05) (Pallant & Florence, 2013).

- **Identify the significant difference between groups.**

To get a profile of user of a technology, it is important that the data are analysed for each metrics: device readiness, user tasks (EOU and confidence with skills) and positive perceptions (usefulness and satisfaction).

When the data are normally distributed, a T-test can be used to identify significant differences between the two groups (the respondent group with the prior knowledge and the group of respondents without prior knowledge) and the analysis of one way variance (ANOVA) to explore significant differences between more than two groups.

However, when the data are not normal distributed, the Mann- Whitney U and Kruskal-Wallis test are used to identify the significance difference between the groups. The Man-Whitney U test is used to explore whether there is any difference between the two groups. The Kruskal-Wallis test is used to investigate whether there is any difference for more than two groups.

- **Identify the correlation between the metrics**

To identify the correlation between the URT's metrics, it Pearson bivariate should be used when the data are normal distributed or Spearman rho when data are not normally distributed.

The URT model shows when device readiness, user tasks and positive perceptions affect each other.

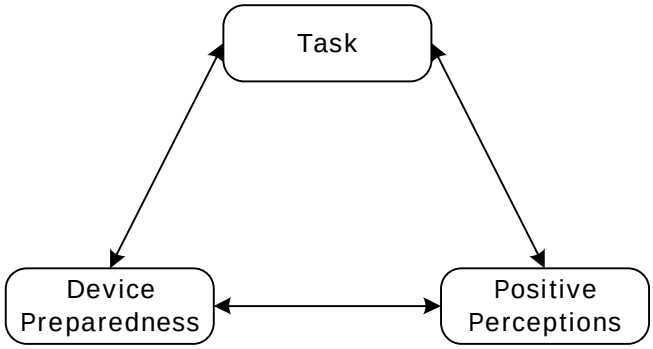

Figure 8-7: Correlation between Device preparedness, User's task and Positive Perception

8.4 Summary

This chapter presents the instructions for using the URT model to produce a profile of a population group for using mobile technology that may be used to design a system for the effective delivery of early warning messages.

CHAPTER 9 : SUMMARY, CONTRIBUTIONS, PRACTICAL IMPLICATIONS AND FURTHER WORKS

9.1 Revisiting Research Aim and Objectives

In section 1.4 of Chapter 1, four objectives were formulated. The framework of this thesis was guided by the goal of meeting these objectives.

As summarised below, the research conducted and reported in this thesis has provided a responses to each objective:

i. **Determine the effectiveness of mobile technology for delivering early warning messages from the user's perspective**

   The effectiveness of mobile technology to deliver early warning messages is determined by the user owning their own devices, have the necessary skill to use the mobile technology, and the willingness to use the mobile technology to access early warning messages. This study discussed the definition of the effectiveness of mobile technology for delivering early warning messages from the user's perspective on Chapter2 and it is illustrated in Figure 2-3

ii. **Determine the measurements for a user-centred evaluation of a mobile phone to deliver early warning messages**

   To place the user at the centre of readiness evaluation for mobile technology that will be used to deliver early warning messages, three metrics are defined that influence the effectiveness of the mobile technology. These are device preparedness, task (EOU and confidence with skill) and positive perception (usefulness and satisfaction). In the chapter 3 section 3.6 it explored the metrics which are: device preparedness, task (EOU and confidence with skill) and positive perception (usefulness and satisfaction).

iii. **Provide empirical evidence for the effectiveness, from the user's perspective, of mobile technology for delivering early warning messages.**

Data collected from Semarang were analysed and results presented in Chapters 5 and 6 showing the profiles of typical users of SMS. The analysis used the three metrics outlined in point ii. Chapter 5 shows the typical user of mobile SMS in emergency conditions (Section 5.8). As Chapter 6 shows the typical user of SMS verification as flood early warning messages (Section 6.7)

iv. **Design a model that includes and facilitates the user contribution to the effectiveness of mobile technology used to deliver early warning messages.**

In Chapter 7, the URT model is proposed (Figure 7-6). The URT model is a methodological tool for investigating the typical user for readiness evaluation of technology selection and dissemination design for delivering early warning messages. Chapter 8 provides a guide for using the URT model.

The following sections provide conclusions, contributions of the research, research limitations, and future work resulting from this research.

9.2 Summary

From the literature it was found that two main techniques are commonly used for investigating the effectiveness of mobile technology to deliver early warning messages from the user's perspective. The first is by investigating the user's intention of use for the mobile technology. The second is by investigating the user's skills for using the technology.

Many previous studies used the user's intention to use the technology for identifying the factors that influence the effectiveness of technology used to deliver public services. However, user skills tend to be ignored in the selection process of technology that will be used. User skills with the specific technology were investigated in this case study to assess the effectiveness of using mobile technology to deliver early warning

messages. Furthermore, no previous methodological tool could be found that discerned end-user skills which could be used in the selection process for technology to deliver early warning messages. By investigating the user's skill, it was validated that user's skill is one of the essential factors in the readiness evaluation for the selection process of mobile technology for delivery of early warning messages.

A readiness evaluation strategy was proposed to identify the user's skills and positive perception of mobile technology for delivery of early warning messages.

These findings are intended for use by information system designers and authorities in order that they can design and implement information systems using appropriate mobile technology that suits the user's skill level.

9.3 Contributions of this Thesis

A user-centric approach was taken to create a profile of people who receive early warning messages in order to ascertain the effectiveness of using mobile technology as the delivery method.

The contributions of this study are as follows:

- **A proposal for providing verification services for early warning messages.**

  As described in Chapter 2, the issues with the notification services in early warning messages were hoax incidents and the multiplication phenomenon. Providing verification services would support and clarify the information in notification services. An evaluation of the verification services demonstrated that these were effective for clarifying notification messages when SMS was used for both services. This thesis validated the effectiveness of verification services (pull method) to be used for supporting the notification services (push method) in disaster early warning messages.

- **Metrics to measure a user's skills and positive perception for mobile technology to deliver early warning messages.**

  In Chapter 3, two methods to measure the user's skills and positive perception were identified: the user's task performance was used to measure the user's physical activity when using the technology, and the user's perception was used to measure the user's opinions after using the technology. Additionally, three metrics were identified to measure the user's skills and positive perception: device preparedness, task (EOU and confidence with skill), and positive perception (usefulness and satisfaction).

- **Validation of three metrics that contribute to the effectiveness of mobile technology from the user's perspective.**

  Chapter 5 and 6 presented analysis of data from two surveys which validated the hypotheses of the impacts of device preparedness, task (EOU and confidence with skill), and positive perception (usefulness and satisfaction) and their influences on the effectiveness of mobile technology for delivering early warning messages.

  The first survey (chapter 5) captured the specific user variables that influence the effectiveness of technology use in emergency conditions. It contributed to the validation process of three metrics and user variables. It demonstrates the user at the centre of readiness evaluation, and demonstrates that a user's ability for device preparedness and skill with using technology are important. These factors are recommended for use in the selection process of technology that will be used for delivering early warning messages. The results in the first survey highlight the importance of the user-centred approach when evaluating technology for delivery of early warning messages. It is essential for good design of an information system to ensure that the technology fits the users' ability.

  The second survey and experiment (chapter 6) demonstrate that information about a user's skill is important, and can be used as

background knowledge for information system design and testing. In addition, it is useful to promote the user-centric approach when examining technology used to deliver public services.

- **A methodological tool was proposed that puts the user at the centre of readiness evaluation.**
  Chapter 7, proposed User Readiness for Technology (URT) that beneficial to create a user profile for mobile technology that could be to better design early warning messages system. The instructions for using the URT are presented in chapter 8. It provides new technique to produce a profile of a group that may be used to design effective delivery of early warning messages via mobile technology.

- **Benefits for people living in a disaster probe area.**
  Surveys were conducted in flood-prone areas of Semarang, Indonesia and recruited people living in disaster prone areas as respondents to gain the users real world conditions. With this information, early warning message systems can be developed for the people who live in these areas. By knowing the actual characteristics of the intended recipients of the system, early warning message systems will be of greater benefit to people living in disaster-prone areas. Moreover, this research contributes to provide opportunities for people living in disaster-prone areas, in order that they can receive the benefit from technology used to deliver early warning messages.

In summary, the major contribution of this thesis is an evaluation technique for identifying the user profiles of a population group when they interact with technology. By identifying the user level of skill for using the technology in the requirements phase, leads to a reduction in additional support for the system, such as training cost, and increases the users' positive perception towards the information system.

9.4 Practical Implications

Practical implications of this research are:

- This study provides set of tools that will assist the information system designer to catch user characteristics in order to design an information system that appropriate to the user.
- This study suggests that user's characteristics that influence the usage of technology is the user's level of education and prior knowledge of technology
- The factors that are essential to investigate for the user readiness for technology are device preparedness, task and positive perceptions.
    - Device preparedness - the user's preparedness when their using their own device to access services.
    - Task - the user's ease of use and confidence with their own skill to use the technology for access the services.
    - Positive perceptions - the user's perception of the technology services
- The resultant URT model can help the information system designer measure the effectiveness of technology before the technology services implemented.

9.5 Research Limitations

- The data was collected information from one city in Indonesia; this was due to limitations of time and funding for the research. In addition, a motivation was to contribute to the local communities in Semarang and people living in disaster prone areas so that the technology used to deliver early warning messages can be utilised by those.

- This study employed flood disaster conditions and SMS to validate the metrics. SMS was used for this research based on published statistics of mobile device ownership and Indonesian device ownership of smartphones and basic mobile phones (Poushter, 2016).

9.6 Future Work

Suggested future work is presented as follows:

- Only the user frequency of use of SMS was used as an indicator to measure the effectiveness of SMS to deliver an early warning message. For further research, it is suggested to include the user's prior knowledge of other communication technologies to investigate if there are any influences that prior knowledge of other technologies may have on EOU and confidence with skill.

- The dissemination of hoax information is a challenging issue. For further research, it is suggested to include factors about users' trust when examining technology used to deliver information.

- The users' prior knowledge and being member of a disaster preparedness group were used as factors in developing profiles of potential recipients of SMS. Further research could also incorporate local culture and local conditions into user profiles to tailor EWS to the target population.

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APPENDICES

Appendix A: Publication in this thesis

1. Nugraheni, D.M.K., and de Vries, D., “Improving the Effectiveness of the Dissemination Method in Disaster Early Warning Message”, E Proceeding of the International Conference on Information Technology & Society 2015, 2015

2. Nugraheni, D.M.K., and de Vries, D., 'Profile of a typical mobile SMS user in emergency situations (empirical study in an urban flood prone area)', Proceeding 2nd International Conference on Science in Information Technology (ICISITech), Balikpapan, Indonesia, 2016, pp. 97-102.© IEEE. doi: 10.1109/ICSITech.2016.7852615

3. Nugraheni, D.M.K., and de Vries, D., 'Users' perception of ease of use (EOU) and confidence with skill using SMS in emergency conditions'. Proceeding 3rd International Conference on Human-Computer Interaction and User Experience in Indonesia, Jakarta, Indonesia, 2017.© ACM. doi:10.1145/3077343.3077350

4. Nugraheni, D.M.K., and de Vries, D., 'The effectiveness of SMS as verification of flood early warning messages from users’ perception', Proceeding 1st International Conference on Informatics and Computational Science (ICISCos), Semarang, Indonesia, 2017, 77-81 .© IEEE. doi: 10.1109/ICICOS.2017.8276341

Appendix B: The Flinders Ethical Committee Approval

FINAL APPROVAL NOTICE

Project No.:	**6817**
Project Title:	The effectiveness and serviceability of SMS as a tool for dissemination of disaster warning messages
Principal Researcher:	Ms Dinar Mutiara Kusumo Nugraheni
Email:	dinar.nugraheni@flinders.edu.au
Approval Date:	14 April 2015
Ethics Approval Expiry Date:	**3 March 2019**

The above proposed project has been **approved** on the basis of the information contained in the application, its attachments and the information subsequently provided.

Appendix C: First Survey

A. In English

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CRICOS Provider No. 00114A

LETTER OF INTRODUCTION
(To Survey participants)

Dear Sir/Madam

This letter is to introduce Dinar Mutiara Kusumo Nugraheni who is a PhD student of the School of Computer Science, Engineering and Mathematics at Flinders University. She will produce her student card, which carries a photograph, as proof of identity.

She is undertaking research leading to the production of a thesis or other publications on the subject of "The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster"

She would like to invite you to assist with this project by consenting to use mobile phone technology for text messages (SMS) and social media (Facebook and twitter) and complete a questionnaire which covers certain aspects of this topic. No more than 20 minutes on one occasion would be required.

Be assured that any information provided will be treated in the strictest confidence and none of the participants will be individually identifiable in the resulting thesis, report or other publications. You are, of course, entirely free to discontinue your participation at any time.

If you would like to consent to participate in this research about the usage of the technology for disaster early warning messages, please sign the consent form attached and return it to the secure box.

Any enquiries you may have concerning this project should be directed to me at the address given above or by telephone on (+61 8 8201 3639), fax (+61 8 8201 3602) or e-mail (denise.devries@flinders.edu.au)

Thank you for your attention and assistance.

Yours sincerely

[redacted]

Dr Denise de Vries BCompInfSc, BSc(Hons), PhD, MACS
Lecturer
School of Computer Science, Engineering and Mathematics
Flinders University

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project number 6817). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

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ADELAIDE • AUSTRALIA

INFORMATION SHEET (Stage1)

Title: 'The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster '

Investigators:

Dinar Mutiara Kusumo Nugraheni
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Project Supervisors:

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inspiring achievement

Description of the study:

This study is part of the project entitled 'The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster '.

This project will investigate what factors support and influence the effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in disaster situation?

This project is supported by Flinders University School of Computer Science, Engineering and Mathematics.

Purpose of the study:

This project aims:

- To identify users' patterns on technological use particularly in SMS as a tool for dissemination of warning messages in disaster situation.
- To compare the users' patterns on technological use of SMS and social media as a tool for dissemination of disaster warning messages.
- To examine the effectiveness and serviceability of notification messages (receiving/ push method) and request messages (sending/pull method) in SMS as a tool for dissemination of warning messages

What will I be asked to do?

You are invited to participant in a survey. The participant is entirely voluntary. The survey question will take approximately 20 minutes to complete. You fill the paper questionnaire that you received directly from the investigator. It can be undertaken in any place at your convenience. The paper questionnaire will be collected by the investigator. This is voluntary.

What benefit will I gain from being involved in this study?

The sharing of your experiences will improve the planning and delivery of future dissemination technology of disaster warning messages in Indonesia.

Will I be identifiable by being involved in this study?

We do not need your name and you will be anonymous. Only survey data from the total large group are analysed and reported.

Are there any risks or discomforts if I am involved?

The investigator anticipates few risks from your involvement in this study. If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with the investigator.

How do I agree to participate?

Participation is voluntary.

How will I receive feedback?

Outcomes from the project will be summarised and given to you by the investigator if you would like to see them. To request this report, please contact the investigator on the email provided above.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project number 6817). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

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CONSENT FORM FOR PARTICIPATION IN RESEARCH

(By survey- Stage1)

The effectiveness and serviceability of SMS as a tool for dissemination of disaster warning messages

I .....being over the age of 18 years hereby consent to participate as requested in the survey for the research project on "The effectiveness and serviceability of SMS as a tool for dissemination of disaster warning messages"

1. I have read the information provided.
2. Details of procedures and any risks have been explained to my satisfaction.
3. I agree to participate in survey.
4. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.
5. I understand that:
   - I may not directly benefit from taking part in this research.
   - I am free to withdraw from the project at any time and am free to decline to answer particular questions.
   - While the information gained in this study will be published as explained, I will not be identified, and individual information will remain confidential.
   - Whether I participate or not, or withdraw after participating, will have no effect on any treatment or service that is being provided to me.
   - Whether I participate or not, or withdraw after participating, will have no effect on my progress in my course of study, or results gained.
   - I may ask that survey be stopped at any time, and that I may withdraw at any time from the session or the research without disadvantage.
6. I agree/do not agree* to result survey being made available to other researchers who are not members of this research team, but who are judged by the research team to be doing related research, on condition that my identity is not revealed. * *delete as appropriate*
7. I have had the opportunity to discuss taking part in this research with a family member or friend.

Participant's signature.....Date.....

I certify that I have explained the study to the volunteer and consider that she/he understands what is involved and freely consents to participation.

Researcher's name.....

Researcher's signature.....Date.....

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Survey: Profile typical user of SMS in emergency condition (Stage 1)

Respondent Demographic profile

1. Age : a. 20 – 30
   b. 31 – 40
   c. 41 -50
   d. over 50

2. Sex : a. Male b. Female

3. Level of education :
   a. No formal education
   b. Elementary
   c. Junior High School
   d. High School degrees
   e. Under - Graduate

Technological use

1. What type of mobile phones do you use
   a. Non Smartphone (telephone and SMS)
   b. Smart phones

2. What facility that you usually used by using mobile phones? (Select that applies)
   a. Telephone/ call
   b. SMS
   c. Twitter
   d. Facebook
   e. What apps
   f. Internet browser
   g. Others (please specify).....

3. SMS frequent of use (FOU)
   a. Once a month
   b. Once a week
   c. More than once a week
   d. Once a day
   e. More than once a day

A	Device Preparedness	Never	Rarely	Sometimes	Often
1	I would turn on my phone at night				
2	My mobile phone accessible at night				
3	My mobile phone turn 'ON' all day				
4	My mobile phone battery available at night				

B	Ease of use	Strongly agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
1	It is easy to use and read in emergency situation						
2	It needs a few step to use it *						
3	I need instruction to use SMS*						
4	I can receive messages successfully						
5	I can identify the sender of messages						
C	**Confidence with skill**	**Strongly agree**	**Agree**	**Somewhat Agree**	**Somewhat Disagree**	**Disagree**	**Strongly Disagree**
1	I am easy to remember how to use SMS						
2	I consider myself skilful for using sending and receiving SMS						
3	I learned to use SMS quickly						
4	I can identify an official and unofficial disaster early warning messages using SMS						
D	**Satisfaction**	**Strongly agree**	**Agree**	**Somewhat Agree**	**Somewhat Disagree**	**Disagree**	**Strongly Disagree**
1	I am satisfied with SMS as early warning messages						
2	I would recommend to use it to a friend						
3	I prefer for using SMS as disaster early warning messages compare to other application						

B. In Indonesian

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SURAT PENGANTAR
(Untuk peserta Percobaan dan Survei)

Kepada Yth. Bapak/ Ibu

Bersama surat ini, kami hendak memperkenalkan Dinar Mutiara Kusumo Nugraheni yang merupakan salah satu mahasiswi P.h.D (S3 atau Strata 3) di School of Computer Science, Engineering and Mathematics at Flinders University, Adelaide, South Australia. Dinar akan menunjukan kartu mahasiswa untuk menunjukan identitasnya sebagai mahasiswi Flinders University, Adelaide, SA.

Pada saat ini, Dinar sedang melakukan penelitian untuk menghasilkan laporan disertasi atau publikasi dengan topik "Mengukur efektivitas pelayanan SMS yang digunakan sebagai alat untuk menyebarkan pesan peringatan dalam konteks bencana alam" (*The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster*).

Dinar, ingin mengundang Bapak/ Ibu untuk dapat membantu penelitian ini dengan menyetujui untuk ikut dalam percobaan pada aplikasi SMS sebagai pesan peringatan dini terhadap bencana alam selama 20 menit. Dan menceritakan pengalaman Bapak dan ibu dalam melakukan percobaan dengan mengisi lembar survei yang telah disediakan. Waktu yang dibutuhkan untuk mengisi survey ini tidak lebih dari 20 menit. Untuk percobaan dan survei, waktu yang diperlukan sekitar 40 menit.

Informasi yang Bapak dan Ibu berikan dalam survey ini akan bersifat rahasia dan identitas peserta survey tidak akan disebarluaskan. Identitas untuk data yang akan digunakan dalam publikasi dan laporan disertasi ini adalah identifikasi dalam bentuk group dan bukan secara individual. Bapak dan Ibu dapat berhenti dari survey ini kapan pun Anda merasa perlu.

Jika Bapak dan Ibu berkenan untuk terlibat dalam percobaan dan survei tentang penggunaan teknologi SMS untuk pesan peringatan dini terhadap bencana alam, silahkan Bapak dan Ibu menandatangani formulir persetujuan yang telah disediakan.

Jika Bapak dan Ibu ada pertanyaan mengenai penelitian ini, Saya dapat dihubungi pada alamat di atas atau dengan menggunakan telephone nomer (+61) 8 8201 3639), fax (+61 8 8201 3602) atau e-mail (denise.devries@flinders.edu.au)

Terimakasih atas perhatian dan kerjasamanya.

Dengan hormat,

[redacted]

Dr Denise de Vries BCompInfSc, BSc(Hons), PhD, MACS

Lecturer
School of Computer Science, Engineering and Mathematics
Flinders University

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project number 6817). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

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LEMBAR INFORMASI (Tahap pertama)

Judul : "Mengukur efektivitas pelayanan SMS yang digunakan sebagai alat untuk menyebarkan pesan peringatan dalam konteks bencana alam "

(*The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster*)

Peneliti:

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inspiring achievement

Deskripsi penelitian:

Penelitian adalah bagian dari proyek berjudul ' Mengukur efektivitas pelayanan SMS yang digunakan sebagai alat untuk menyebarkan pesan peringatan dalam konteks bencana alam '.

Penelitian ini akan menyelidiki faktor-faktor yang mempengaruhi efektivitas pelayanan SMS sebagai alat untuk penyebaran peringatan pesan dalam situasi bencana.

Penelitian ini didukung oleh Flinders University School of Computer Science, Engineering and Mathematics.

Tujuan Penelitian :

- Mengidentifikasi pola-pola pengguna pada penggunaan teknologi terutama di SMS sebagai alat untuk penyebaran peringatan pesan dalam situasi bencana.
- Untuk membandingkan pola pengguna pada penggunaan teknologi SMS dan media sosial sebagai alat untuk penyebaran pesan peringatan bencana.
- Untuk menguji efektivitas dan layanan pesan pemberitahuan (menerima / mendorong metode) dan permintaan (pengiriman tarik metode) pesan SMS sebagai alat untuk penyebaran pesan peringatan

Petunjuk :

Anda diundang untuk dapat berpartisipasi dalam pengisian survei. Peserta bersifat sukarela. Untuk pengisian survei akan memerlukan Waktu 20 menit. Formulir survei akan disampaikan oleh peneliti secara langsung. Dan formulir kuesioner ini akan dikumpulkan lagi oleh peneliti. Survei ini bersifat sukarela.

Keuntungan yang akan anda peroleh dengan mengikuti penelitian ini:

Pengalaman penggunaan teknologi dari anda akan membantu perencanaan dari bentuk penyebaran pesan dini terhadap bencana bagi masyarakat di Indonesia.

Apakah anda akan diidentifikasi dengan terlibat dalam penelitian ini?

Kami tidak akan menggunakan identitas atau nama anda dalam penelitian ini. Hasil survei akan diidentifikasi dalam bentuk group untuk analisa data dan laporan penelitian.

Apakah ada resiko jika saya terlibat dalam penelitian ini?

Peneliti sudah mengantisipasi segala kemungkinan jika ada ketidaknyamanan dalam penelitian ini. Jika anda merasa ada resiko dan ketidak nyamanan dalam melakukan pengisian survey, mohon untuk mengatakan hal tersebut kepada peneliti.

Bagaimana jika saya bersedia untuk berpartisipasi dalam survey ini?

Peserta dalam penelitian ini bersifat sukarela.

Bagaimana saya akan mendapatkan hasil dari penelitian ini?

Hasil dari penelitian ini akan dibuat dalam bentuk data dan diberikan oleh peneliti, jika anda ingin melihat hasil dari penelitian ini. Untuk mendapatkan hasil dari penelitian ini, anda bisa menghubungi peneliti pada email yang telah disebutkan di atas.

Terimakasih atas Waktu yang anda berikan untuk membaca lembar informasi ini dan kami harap anda akan menerima undangan kami untuk berpartisipasi dalam penelitian ini.

Flinders
UNIVERSITY

SURAT PERSETUJUAN BAGI PESERTA PENELITIAN

(Survei/ Tahap pertama)

Mengukur efektivitas dan layanan SMS sebagai alat untuk penyebaran pesan peringatan bencana (*The effectiveness and serviceability of SMS as a tool for dissemination of disaster warning messages)*

Saya yang bernama ....., berusia diatas 18 tahun dan bersedia untuk berpartisipasi dalam survey untuk proyek penelitian tentang "Efektifitas dan layanan SMS sebagai alat untuk penyebaran pesan peringatan dini terhadap bencana alam ".

1. Saya telah membaca informasi yang disediakan.
2. Rincian prosedur dan resiko apapun telah dijelaskan kepada Saya.
3. Saya setuju untuk berpartisipasi dalam survei.
4. Saya menyadari bahwa saya harus memiliki salinan lembar informasi dan formulir persetujuan untuk referensi di masa mendatang.
5. Saya mengerti bahwa:
   - Saya mungkin tidak secara langsung mendapatkan manfaat dari penelitian ini.
   - Saya bebas untuk menarik diri dari penelitian setiap saat dan saya bebas untuk menolak untuk menjawab pertanyaan-pertanyaan tertentu.
   - Saya telah mendapatkan penjelasan bahwa untuk publikasi penelitian ini, saya tidak akan diidentifikasi secara perorangan, dan informasi pribadi Saya akan tetap rahasia.
   - Saya dapat berhenti dari survei setiap saat.
6. Saya setuju/tidak setuju * hasil survei dapat dimanfaatkan oleh peneliti lain yang bukan anggota tim penelitian ini, dan dinilai oleh tim peneliti yang melakukan penelitian terkait. Dengan syarat bahwa identitas saya tidak diungkapkan. (***coret yang tidak sesuai.***)
7. Saya berkesempatan untuk mendiskusikan dengan anggota keluarga atau teman, untuk menjadi bagian dalam penelitian ini

Tanda tangan peserta .....Tanggal.....

Saya dengan ini menyatakan bahwa saya telah menjelaskan tentang keterlibatan peserta pnelitian adalah secara sukarela. Dan Saya sudah mempertimbangkan bahwa peserta mengerti tentang keterlibatan dalam penelitian ini dan peserta bebas untuk berpartisipasi.

Nama Peneliti.....

Tanda tangan peneliti .....Tanggal .....

Survey: Profil pengguna SMS di situasi emergency (Tahap pertama)

Responden demographic profile

1. Usia : a. 20 – 30
   b. 31 – 40
   c. 41 -50
   d. lebih dari 50 tahun

2. Jenis Kelamin : a. Laki- Laki b. Wanita

3. Tingkat pendidikan :
   a. Tanpa pendidikan formal
   b. SD (Sekolah Dasar)
   c. Sekolah Menengah Pertama (SMP)
   d. Sekolah Menengah Umum (SMU)
   e. Sarjana (S1)

Technological use

1. Apa jenis ponsel yang anda gunakan ? What type of mobile phones do you use
   a. Non Smartphone (telepon dan SMS)
   b. Smartphone

2. Fasilitas apa yang biasanya Anda gunakan dengan menggunakan ponsel?
   a. Telepon
   b. SMS
   c. Twitter
   d. Facebook
   e. What apps
   f. Internet browser
   g. Yang lainnya .....
3. Frekuensi dalam menggunakan SMS
   a. Sekali dalam satu bulan
   b. Sekali dalam satu minggu
   c. Lebih dari satu kali dalam satu minggu
   d. Sekali dalam satu hari
   e. Lebih dari satu kali dalam satu hari

A	Persiapan ponsel	Tidak pernah	Jarang	Kadang-kadang	Sering
1	Saya akan menyalakan ponsel saya di malam hari				
2	Ponsel saya bisa dalam jangkauan di saat malam hari.				
3	Sepanjang hari telepon saya dalam kondisi menyala (stand by)				
4	Baterai ponsel saya selalu tersedia pada malam hari				

B	Kemudahan dalam penggunaan	Sangat Setuju	Setuju	Agak Setuju	Agak Tidak Setuju	Tidak Setuju	Sangat Tidak Setuju
1	SMS mudah untuk digunakan dan dibaca pada situasi darurat						
2	Untuk menggunakan SMS diperlukan beberapa langkah						
3	Saya membutuhkan instruksi untuk menggunakn SMS						
4	Saya dapat menerima pesan menggunakan SMS dengan sukses.						
5	Saya bisa mengenali pengirim pesan						
C	**Percaya diri terhadap kemampuan menggunakan SMS**	**Sangat Setuju**	**Setuju**	**Agak Setuju**	**Agak Tidak Setuju**	**Tidak Setuju**	**Sangat Tidak Setuju**
1	Saya mudah mengingat bagaimana cara menggunakan SMS						
2	Saya menganggap diri saya ahli dalam menggunakan SMS						
3	Saya belajar dengan cepat dalam menggunakan SMS						
4	Saya dapat mengidentifikasi pesan peringatan resmi dari pemerintah dan pesan yang tidak resmi.						

D	Kepuasaan untuk menggunakan SMS	Sangat Setuju	Setuju	Agak Setuju	Agak Tidak Setuju	Tidak Setuju	Sangat Tidak Setuju
1	Saya puas dalam menggunakan SMS sebagai pesan peringatan dini						
2	Saya akan memberikan rekomendasi ke teman untuk memanfaatkan SMS sebagai pesan peringatan dini						
3	Saya lebih suka menggunakan SMS sebagai pesan peringtan dini bencana dibandigkan dengan aplikasi yang lain.						

Appendix D: Second Survey

A. In English

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LETTER OF INTRODUCTION
(To Experiment and Survey participants)

Dear Sir/Madam

This letter is to introduce Dinar Mutiara Kusumo Nugraheni who is a PhD student in the School of Computer Science, Engineering and Mathematics at Flinders University. She will produce her student card, which carries a photograph, as proof of identity.

She is undertaking research leading to the production of a thesis or other publications on the subject of "The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster"

She would like to invite you to assist with this project by using a prototype SMS model of early disaster warning messages and completing a questionnaire that covers certain aspects of this topic. The trial will take approximately 20 minutes and then will be followed with a questionnaire that will take approximately 20 minutes to complete. So, it will take a total of 40 minutes of your time to trial the model and answer the questionnaire.

Be assured that any information provided will be treated in the strictest confidence and none of the participants will be individually identifiable in the resulting thesis, report or other publications. You are, of course, entirely free to discontinue your participation at any time or to decline to answer particular questions.

If you would like to consent to participate in this research about the usage of the technology for disaster early warning messages, please sign the consent form attached and return it to the secure box.

Any enquiries you may have concerning this project should be directed to me at the address given above or by telephone on (+61 8 8201 3639), fax (+61 8 8201 3602) or e-mail (denise.devries@flinders.edu.au)

Thank you for your attention and assistance.

Yours sincerely

[redacted]

Dr Denise de Vries BCompInfSc, BSc(Hons), PhD, MACS
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Flinders University

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project number 6817). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

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INFORMATION SHEET (Stage 2)

Title: 'The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster '

Investigators:

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Description of the study:

This study is part of the project entitled 'The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster '.

This project will investigate what factors support and influence the effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in disaster situation?

This project is supported by Flinders University School of Computer Science, Engineering and Mathematics.

Purpose of the study:

This project aims:

- To identify users' patterns on technological use particularly in SMS as a tool for dissemination of warning messages in disaster situation.
- To compare the users' patterns on technological use of SMS and social media as a tool for dissemination of disaster warning messages.
- To examine the effectiveness and serviceability of notification messages (receiving/ push method) and request messages (sending/pull method) in SMS as a tool for dissemination of warning messages

What will I be asked to do?

You are invited to participate in experiment and survey. The participant is entirely voluntary. The trial will take 20 minutes and survey question will take approximately 20 minutes to complete. Please complete the consent form and return the complete consent form to the investigator.

After, trialling the prototype you will complete the paper questionnaire that you received from the investigator. It can be undertaken in any place at your convenience. A secure drop box will place in the meeting room. You can put the answered paper questionnaire in the secure box that the investigator provide in the meeting room. This is voluntary.

What benefit will I gain from being involved in this study?

The sharing of your experiences will improve the planning and delivery of future dissemination technology of disaster warning messages in Indonesia.

Will I be identifiable by being involved in this study?

We do not need your name and you will be anonymous. Only survey data from the total large group are analysed and reported.

Are there any risks or discomforts if I am involved?

The investigator anticipates few risks from your involvement in this study. If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with the investigator.

How do I agree to participate?

Participation is voluntary.

How will I receive feedback?

Outcomes from the project will be summarised and given to you by the investigator if you would like to see them. To request this report, please contact the investigator on the email provided above.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project number 6817). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

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CONSENT FORM FOR PARTICIPATION IN RESEARCH

(By experiment and survey- Stage2)

The effectiveness and serviceability of SMS as a tool for dissemination of disaster warning messages

I .....being over the age of 18 years hereby consent to participate as requested in the experiment and survey for the research project on "The effectiveness and serviceability of SMS as a tool for dissemination of disaster warning messages"

1. I have read the information provided.
2. Details of procedures and any risks have been explained to my satisfaction.
3. I agree to participate in experiment and survey.
4. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.
5. I understand that:
   - I may not directly benefit from taking part in this research.
   - I am free to withdraw from the project at any time and am free to decline to answer particular questions.
   - While the information gained in this study will be published as explained, I will not be identified, and individual information will remain confidential.
   - I may ask that survey be stopped at any time, and that I may withdraw at any time from the session or the research without disadvantage.
6. I agree/do not agree* to result survey being made available to other researchers who are not members of this research team, but who are judged by the research team to be doing related research, on condition that my identity is not revealed. * *delete as appropriate*
7. I have had the opportunity to discuss taking part in this research with a family member or friend.

Participant's signature.....Date.....

I certify that I have explained the study to the volunteer and consider that she/he understands what is involved and freely consents to participation.

Researcher's name.....

Researcher's signature.....Date.....

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Survey: The effectiveness of SMS verification (Stage 2)

User Demographic profile

1. Age : a. 20 – 30
   b. 31 – 40
   c. 41 -50
   d. over 50
2. Sex : a. Male b. Female
3. Level of education :
   a. No formal education
   b. Elementary
   c. Secondary
   d. High School degrees or equivalent
   e. Under - Graduate
4. Member of disaster preparedness group : a. Yes b. No

A	Device Preparedness	Never	Rarely	Sometimes	Often
1	I would turn on my phone at night				
2	My mobile phone accessible at night				
3	My mobile phone turn 'ON' all day				
4	My mobile phone battery available at night				

SMS Notification

B1	Ease of use on notification SMS	Strongly agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
1	It is easy to use and read in emergency situation						
2	It needs a few step to use it						
3	I can receive messages successfully						
4	I can identify the sender of messages						
C1	**Confidence with skill for using SMS notification**	**Strongly agree**	**Agree**	**Somewhat Agree**	**Somewhat Disagree**	**Disagree**	**Strongly Disagree**
1	I easily to remember how to use SMS						
2	I consider myself skilful at using sending and receiving SMS						
3	I learned to use SMS quickly						
4	I can identify an official or unofficial disaster early warning messages using SMS						
D1	**Usefulness on notification SMS**	**Strongly agree**	**Agree**	**Somewhat Agree**	**Somewhat Disagree**	**Disagree**	**Strongly Disagree**
1	SMS is useful to notify me about the disaster situations						
2	SMS notification is usefulness to quick access information about the disaster situations						
3	SMS notification is my preference to receive early warning messages.						
4	SMS notification is usefulness to receive current disaster situations						
5	SMS useful to receive about disaster situations compare to other application (Twitter or Facebook)						
E1	**Satisfaction on SMS notification**	**Strongly agree**	**Agree**	**Somewhat Agree**	**Somewhat Disagree**	**Disagree**	**Strongly Disagree**
1	I am satisfied with SMS as early warning messages						
2	I would recommend to use it to a friend						
3	I prefer to use SMS as early warning messages compared to other application						

SMS Verification

B2	Ease of use on verification SMS	Strongly agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
1	It is easy to use and read in emergency situation						
2	It needs a few step to use it*						
3	I can send the request for the verification messages successfully						
4	I can receive messages successfully						
5	I can identify the sender of messages						
6	SMS Verification is easy to use						
C2	**Confidence with skill for using SMS verification**	**Strongly agree**	**Agree**	**Somewhat Agree**	**Somewhat Disagree**	**Disagree**	**Strongly Disagree**
1	I easily to remember how to use SMS						
2	I consider myself skilful at using SMS Verification						
3	I learned to use SMS Verification quickly						
4	I can identify an official or unofficial SMS that deliver early warning messages						
D2	**Usefulness on verification SMS**	**Strongly agree**	**Agree**	**Somewhat Agree**	**Somewhat Disagree**	**Disagree**	**Strongly Disagree**
1	SMS verification is useful to confirm the information in SMS notification						
2	The verification messages is useful to access current disaster situations						
3	The verification messages is usefulness to confirm information compare to twitter or Facebook						
E2	**Satisfaction SMS as disaster early warning messages**	**Strongly agree**	**Agree**	**Somewhat Agree**	**Somewhat Disagree**	**Disagree**	**Strongly Disagree**
1	I am satisfied with SMS as verification as early warning messages						
2	I would recommend to use it to a friend						
3	I prefer to use SMS to verify disaster information compare to other application						

B. In Indonesian

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SURAT PENGANTAR
(Untuk peserta Percobaan dan Survei)

Kepada Yth. Bapak/ Ibu

Bersama surat ini, kami hendak memperkenalkan Dinar Mutiara Kusumo Nugraheni yang merupakan salah satu mahasiswi P.h.D (S3 atau Strata 3) di School of Computer Science, Engineering and Mathematics at Flinders University, Adelaide, South Australia. Dinar akan menunjukan kartu mahasiswa untuk menunjukan identitasnya sebagai mahasiswi Flinders University, Adelaide, SA.

Pada saat ini, Dinar sedang melakukan penelitian untuk menghasilkan laporan disertasi atau publikasi dengan topik "Mengukur efektivitas pelayanan SMS yang digunakan sebagai alat untuk menyebarkan pesan peringatan dalam konteks bencana alam" (*The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster*).

Dinar, ingin mengundang Bapak/ Ibu untuk dapat membantu penelitian ini dengan menyetujui untuk ikut dalam percobaan pada aplikasi SMS sebagai pesan peringatan dini terhadap bencana alam selama 20 menit. Dan menceritakan pengalaman Bapak dan ibu dalam melakukan percobaan dengan mengisi lembar survei yang telah disediakan. Waktu yang dibutuhkan untuk mengisi survey ini tidak lebih dari 20 menit. Untuk percobaan dan survei, waktu yang diperlukan sekitar 40 menit.

Informasi yang Bapak dan Ibu berikan dalam survey ini akan bersifat rahasia dan identitas peserta survey tidak akan disebarluaskan. Identitas untuk data yang akan digunakan dalam publikasi dan laporan disertasi ini adalah identifikasi dalam bentuk group dan bukan secara individual. Bapak dan Ibu dapat berhenti dari survey ini kapan pun Anda merasa perlu.

Jika Bapak dan Ibu berkenan untuk terlibat dalam percobaan dan survei tentang penggunaan teknologi SMS untuk pesan peringatan dini terhadap bencana alam, silahkan Bapak dan Ibu menandatangani formulir persetujuan yang telah disediakan.

Jika Bapak dan Ibu ada pertanyaan mengenai penelitian ini, Saya dapat dihubungi pada alamat di atas atau dengan menggunakan telephone nomer (+61) 8 8201 3639), fax (+61 8 8201 3602) atau e-mail (denise.devries@flinders.edu.au)

Terimakasih atas perhatian dan kerjasamanya.

Dengan hormat,

[redacted]

Dr Denise de Vries BCompInfSc, BSc(Hons), PhD, MACS

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LEMBAR INFORMASI (Tahap ke 2)

Judul : "Mengukur efektivitas pelayanan SMS yang digunakan sebagai alat untuk menyebarkan pesan peringatan dalam konteks bencana alam "

(*The effectiveness and serviceability of SMS as a tool for the dissemination of warning messages in context of disaster*)

Peneliti:

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inspiring achievement

Deskripsi penelitian:

Penelitian adalah bagian dari proyek berjudul ' Mengukur efektivitas pelayanan SMS yang digunakan sebagai alat untuk menyebarkan pesan peringatan dalam konteks bencana alam '.

Penelitian ini akan menyelidiki faktor-faktor yang mendukung dan mempengaruhi efektivitas pelayanan SMS sebagai alat untuk penyebaran peringatan pesan dalam situasi bencana.

Penelitian ini didukung oleh Flinders University School of Computer Science, Engineering and Mathematics.

Tujuan Penelitian :

- Mengidentifikasi pola-pola pengguna pada penggunaan teknologi terutama di SMS sebagai alat untuk penyebaran peringatan pesan dalam situasi bencana.
- Untuk membandingkan pola pengguna pada penggunaan teknologi SMS dan media sosial sebagai alat untuk penyebaran pesan peringatan bencana.
- Untuk menguji efektivitas dan layanan pesan pemberitahuan (menerima / mendorong metode) dan permintaan (pengiriman tarik metode) pesan SMS sebagai alat untuk penyebaran pesan peringatan

Petunjuk :

Anda diundang untuk dapat berpartisipasi dalam uji coba penggunaan SMS dan pengisian survei. Peserta bersifat sukarela. Untuk ujicoba aplikasi SMS selama 20 menit dan pengisian survei akan memerlukan Waktu 20 menit . Anda akan mengisi lembar persetujuan sebelum percobaan dimulai, dan lembar persetujuan dapat diserahkan langsung kepada penelit.

Setelah selesai percobaan, anda akan mengisi formulir survey. Formulir survei akan disampaikan oleh peneliti secara langsung. Dan formulir kuesioner ini akan dikumpulkan lagi oleh peneliti. Survei ini bersifat sukarela.

Keuntungan yang akan anda peroleh dengan mengikuti penelitian ini:

Pengalaman penggunaan teknologi dari anda akan membantu perencanaan dari bentuk penyebaran pesan dini terhadap bencana bagi masyarakat di Indonesia.

Apakah anda akan diidentifikasi dengan terlibat dalam penelitian ini?

Kami tidak akan menggunakan identitas atau nama anda dalam penelitian ini. Hasil survei akan diidentifikasi dalam bentuk group untuk analisa data dan laporan penelitian.

Apakah ada resiko jika saya terlibat dalam penelitian ini?

Peneliti sudah mengantisipasi segala kemungkinan jika ada ketidaknyamanan dalam penelitian ini. Jika anda merasa ada resiko dan ketidak nyamanan dalam melakukan pengisian survey, mohon untuk mengatakan hal tersebut kepada peneliti.

Bagaimana jika saya bersedia untuk berpartisipasi dalam survey ini?

Responden dalam penelitian ini bersifat sukarela.

Bagaimana saya akan mendapatkan hasil dari penelitian ini?

Hasil dari penelitian ini akan dibuat dalam bentuk data dan diberikan oleh peneliti, jika anda ingin melihat hasil dari penelitian ini. Untuk mendapatkan hasil dari penelitian ini, anda bisa menghubungi peneliti pada email yang telah disebutkan di atas.

Terimakasih atas waktu yang Anda berikan untuk membaca lembar informasi ini dan kami harap anda akan menerima undangan kami untuk berpartisipasi dalam penelitian ini.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project number 6817). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au

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SURAT PERSETUJUAN BAGI PESERTA PENELITIAN

(Percobaan dan Survei/ tahap ke dua)

Mengukur efektivitas dan layanan SMS sebagai alat untuk penyebaran pesan peringatan bencana (*The effectiveness and serviceability of SMS as a tool for dissemination of disaster warning messages)*

Saya yang bernama ....., berusia diatas 18 tahun dan bersedia untuk berpartisipasi dalam percobaan dan survey untuk proyek penelitian tentang "Efektifitas dan layanan SMS sebagai alat untuk penyebaran pesan peringatan dini terhadap bencana alam ".

1. Saya telah membaca informasi yang disediakan.
2. Rincian prosedur dan resiko apapun telah dijelaskan kepada Saya.
3. Saya setuju untuk berpartisipasi dalam percobaan dan survei.
4. Saya menyadari bahwa saya harus memiliki salinan lembar informasi dan formulir persetujuan untuk referensi di masa mendatang.
5. Saya mengerti bahwa:
   - Saya mungkin tidak secara langsung mendapatkan manfaat dari penelitian ini.
   - Saya bebas untuk menarik diri dari penelitian ini setiap saat dan saya bebas untuk menolak untuk melakukan percobaan dan menjawab pertanyaan-pertanyaan tertentu.
   - Saya telah mendapatkan penjelasan bahwa dalam penelitian ini untuk publikasi, saya tidak akan diidentifikasi secara perorangan, dan informasi pribadi Saya akan tetap rahasia.
   - Saya dapat berhenti dari percobaan dan survey setiap saat.
6. Saya setuju/tidak setuju * hasil survei dapat dimanfaatkan oleh peneliti lain yang bukan anggota tim penelitian ini, dan dinilai oleh tim peneliti yang melakukan penelitian terkait. Dengan syarat bahwa identitas saya tidak diungkapkan. (*coret yang tidak sesuai.)
7. Saya berkesempatan untuk mendiskusikan dengan anggota keluarga atau teman, untuk menjadi partisipant dalam penelitian ini

Tanda tangan peserta .....Tanggal.....

Dengan ini, sebagai peneliti, Saya menyatakan bahwa saya telah menjelaskan kepada peserta penelitian bahwa penelitian ini bersifat sukarela dan tidak ada paksaan dari pihak manapun. Dan peserta penelitian telah mengerti tentang keterlibatan dalam penelitian dan mereka bebas untuk berpartisipasi dalam penelitian.

Nama Peneliti.....

Tanda tangan peneliti .....**Tanggal** .....

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Survey: Mengukur efektifitas dari pengunaan SMS Verifikasi (Tahap kedua)

Responden demographic profile

1. Usia : a. 20 – 30
   b. 31 – 40
   c. 41 -50
   d. lebih dari 50 tahun

2. Jenis Kelamin : a. Laki- Laki b. Wanita

3. Tingkat Pendidikan :
   a. Tanpa pendidikan formal
   b. SD (Sekolah Dasar)
   c. Sekolah Menengah Pertama (SMP)
   d. Sekolah Menengah Umum (SMU)
   e. Sarjana (S1)

4. Apakah anda anggota Kelompok Siaga Bencana
   a. Ya b. Tidak

A	Persiapan ponsel	Tidak pernah	Jarang	Kadang-kadang	Sering
1	Saya akan menyalakan ponsel saya di malam hari				
2	Ponsel saya bisa dalam jangkauan di saat malam hari.				
3	Sepanjang hari telepon saya dalam kondisi menyala (stand by)				
4	Baterai ponsel saya selalu tersedia pada malam hari				

SMS Notifikasi

B1	Kemudahan dalam penggunaan SMS notifikasi	Sangat Setuju	Setuju	Agak Setuju	Agak Tidak Setuju	Tidak Setuju	Sangat Tidak Setuju
1	SMS mudah untuk digunakan dan dibaca pada situasi darurat.						
2	Untuk menggunakan SMS diperlukan beberapa langkah.						
3	Saya bisa menerima pesan SMS dengan sukses						
4	Saya bisa mengenali pengirim SMS						
C1	**Percaya diri terhadap kemampuan menggunakan SMS Notifikasi**	**Sangat Setuju**	**Setuju**	**Agak Setuju**	**Agak Tidak Setuju**	**Tidak Setuju**	**Sangat Tidak Setuju**
1	Saya sangat mudah mengingat bagaimana cara menggunakan SMS						
2	Saya menganggap diri saya ahli dalam menggunakan SMS						
3	Saya belajar menggunakan SMS dengan cepat						
4	Saya bisa mengidentifikasi pesan peringatan dini yang resmi dan yang tidak resmi.						
D1	**Manfaat dari tersedianya SMS Notifikasi**	**Sangat Setuju**	**Setuju**	**Agak Setuju**	**Agak Tidak Setuju**	**Tidak Setuju**	**Sangat Tidak Setuju**
1	SMS notifikasi bermanfaat untuk memberitahu saya tentang kondisi bencana.						
2	SMS notifikasi bermanfaat untuk mendapatkan akses cepat memperoleh informasi tentang kondisi bencana						
3	SMS Notifiksi menajdi pilihan saya dalam menerima pesan peringatan dini						
4	SMS Notifikasi bermanfaat untuk menerima berita tentang situasi bencana yang terbaru.						
5	SMS lebih bermanfaat untuk memberitahukan situasi bencana dibandingkan aplikasi yang lain (Twitter atau Facebook).						

E1	Kepuasan terhadap layanan SMS notifikasi	Sangat Setuju	Setuju	Agak Setuju	Agak Tidak Setuju	Tidak Setuju	Sangat Tidak Setuju
1	Saya puas dengan penggunaan SMS sebagai pesan peringatan dini						
2	Saya akan merekomendasikan kepada teman untuk menggunakan SMS notifikasi						
3	Saya lebih suka menggunakan SMS sebagai pesan peringatan dini dbandingkan dengan menggunakan aplikasi yang lain.						

3

SMS Verifikasi

B2	Kemudahan dalam penggunaan SMS Verifikasi	Sangat Setuju	Setuju	Agak Setuju	Agak Tidak Setuju	Tidak Setuju	Sangat Tidak Setuju
1	SMS Verifikasi mudah digunakan dan dibaca dalam situasi darurat						
2	Perlu beberapa langkah dalam menggunakan SMS verifikasi						
3	Saya bisa mengirim pesan dengan mudah						
4	Saya bisa menerima pesan dengan mudah						
5	Saya dengan mudah mengidentifikasi pengirim pesan						
6	Sangat mudah menggunakan SMS Verifikasi						
C2	**Rasa Percaya diri dalam menggunakan SMS Verifikasi**	**Sangat Setuju**	**Setuju**	**Agak Setuju**	**Agak Tidak Setuju**	**Tidak Setuju**	**Sangat Tidak Setuju**
1	Saya sangat mudah mengingat cara menggunakan SMS Verfikasi						
2	Saya menganggap diri saya ahli dalam menggunakan SMS Verifikasi						
3	Saya belajar dengan cepat dalam menggunakan SMS Verifikasi						
4	Saya dapat mengidentifikasi pesan resmi atau tak resmi dari pemerintah						
D2	**Manfaat dari tersedianya SMS Verifikasi.**	**Sangat Setuju**	**Setuju**	**Agak Setuju**	**Agak Tidak Setuju**	**Tidak Setuju**	**Sangat Tidak Setuju**
1	SMS Verifikasi bermanfaat untuk memverifikasi infromasi yang ada di SMS Notifikasi						
2	SMS verifikasi bermanfaat untuk mengklarifikasi kondisi darurat yang terbaru.						
3	SMS verifikasi berguna untuk mengklarifikasi informasi dibandingkan menggunakan twitter atau Facebook						

F2	Kepuasana terhadap layanan SMS Verifikasi	Sangat Setuju	Setuju	Agak Setuju	Agak Tidak Setuju	Tidak Setuju	Sangat Tidak Setuju
1	Saya puas dengan adanya fasilitas SMS verifikasi						
2	Saya akan merekomendasikan layanan SMS verifikasi kepada teman.						
3	Saya lebih puas menggunakan SMS untuk mengklarifikasi berita bencana dibandingkan dengan menggunakan aplikasi yang lain.						

Appendix E: First Data Survey

ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
1	3	1	3	1	4	1					2	2	2	2	5	4	5	6	5	3	5	5	5	3	5	6
2	3	2	1	2	4	1					3	3	2	3	5	4	3	5	3	4	5	6	6	4	5	2
3	2	2	1	2	5	1					3	3	3	2	6	5	5	5	5	5	6	6	5	5	5	1
4	1	2	3	2	4	1	1	1	1		3	3	4	3	3	2	2	6	5	5	5	5	6	6	4	2
5	3	2	1	1	5	1					2	2	2	2	5	5	5	5	5	4	5	6	6	5	5	6
6	2	1	3	2	4	1	1	1			4	4	4	4	4	3	6	4	5	6	5	6	6	6	6	1
7	1	1	1	1	4	1					3	3	3	3	3	4	4	3	3	3	3	3	3	3	3	2
8	2	1	1	1	4	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	2
9	4	1	1	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	2
10	3	2	2	2	5	1					2	2	2	2	5	4	3	3	3	4	5	5	3	3	3	4
11	2	1	1	1	4	1					2	2	2	2	4	3	3	4	4	4	4	4	4	4	4	1
12	4	2	1	1	3	1					2	2	2	2	5	5	5	5	5	6	6	6	6	5	5	2
13	1	1	3	2	5	1	1				2	2	2	2	5	5	4	5	5	6	6	6	5	6	5	2
14	3	1	1	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	1
15	2	1	3	1	5	1					3	3	3	3	4	3	5	4	4	4	5	6	6	6	6	5
16	1	1	1	2	5	1	1		1	1	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	1
17	2	2	2	1	3	1					2	2	2	2	3	3	4	3	3	3	3	3	3	3	3	4

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- **SG**: Sex group with options: 1= male and 2 = female.
- **EG**: Education group with options : 0 = no education; 1= elementary; 2= Junior high school; 3 = Senior high School; 4= Undergraduate
- **MP**: Mobile Phone type with options : 1 = non- smartphone and 2 = smartphone
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- **A1-A4** : Device preparedness responds with options : 1= never; 2= rarely; 3 = sometimes; and 4 = frequently
- **B1-B5** : Ease of use (EOU); **C1-C4** : Confidence with skill; **D1-D3**= Satisfaction, with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
18	3	1	2	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
19	1	1	1	1	4	1					2	1	2	1	3	5	5	5	5	4	5	6	6	3	3	5
20	2	1	2	1	4	1					1	1	1	1	6	1	3	6	6	6	6	6	6	6	6	3
21	3	2	1	1	4	1					2	2	2	2	5	4	5	6	5	3	5	5	5	3	5	6
22	1	1	3	2	3	1	1	1		1	4	4	4	4	1	3	3	5	4	5	5	5	4	5	5	4
23	1	2	3	1	4	1					2	2	2	2	2	5	5	4	5	3	5	4	5	2	2	4
24	3	2	3	1	4	1					4	4	4	4	1	3	3	6	6	1	4	5	3	4	2	5
25	2	1	2	1	4	1					4	4	4	4	2	4	4	6	5	6	6	6	6	2	2	5
26	4	2	1	1	4	1					4	4	4	4	2	6	5	5	5	5	5	5	5	2	2	2
27	3	1	2	2	4	1			1		2	2	2	2	2	6	6	5	3	5	6	6	3	2	4	5
28	1	1	4	1	3	1					4	4	4	4	5	5	5	5	6	5	6	6	6	5	5	6
29	2	1	2	1	5	1					4	4	4	4	3	4	4	3	4	5	5	6	5	3	3	5
30	3	2	3	1	5	1					4	4	4	4	4	5	5	4	4	4	4	6	6	4	4	5
31	4	2	2	2	4	1					4	4	4	4	5	6	6	5	5	5	4	5	5	5	4	2
32	3	1	3	1	5	1					4	4	4	4	5	5	5	5	5	5	5	5	1	4	4	3
33	2	2	2	1	4	1					4	4	4	4	2	2	2	2	2	4	4	2	3	2	2	4

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ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
34	2	1	1	1	5	1					2	2	2	2	3	3	3	3	3	5	5	5	4	3	5	4
35	2	2	3	2	5	1					3	3	3	3	3	5	5	3	3	1	5	6	4	4	4	3
36	2	2	2	1	3	1					4	4	4	4	2	5	5	6	6	4	5	6	6	2	2	6
37	3	1	1	1	4	1					4	4	4	4	3	4	4	5	5	3	5	5	5	4	4	4
38	3	2	1	1	4	1					3	3	3	3	4	5	5	5	5	5	2	5	3	4	4	4
39	1	2	3	2	4	1	1		1		4	4	4	4	2	5	5	2	5	5	6	2	5	2	5	5
40	2	1	3	1	4	1					4	4	4	4	6	6	6	6	6	5	6	5	5	5	6	3
41	2	2	1	2	1	1					3	3	3	3	2	4	1	5	3	5	2	5	5	5	5	2
42	2	2	3	2	4	1					2	2	2	2	2	5	6	2	2	4	4	2	4	2	3	5
43	2	2	3	1	5	1					3	3	3	3	3	4	4	6	4	4	4	5	6	4	3	5
44	4	2	2	1	0	1					2	2	2	2	1	1	4	2	2	5	2	1	1	5	2	2
45	4	2	3	1	3	1					2	2	2	2	3	1	1	1	1	1	3	1	1	3	3	3
46	3	2	2	1	3	1					3	3	3	3	2	2	2	3	5	5	4	5	5	5	3	3
47	2	1	3	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
48	3	2	1	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
49	2	2	3	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
50	2	1	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4
51	3	1	3	1	4	1					4	4	4	4	3	6	6	6	5	3	5	3	5	4	4	4

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ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
52	3	1	3	1	4	1					4	4	4	4	6	5	5	6	6	5	4	6	4	4	5	5
53	3	1	2	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5
54	1	1	1	1	4	1					3	3	3	3	4	5	5	5	5	5	2	5	3	4	4	4
55	4	2	1	1	4	1					4	4	4	4	2	6	5	5	5	5	5	5	5	2	2	2
56	3	1	2	2	4	1			1		2	2	2	2	2	6	6	5	3	5	6	6	3	2	4	5
57	1	1	4	1	3	1					4	4	4	4	5	5	5	5	6	5	6	6	6	5	5	6
58	2	1	2	1	5	1					4	4	4	4	3	4	4	3	4	5	5	6	5	3	3	5
59	3	2	3	1	5	1					4	4	4	4	4	5	5	4	4	4	4	6	6	4	4	5
60	4	2	2	2	4	1					4	4	4	4	5	6	6	5	5	5	4	5	5	5	4	2
61	3	1	3	1	5	1					4	4	4	4	5	5	5	5	5	5	5	5	1	4	4	3
62	2	2	2	1	4	1					4	4	4	4	2	2	2	2	2	4	4	2	3	2	2	4
63	2	1	1	1	5	1					2	2	2	2	3	3	3	3	3	5	5	5	4	3	5	4
64	2	2	3	2	5	1					3	3	3	3	3	5	5	3	3	1	5	6	4	4	4	3
65	2	2	2	1	3	1					4	4	4	4	2	5	5	6	6	4	5	6	6	2	2	6
66	3	1	1	1	4	1					4	4	4	4	3	4	4	5	5	3	5	5	5	4	4	4
67	3	2	1	1	4	1					3	3	3	3	4	5	5	5	5	5	2	5	3	4	4	4
68	1	2	3	2	4	1	1		1		4	4	4	4	2	5	5	2	5	5	6	2	5	2	5	5
69	2	1	3	1	4	1					4	4	4	4	6	6	6	6	6	5	6	5	5	5	6	3
70	2	2	1	2	1	1					3	3	3	3	2	4	1	5	3	5	2	5	5	5	5	2

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ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
71	2	2	3	2	4	1					2	2	2	2	2	5	6	2	2	4	4	2	4	2	3	5
72	2	2	3	1	5	1					3	3	3	3	3	4	4	6	4	4	4	5	6	4	3	5
73	4	2	2	1	0	1					2	2	2	2	1	1	4	2	2	5	2	1	1	5	2	2
74	4	2	3	1	3	1					2	2	2	2	3	1	1	1	1	1	3	1	1	3	3	3
75	3	2	2	1	3	1					3	3	3	3	2	2	2	3	5	5	4	5	5	5	3	3
76	3	2	1	1	4	1					4	4	4	4	3	1	2	3	3	3	2	2	2	3	3	4
77	1	1	4	2	4	1					4	4	4	4	5	6	6	5	5	5	5	5	5	5	5	2
78	1	1	3	1	4	1					4	4	4	4	1	5	5	5	5	4	4	6	3	3	4	5
79	3	1	1	1	4	1					4	4	4	4	3	4	2	4	4	4	4	3	3	3	3	1
80	2	1	3	1	4	1					4	4	4	4	4	2	2	5	5	5	5	6	6	3	3	6
81	1	2	3	2	5	1			1		2	2	2	2	4	5	5	5	6	6	5	6	5	5	5	2
82	1	1	1	1	4	1			1		2	2	2	2	1	3	3	5	3	3	5	5	5	1	1	4
83	2	2	3	1	4	1					2	2	2	2	3	2	2	2	3	3	4	5	5	6	2	5
84	3	1	4	2	4	1	1			1	4	4	4	4	5	2	2	5	6	6	6	5	3	6	6	1
85	2	2	3	1	3	1					2	2	2	2	5	5	5	3	3	5	5	3	4	2	3	2
86	2	1	3	1	4	1					2	2	4	2	6	6	6	5	5	6	6	6	6	6	6	6
87	2	1	3	2	4	1	1				2	1	1	1	3	6	6	5	3	6	6	6	5	3	5	4
88	2	1	0	1	2	1					1	1	1	1	5	2	2	2	3	4	2	3	3	3	3	4

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89	2	2	3	1	4	1					3	4	4	3	3	4	5	6	6	5	5	5	5	5	5	5
90	2	2	2	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	1
91	2	1	3	1	5	1					3	3	3	3	4	3	5	4	4	4	5	6	6	6	6	5
92	2	2	3	2	5	1	1		1	1	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	1
93	3	2	2	1	4	1					4	4	4	4	6	5	5	6	5	5	5	5	6	5	6	4
94	4	2	1	1	2	1					2	2	2	2	1	2	2	1	2	4	2	4	3	2	2	4
95	3	1	1	1	2	1					2	2	2	2	2	5	4	2	3	3	2	1	2	1	2	2
96	1	1	3	2	4	1					4	4	4	4	5	5	5	6	6	6	6	6	3	3	3	4
97	3	1	2	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5
98	1	1	2	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
99	4	2	1	1	2	1					2	2	2	2	5	5	6	5	5	5	5	5	5	5	5	5
100	3	2	1	1	4	1					4	4	4	4	6	2	3	6	5	5	4	4	4	4	4	4
101	2	1	3	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
102	3	2	1	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
103	2	2	3	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
104	2	1	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4
105	3	1	3	1	4	1					4	4	4	4	3	6	6	6	5	3	5	3	5	4	4	4
106	3	1	3	1	4	1					4	4	4	4	6	5	5	6	6	5	4	6	4	4	5	5

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107	3	1	2	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5
108	1	1	1	1	4	1					3	3	3	3	4	5	5	5	5	5	2	5	3	4	4	4
109	3	2	2	2	5	1					2	2	2	2	5	4	3	3	3	4	5	5	3	3	3	4
110	2	1	1	1	4	1					2	2	2	2	4	3	3	4	4	4	4	4	4	4	4	1
111	4	2	1	1	3	1					2	2	2	2	5	5	5	5	5	6	6	6	6	5	5	2
112	1	1	3	2	5	1	1				2	2	2	2	5	5	4	5	5	6	6	6	5	6	5	2
113	3	1	1	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	1
114	2	1	3	1	5	1					3	3	3	3	4	3	5	4	4	4	5	6	6	6	6	5
115	1	1	1	2	5	1	1		1	1	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	1
116	2	2	2	1	3	1					2	2	2	2	3	3	4	3	3	3	3	3	3	3	3	4
117	3	1	2	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
118	1	1	1	1	4	1					2	1	2	1	3	5	5	5	5	4	5	6	6	3	3	5
119	2	1	2	1	4	1					1	1	1	1	6	1	3	6	6	6	6	6	6	6	6	3
120	3	2	1	1	4	1					2	2	2	2	5	4	5	6	5	3	5	5	5	3	5	6
121	1	1	3	2	3	1	1	1		1	4	4	4	4	1	3	3	5	4	5	5	5	4	5	5	4
122	1	2	3	1	4	1					2	2	2	2	2	5	5	4	5	3	5	4	5	2	2	4
123	3	2	3	1	4	1					4	4	4	4	1	3	3	6	6	1	4	5	3	4	2	5

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ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
124	2	1	2	1	4	1					4	4	4	4	2	4	4	6	5	6	6	6	6	2	2	5
125	4	2	1	1	4	1					4	4	4	4	2	6	5	5	5	5	5	5	5	2	2	2
126	3	1	2	2	4	1			1		2	2	2	2	2	6	6	5	3	5	6	6	3	2	4	5
127	1	1	4	1	3	1					4	4	4	4	5	5	5	5	6	5	6	6	6	5	5	6
128	2	1	2	1	5	1					4	4	4	4	3	4	4	3	4	5	5	6	5	3	3	5
129	3	2	3	1	5	1					4	4	4	4	4	5	5	4	4	4	4	6	6	4	4	5
130	4	2	2	2	4	1					4	4	4	4	5	6	6	5	5	5	4	5	5	5	4	2
131	3	1	3	1	5	1					4	4	4	4	5	5	5	5	5	5	5	5	1	4	4	3
132	2	2	2	1	4	1					4	4	4	4	2	2	2	2	2	4	4	2	3	2	2	4
133	2	1	1	1	5	1					2	2	2	2	3	3	3	3	3	5	5	5	4	3	5	4
134	2	2	3	2	5	1					3	3	3	3	3	5	5	3	3	1	5	6	4	4	4	3
135	2	2	2	1	3	1					4	4	4	4	2	5	5	6	6	4	5	6	6	2	2	6
136	3	1	1	1	4	1					4	4	4	4	3	4	4	5	5	3	5	5	5	4	4	4
137	3	2	1	1	4	1					3	3	3	3	4	5	5	5	5	5	2	5	3	4	4	4
138	1	2	3	2	4	1	1		1		4	4	4	4	2	5	5	2	5	5	6	2	5	2	5	5
139	2	1	3	1	3	1					2	2	2	2	3	3	4	3	3	3	3	3	3	3	3	4

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- **SG**: Sex group with options: 1= male and 2 = female.
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- **B1-B5** : Ease of use (EOU); **C1-C4** : Confidence with skill; **D1-D3**= Satisfaction, with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
140	2	1	3	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
141	2	2	2	1	4	1					4	4	4	4	6	2	3	6	5	5	4	4	4	4	4	4
142	2	1	1	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
143	3	1	1	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
144	1	1	2	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
145	1	2	3	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
146	1	2	3	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
147	2	2	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4
148	4	1	1	1	4	1					4	4	4	4	3	6	6	6	5	3	5	3	5	4	4	4
149	4	2	1	1	4	1					4	4	4	4	6	5	5	6	6	5	4	6	4	4	5	5
150	3	1	3	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5
151	3	1	3	1	4	1					2	2	2	2	5	4	5	6	5	3	5	5	5	3	5	6
152	3	2	1	2	4	1					3	3	2	3	5	4	3	5	3	4	5	6	6	4	5	2
153	2	2	1	2	5	1					3	3	3	2	6	5	5	5	5	5	6	6	5	5	5	1

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
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- **B1-B5** : Ease of use (EOU); **C1-C4** : Confidence with skill; **D1-D3**= Satisfaction, with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
154	1	2	3	2	4	1	1	1	1		3	3	4	3	3	2	2	6	5	5	5	5	6	6	4	2
155	3	2	1	1	5	1					2	2	2	2	5	5	5	5	5	4	5	6	6	5	5	6
156	2	1	3	2	4	1	1	1			4	4	4	4	4	3	6	4	5	6	5	6	6	6	6	1
157	1	1	1	1	4	1					3	3	3	3	3	4	4	3	3	3	3	3	3	3	3	2
158	2	1	1	1	4	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	2
159	4	1	1	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	2
160	3	2	2	2	5	1					2	2	2	2	5	4	3	3	3	4	5	5	3	3	3	4
161	2	1	1	1	4	1					2	2	2	2	4	3	3	4	4	4	4	4	4	4	4	1
162	4	2	1	1	3	1					2	2	2	2	5	5	5	5	5	6	6	6	6	5	5	2
163	1	1	3	2	5	1	1				2	2	2	2	5	5	4	5	5	6	6	6	5	6	5	2
164	3	1	1	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	1
165	2	1	3	1	5	1					3	3	3	3	4	3	5	4	4	4	5	6	6	6	6	5
166	1	1	1	2	5	1	1		1	1	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	1
167	2	2	2	1	3	1					2	2	2	2	3	3	4	3	3	3	3	3	3	3	3	4
168	3	1	2	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
169	1	1	1	1	4	1					2	1	2	1	3	5	5	5	5	4	5	6	6	3	3	5

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ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
170	2	1	2	1	4	1					1	1	1	1	6	1	3	6	6	6	6	6	6	6	6	3
171	3	2	1	1	4	1					2	2	2	2	5	4	5	6	5	3	5	5	5	3	5	6
172	1	1	3	2	3	1	1	1		1	4	4	4	4	1	3	3	5	4	5	5	5	4	5	5	4
173	1	2	3	1	4	1					2	2	2	2	2	5	5	4	5	3	5	4	5	2	2	4
174	3	2	3	1	4	1					4	4	4	4	1	3	3	6	6	1	4	5	3	4	2	5
175	2	1	2	1	4	1					4	4	4	4	2	4	4	6	5	6	6	6	6	2	2	5
176	1	1	4	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
177	2	1	3	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
178	3	1	3	1	4	1					3	3	3	3	3	3	5	3	3	3	3	3	3	3	3	3
179	4	1	2	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
180	1	2	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4
181	2	2	3	1	4	1					4	4	4	4	2	5	5	2	4	3	5	5	5	2	2	4
182	2	2	2	1	5	1					4	4	4	4	3	4	4	3	4	5	5	6	5	3	3	5
183	2	1	2	1	5	1					4	4	4	4	4	5	5	4	4	4	4	6	6	4	4	5
184	4	1	2	1	4	1					4	4	4	4	3	6	6	6	5	5	5	6	6	5	6	2
185	2	1	3	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
186	3	1	3	1	4	1					3	3	3	3	3	3	5	3	3	3	3	3	3	3	3	3
187	4	1	2	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
188	1	2	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4

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189	2	2	3	1	4	1					4	4	4	4	2	5	5	2	4	3	5	5	5	2	2	4
190	2	2	2	1	5	1					4	4	4	4	3	4	4	3	4	5	5	6	5	3	3	5
191	2	1	2	1	5	1					4	4	4	4	4	5	5	4	4	4	4	6	6	4	4	5
192	4	1	2	1	4	1					4	4	4	4	3	6	6	6	5	5	5	6	6	5	6	2
193	3	2	2	1	4	1					4	4	4	4	6	5	5	6	5	5	5	5	6	5	6	4
194	4	2	1	1	2	1					2	2	2	2	1	2	2	1	2	4	2	4	3	2	2	4
195	3	1	1	1	2	1					2	2	2	2	2	5	4	2	3	3	2	1	2	1	2	2
196	1	1	3	2	4	1					4	4	4	4	5	5	5	6	6	6	6	6	3	3	3	4
197	3	1	2	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5
198	1	1	2	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
199	4	2	1	1	2	1					2	2	2	2	5	5	6	5	5	5	5	5	5	5	5	5
200	3	2	1	1	4	1					4	4	4	4	6	2	3	6	5	5	4	4	4	4	4	4
201	2	1	3	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
202	3	2	1	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
203	2	2	3	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
204	2	1	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4
205	3	1	3	1	4	1					4	4	4	4	3	6	6	6	5	3	5	3	5	4	4	4
206	3	1	3	1	4	1					4	4	4	4	6	5	5	6	6	5	4	6	4	4	5	5

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207	3	1	2	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5
208	1	1	1	1	4	1					3	3	3	3	4	5	5	5	5	5	2	5	3	4	4	4
209	3	1	1	1	4	1					4	4	4	4	3	4	2	4	4	4	4	3	3	3	3	1
210	2	1	3	1	4	1					4	4	4	4	4	2	2	5	5	5	5	6	6	3	3	6
211	1	2	3	2	5	1			1		2	2	2	2	4	5	5	5	6	6	5	6	5	5	5	2
212	1	1	1	1	4	1			1		2	2	2	2	1	3	3	5	3	3	5	5	5	1	1	4
213	2	2	3	1	4	1					2	2	2	2	3	2	2	2	3	3	4	5	5	6	2	5
214	3	1	4	2	4	1	1			1	4	4	4	4	5	2	2	5	6	6	6	5	3	6	6	1
215	2	2	3	1	3	1					2	2	2	2	5	5	5	3	3	5	5	3	4	2	3	2
216	2	1	3	1	4	1					2	2	4	2	6	6	6	5	5	6	6	6	6	6	6	6
217	2	1	3	2	4	1	1				2	1	1	1	3	6	6	5	3	6	6	6	5	3	5	4
218	2	1	0	1	2	1					1	1	1	1	5	2	2	2	3	4	2	3	3	3	3	4
219	2	2	3	1	4	1					3	4	4	3	3	4	5	6	6	5	5	5	5	5	5	5
220	2	2	2	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	1
221	2	1	3	1	5	1					3	3	3	3	4	3	5	4	4	4	5	6	6	6	6	5
222	2	2	3	2	5	1	1		1	1	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	1
223	2	1	3	1	3	1					2	2	2	2	3	3	4	3	3	3	3	3	3	3	3	4

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ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
224	2	1	3	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
225	2	2	2	1	4	1					4	4	4	4	6	2	3	6	5	5	4	4	4	4	4	4
226	2	1	1	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
227	3	1	1	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
228	1	1	2	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
229	1	2	3	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
230	1	2	3	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
231	2	1	3	1	4	1					4	4	4	4	6	6	6	6	6	5	6	5	5	5	6	3
232	3	1	3	1	4	1					2	2	2	2	5	4	5	6	5	3	5	5	5	3	5	6
233	3	2	1	2	4	1					3	3	2	3	5	4	3	5	3	4	5	6	6	4	5	2
234	2	2	1	2	5	1					3	3	3	2	6	5	5	5	5	5	6	6	5	5	5	1
235	1	2	3	2	4	1	1	1	1		3	3	4	3	3	2	2	6	5	5	5	5	6	6	4	2
236	3	2	1	1	5	1					2	2	2	2	5	5	5	5	5	4	5	6	6	5	5	6

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ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
237	2	1	3	2	4	1	1	1			4	4	4	4	4	3	6	4	5	6	5	6	6	6	6	1
238	1	1	1	1	4	1					3	3	3	3	3	4	4	3	3	3	3	3	3	3	3	2
239	2	1	1	1	4	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	2
240	4	1	1	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	2
241	3	2	2	2	5	1					2	2	2	2	5	4	3	3	3	4	5	5	3	3	3	4
242	2	2	3	2	4	1					2	2	2	2	2	5	6	2	2	4	4	2	4	2	3	5
243	2	2	3	1	5	1					3	3	3	3	3	4	4	6	4	4	4	5	6	4	3	5
244	4	2	2	1	0	1					2	2	2	2	1	1	4	2	2	5	2	1	1	5	2	2
245	4	2	3	1	3	1					2	2	2	2	3	1	1	1	1	1	3	1	1	3	3	3
246	3	2	2	1	3	1					3	3	3	3	2	2	2	3	5	5	4	5	5	5	3	3
247	3	2	1	1	4	1					4	4	4	4	3	1	2	3	3	3	2	2	2	3	3	4
248	1	1	4	2	4	1					4	4	4	4	5	6	6	5	5	5	5	5	5	5	5	2
249	1	1	3	1	4	1					4	4	4	4	1	5	5	5	5	4	4	6	3	3	4	5
250	3	1	1	1	4	1					4	4	4	4	3	4	2	4	4	4	4	3	3	3	3	1
251	2	1	3	1	4	1					4	4	4	4	4	2	2	5	5	5	5	6	6	3	3	6

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- **SG**: Sex group with options: 1= male and 2 = female.
- **EG**: Education group with options : 0 = no education; 1= elementary; 2= Junior high school; 3 = Senior high School; 4= Undergraduate
- **MP**: Mobile Phone type with options : 1 = non- smartphone and 2 = smartphone
- **FOU**: Frequency of use for SMS: 0 = no answer; 1= once a month; 2= once a week; 3= more than once a week; 4= once a day; 5= More than once a day.
- **A1-A4** : Device preparedness responds with options : 1= never; 2= rarely; 3 = sometimes; and 4 = frequently
- **B1-B5** : Ease of use (EOU); **C1-C4** : Confidence with skill; **D1-D3**= Satisfaction, with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
252	1	2	3	2	5	1			1		2	2	2	2	4	5	5	5	6	6	5	6	5	5	5	2
253	1	1	1	1	4	1			1		2	2	2	2	1	3	3	5	3	3	5	5	5	1	1	4
254	2	2	3	1	4	1					2	2	2	2	3	2	2	2	3	3	4	5	5	6	2	5
255	3	1	4	2	4	1	1			1	4	4	4	4	5	2	2	5	6	6	6	5	3	6	6	1
256	2	2	3	1	3	1					2	2	2	2	5	5	5	3	3	5	5	3	4	2	3	2
257	2	1	3	1	4	1					2	2	4	2	6	6	6	5	5	6	6	6	6	6	6	6
258	2	1	3	2	4	1	1				2	1	1	1	3	6	6	5	3	6	6	6	5	3	5	4
259	2	1	0	1	2	1					1	1	1	1	5	2	2	2	3	4	2	3	3	3	3	4
260	2	2	3	1	4	1					3	4	4	3	3	4	5	6	6	5	5	5	5	5	5	5
261	2	2	2	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	1
262	2	1	3	1	5	1					3	3	3	3	4	3	5	4	4	4	5	6	6	6	6	5
263	2	2	3	2	5	1	1		1	1	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	1
264	2	1	3	1	3	1					2	2	2	2	3	3	4	3	3	3	3	3	3	3	3	4
265	2	1	3	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
266	2	2	2	1	4	1					4	4	4	4	6	2	3	6	5	5	4	4	4	4	4	4
267	2	1	1	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- **SG**: Sex group with options: 1= male and 2 = female.
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- **A1-A4** : Device preparedness responds with options : 1= never; 2= rarely; 3 = sometimes; and 4 = frequently
- **B1-B5** : Ease of use (EOU); **C1-C4** : Confidence with skill; **D1-D3**= Satisfaction, with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
268	3	1	1	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
269	1	1	2	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
270	1	2	3	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
271	1	2	3	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
272	2	2	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4
273	4	1	1	1	4	1					4	4	4	4	3	6	6	6	5	3	5	3	5	4	4	4
274	4	2	1	1	4	1					4	4	4	4	6	5	5	6	6	5	4	6	4	4	5	5
275	3	1	3	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5
276	1	1	4	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
277	3	2	1	1	4	1					4	4	4	4	3	1	2	3	3	3	2	2	2	3	3	4
278	1	1	4	2	4	1					4	4	4	4	5	6	6	5	5	5	5	5	5	5	5	2
279	1	1	3	1	4	1					4	4	4	4	1	5	5	5	5	4	4	6	3	3	4	5
280	3	1	1	1	4	1					4	4	4	4	3	4	2	4	4	4	4	3	3	3	3	1
281	2	1	3	1	4	1					4	4	4	4	4	2	2	5	5	5	5	6	6	3	3	6
282	1	2	3	2	5	1			1		2	2	2	2	4	5	5	5	6	6	5	6	5	5	5	2
283	1	1	1	1	4	1			1		2	2	2	2	1	3	3	5	3	3	5	5	5	1	1	4
284	2	2	3	1	4	1					2	2	2	2	3	2	2	2	3	3	4	5	5	6	2	5
285	3	1	4	2	4	1	1			1	4	4	4	4	5	2	2	5	6	6	6	5	3	6	6	1
286	2	2	3	1	3	1					2	2	2	2	5	5	5	3	3	5	5	3	4	2	3	2

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
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- **FOU**: Frequency of use for SMS: 0 = no answer; 1= once a month; 2= once a week; 3= more than once a week; 4= once a day; 5= More than once a day.
- **A1-A4** : Device preparedness responds with options : 1= never; 2= rarely; 3 = sometimes; and 4 = frequently
- **B1-B5** : Ease of use (EOU); **C1-C4** : Confidence with skill; **D1-D3**= Satisfaction, with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
287	2	1	3	1	4	1					2	2	4	2	6	6	6	5	5	6	6	6	6	6	6	6
288	2	1	3	2	4	1	1				2	1	1	1	3	6	6	5	3	6	6	6	5	3	5	4
289	2	1	0	1	2	1					1	1	1	1	5	2	2	2	3	4	2	3	3	3	3	4
290	2	2	3	1	4	1					3	4	4	3	3	4	5	6	6	5	5	5	5	5	5	5
291	2	2	2	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	1
292	2	1	3	1	5	1					3	3	3	3	4	3	5	4	4	4	5	6	6	6	6	5
293	2	2	3	2	5	1	1		1	1	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	1
294	2	1	3	1	3	1					2	2	2	2	3	3	4	3	3	3	3	3	3	3	3	4
295	2	1	3	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
296	2	2	2	1	4	1					4	4	4	4	6	2	3	6	5	5	4	4	4	4	4	4
297	2	1	1	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
298	3	1	1	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
299	1	1	2	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
300	1	2	3	1	4	1					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
301	1	2	3	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
302	2	2	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4
303	4	1	1	1	4	1					4	4	4	4	3	6	6	6	5	3	5	3	5	4	4	4
304	4	2	1	1	4	1					4	4	4	4	6	5	5	6	6	5	4	6	4	4	5	5
305	3	1	3	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- **SG**: Sex group with options: 1= male and 2 = female.
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- **MP**: Mobile Phone type with options : 1 = non- smartphone and 2 = smartphone
- **FOU**: Frequency of use for SMS: 0 = no answer; 1= once a month; 2= once a week; 3= more than once a week; 4= once a day; 5= More than once a day.
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ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
306	1	1	4	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
307	2	1	3	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1
308	3	1	3	1	4	1					3	3	3	3	3	3	5	3	3	3	3	3	3	3	3	3
309	4	1	2	1	4	1					4	4	4	4	6	6	6	6	6	6	6	6	6	3	6	6
310	1	2	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4
311	2	2	3	1	4	1					4	4	4	4	2	5	5	2	4	3	5	5	5	2	2	4
312	2	2	2	1	5	1					4	4	4	4	3	4	4	3	4	5	5	6	5	3	3	5
313	2	1	2	1	5	1					4	4	4	4	4	5	5	4	4	4	4	6	6	4	4	5
314	4	1	2	1	4	1					4	4	4	4	3	6	6	6	5	5	5	6	6	5	6	2
315	3	2	2	1	4	1					4	4	4	4	6	5	5	6	5	5	5	5	6	5	6	4
316	4	2	1	1	2	1					2	2	2	2	1	2	2	1	2	4	2	4	3	2	2	4
317	3	1	1	1	2	1					2	2	2	2	2	5	4	2	3	3	2	1	2	1	2	2
318	1	1	3	2	4	1					4	4	4	4	5	5	5	6	6	6	6	6	3	3	3	4
319	3	1	2	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5
320	1	1	2	2	4	1	1				4	4	4	4	6	6	6	5	6	6	6	6	5	6	6	1

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- **SG**: Sex group with options: 1= male and 2 = female.
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- **MP**: Mobile Phone type with options : 1 = non- smartphone and 2 = smartphone
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- **A1-A4** : Device preparedness responds with options : 1= never; 2= rarely; 3 = sometimes; and 4 = frequently
- **B1-B5** : Ease of use (EOU); **C1-C4** : Confidence with skill; **D1-D3**= Satisfaction, with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
321	4	2	1	1	2	1					2	2	2	2	5	5	6	5	5	5	5	5	5	5	5	5
322	3	2	1	1	4	1					4	4	4	4	6	2	3	6	5	5	4	4	4	4	4	4
323	2	2	2	1	5	1					4	4	4	4	6	6	6	5	5	5	5	6	6	3	3	4
324	4	1	1	1	4	1					4	4	4	4	3	6	6	6	5	3	5	3	5	4	4	4
325	4	2	1	1	4	1					4	4	4	4	6	5	5	6	6	5	4	6	4	4	5	5
326	3	1	3	1	4	1					3	4	4	4	5	5	5	5	5	3	5	4	4	5	5	5
327	3	1	3	1	4	1					2	2	2	2	5	4	5	6	5	3	5	5	5	3	5	6
328	3	2	1	2	4	1					3	3	2	3	5	4	3	5	3	4	5	6	6	4	5	2
329	2	2	1	2	5	1					3	3	3	2	6	5	5	5	5	5	6	6	5	5	5	1
330	1	2	3	2	4	1	1	1	1		3	3	4	3	3	2	2	6	5	5	5	5	6	6	4	2
331	3	2	1	1	5	1					2	2	2	2	5	5	5	5	5	4	5	6	6	5	5	6
332	2	1	3	2	4	1	1	1			4	4	4	4	4	3	6	4	5	6	5	6	6	6	6	1
333	1	1	1	1	4	1					3	3	3	3	3	4	4	3	3	3	3	3	3	3	3	2
334	2	1	1	1	4	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	2
335	4	1	1	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	2

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
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- **MP**: Mobile Phone type with options : 1 = non- smartphone and 2 = smartphone
- **FOU**: Frequency of use for SMS: 0 = no answer; 1= once a month; 2= once a week; 3= more than once a week; 4= once a day; 5= More than once a day.
- **A1-A4** : Device preparedness responds with options : 1= never; 2= rarely; 3 = sometimes; and 4 = frequently
- **B1-B5** : Ease of use (EOU); **C1-C4** : Confidence with skill; **D1-D3**= Satisfaction, with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	AG	SG	EG	MP	FOU SMS	SMS	FB	Twitter	What apps	Internet	A1	A2	A3	A4	B1	B2	B3	B4	B5	C1	C2	C3	C4	D1	D2	D3
336	3	2	2	2	5	1					2	2	2	2	5	4	3	3	3	4	5	5	3	3	3	4
337	2	1	1	1	4	1					2	2	2	2	4	3	3	4	4	4	4	4	4	4	4	1
338	4	2	1	1	3	1					2	2	2	2	5	5	5	5	5	6	6	6	6	5	5	2
339	1	1	3	2	5	1	1				2	2	2	2	5	5	4	5	5	6	6	6	5	6	5	2
340	3	1	1	1	3	1					2	2	2	2	3	4	4	3	3	3	3	3	3	3	3	1
341	2	1	3	1	5	1					3	3	3	3	4	3	5	4	4	4	5	6	6	6	6	5
342	1	1	1	2	5	1	1		1	1	4	4	4	4	5	5	5	5	6	6	6	6	6	6	6	1
343	2	2	2	1	3	1					2	2	2	2	3	3	4	3	3	3	3	3	3	3	3	4
344	3	1	2	2	5	1				1	3	3	3	3	6	1	4	6	6	6	6	6	6	5	6	2
345	1	1	1	1	4	1					2	1	2	1	3	5	5	5	5	4	5	6	6	3	3	5
346	2	1	2	1	4	1					1	1	1	1	6	1	3	6	6	6	6	6	6	6	6	3
347	3	2	1	1	4	1					2	2	2	2	5	4	5	6	5	3	5	5	5	3	5	6
348	1	1	3	2	3	1	1	1		1	4	4	4	4	1	3	3	5	4	5	5	5	4	5	5	4
349	1	2	3	1	4	1					2	2	2	2	2	5	5	4	5	3	5	4	5	2	2	4
350	3	2	3	1	4	1					4	4	4	4	1	3	3	6	6	1	4	5	3	4	2	5

- **AG** : Age group with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- **SG**: Sex group with options: 1= male and 2 = female.
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- **MP**: Mobile Phone type with options : 1 = non- smartphone and 2 = smartphone
- **FOU**: Frequency of use for SMS: 0 = no answer; 1= once a month; 2= once a week; 3= more than once a week; 4= once a day; 5= More than once a day.
- **A1-A4** : Device preparedness responds with options : 1= never; 2= rarely; 3 = sometimes; and 4 = frequently
- **B1-B5** : Ease of use (EOU); **C1-C4** : Confidence with skill; **D1-D3**= Satisfaction, with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

Appendix F: Second Data Survey

ID	KSB 2	Gender	Ages	Education	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C1.4	C1.5	C2.1	C2.1	C2.3
1	1	1	3	3	4	4	3	5	6	6	6	6	6	6	6	6	6	6	6	5	4	5	5	6
2	1	1	4	4	5	6	5	4	5	6	5	6	6	6	6	6	6	6	5	5	4	5	5	6
3	1	2	3	3	6	4	5	4	5	5	5	5	5	5	5	6	5	5	5	5	5	5	5	5
4	1	1	3	4	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	5	4	6	6	6
5	1	1	2	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	3	4	5	5
6	1	1	4	3	6	5	4	4	5	5	5	5	6	6	6	6	5	6	5	4	5	5	5	6
7	1	1	4	4	6	6	5	2	5	5	5	5	6	6	6	6	6	6	6	6	5	5	6	6
8	1	1	3	3	6	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	5	5	5
9	1	1	3	4	6	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	5	5	5
10	1	1	2	3	6	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	5	5	5
11	1	1	3	4	6	6	6	6	6	6	6	6	6	6	6	4	6	6	6	6	5	5	6	5
12	1	1	1	3	6	6	6	6	6	5	5	5	5	5	6	5	6	5	6	6	6	6	6	6
13	1	2	1	3	5	5	5	5	6	6	5	6	6	6	5	5	6	6	6	5	6	5	6	6
14	1	2	3	4	6	6	6	6	4	6	6	6	6	6	6	6	6	6	6	2	1	6	6	6
15	1	1	3	4	6	6	6	6	4	6	6	6	6	6	6	6	6	6	6	2	1	6	6	5

- KSB : Kelompok Siaga Bencana / Disaster preparedness group, with options 1= KSB and 2 = Non-KSB
- Gender, with options 1 = male and 2 = female
- Ages, with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- Education, with options : 0 = no education; 1= elementary; 2= Junior high school; 3 = Senior high School; 4= Undergraduate
- **A1-A4** : Device preparedness with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree
- **SMS notification services B1.1-B1.4** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.5** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	B1.1	B1.2	B1.3	B1.4	B1.5	B1.6	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C2.1	C2.2	C2.3
1	5	6	6	6	6	6	6	6	6	6	5	6	6	5	5	5
2	6	6	6	6	6	5	5	5	6	5	5	6	6	6	5	5
3	4	5	5	5	5	4	5	4	5	5	5	5	5	5	5	5
4	6	5	6	6	6	6	6	6	6	6	5	6	6	5	6	6
5	5	5	5	6	6	6	5	5	5	6	6	5	5	6	6	6
6	5	6	6	6	6	5	6	6	6	5	6	6	6	6	6	6
7	6	6	6	6	6	6	6	5	6	6	5	6	6	6	6	6
8	5	5	5	5	5	5	5	5	5	5	6	6	6	5	5	5
9	5	5	5	5	5	5	5	5	5	5	6	6	6	5	5	5
10	5	5	5	5	5	5	5	5	5	5	6	6	6	5	5	5
11	6	6	6	6	5	6	5	6	6	6	6	6	6	6	6	5
12	6	6	5	6	6	6	6	6	6	6	5	5	5	5	6	6
13	6	6	6	6	6	5	5	5	5	5	6	6	6	6	6	5
14	6	2	3	6	6	4	4	5	6	5	2	4	1	4	2	3
15	6	2	3	6	6	4	4	5	6	5	2	4	1	4	2	3

- **SMS Verification services B1.1-B1.6** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.3** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	KSB 2	Gender	Ages	Education	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C1.4	C1.5	C2.1	C2.1	C2.3
16	1	1	4	4	6	6	6	6	4	6	6	6	6	6	6	6	3	3	1	1	1	4	2	4
17	1	1	3	4	6	6	6	6	5	5	6	6	5	5	5	6	4	1	3	3	1	3	2	3
18	1	2	2	3	6	6	6	6	5	5	6	6	5	5	5	6	4	1	3	3	1	3	2	3
19	2	1	2	1	5	5	6	4	5	4	4	4	5	4	5	6	5	5	4	3	4	3	4	4
20	2	2	3	3	2	4	3	3	6	6	5	5	6	5	6	6	6	6	6	6	5	6	5	6
21	2	1	1	2	5	5	5	4	5	5	4	4	5	5	5	5	4	5	3	3	4	4	4	4
22	2	1	2	2	4	3	4	4	6	6	5	6	6	5	6	6	6	6	6	6	5	6	6	6
23	2	1	1	1	6	2	6	5	3	3	3	3	5	4	4	5	5	3	3	3	4	4	3	3
24	2	1	4	4	4	4	5	5	5	5	6	5	5	5	5	5	6	6	6	5	5	6	6	6
25	2	1	4	1	4	4	3	3	5	4	4	4	4	3	4	4	4	3	3	3	3	4	3	4
26	2	2	1	2	6	5	5	4	4	4	4	3	4	3	3	3	3	3	3	3	4	3	3	5
27	2	2	4	3	2	3	3	3	5	4	3	3	4	3	3	3	3	3	4	3	3	3	3	3
28	2	2	1	3	5	5	3	5	6	6	6	6	6	5	6	6	6	6	6	5	5	6	6	6
29	2	2	3	3	5	4	6	5	4	4	3	3	4	3	4	4	4	4	3	3	3	3	3	2
30	2	1	3	3	4	5	4	5	6	6	6	5	6	5	5	6	6	6	6	6	5	6	6	6

- KSB : Kelompok Siaga Bencana / Disaster preparedness group, with options 1= KSB and 2 = Non-KSB
- Gender, with options 1 = male and 2 = female
- Ages, with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- Education, with options : 0 = no education; 1= elementary; 2= Junior high school; 3 = Senior high School; 4= Undergraduate
- **A1-A4** : Device preparedness with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree
- **SMS notification services B1.1-B1.4** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.5** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	B1.1	B1.2	B1.3	B1.4	B1.5	B1.6	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C2.1	C2.2	C2.3
16	5	3	6	6	6	6	6	6	6	5	6	6	5	6	6	6
17	6	1	5	5	6	4	6	6	6	6	6	6	4	6	6	6
18	6	1	5	5	6	4	6	6	6	6	6	6	4	6	6	6
19	6	6	5	6	6	5	5	6	6	6	6	6	5	6	6	6
20	3	4	5	4	4	4	4	3	3	5	4	4	3	4	3	3
21	6	6	4	5	6	6	6	6	6	6	5	6	6	6	5	6
22	5	3	4	3	3	4	4	3	4	4	4	4	3	4	3	3
23	5	6	5	6	6	4	6	5	6	6	5	6	6	6	6	6
24	5	5	4	4	4	4	4	4	4	4	5	5	5	4	4	4
25	6	1	2	6	5	6	1	2	5	6	6	6	6	6	6	6
26	6	5	5	6	6	6	6	5	5	6	6	6	5	6	6	6
27	5	5	5	5	5	5	6	5	6	6	6	5	6	6	6	6
28	4	4	5	4	4	3	4	3	4	4	4	4	4	3	4	1
29	6	6	5	6	6	6	6	5	6	6	5	5	6	6	6	6
30	4	4	5	4	3	3	4	3	3	4	4	4	4	3	3	3

- **SMS Verification services B1.1-B1.6** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.3** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	KSB 2	Gender	Ages	Education	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C1.4	C1.5	C2.1	C2.1	C2.3
31	2	1	3	1	4	4	3	4	4	4	4	4	4	4	3	4	4	4	2	2	2	4	3	4
32	2	1	2	2	5	5	5	4	6	6	5	5	5	4	5	5	6	6	5	6	4	6	5	5
33	2	1	4	1	2	3	3	3	5	4	4	4	3	4	4	4	4	3	4	3	3	4	3	4
34	2	2	3	3	5	4	4	3	6	6	6	5	5	5	6	5	6	6	5	5	4	5	5	6
35	2	1	3	1	3	3	2	3	5	3	4	3	4	3	3	3	4	4	3	3	3	4	3	3
36	2	1	2	2	5	5	4	5	6	6	6	6	6	5	5	5	6	6	5	5	4	5	5	6
37	2	1	1	3	6	6	5	6	6	6	5	5	5	5	6	6	6	6	5	5	4	6	5	6
38	2	1	2	1	5	3	5	4	6	6	5	5	5	5	6	5	6	6	5	5	5	6	5	6
39	2	1	3	4	5	6	6	6	5	6	6	6	5	6	6	6	6	6	6	5	5	6	6	6
40	2	2	2	3	2	3	6	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
41	2	2	3	3	2	3	6	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
42	2	1	2	1	4	4	3	3	5	6	6	5	6	6	6	5	6	6	5	5	4	6	6	6
43	2	2	2	4	5	5	5	4	6	5	5	5	6	5	6	5	6	6	5	5	4	6	5	6
44	2	1	4	0	2	3	2	3	5	5	4	5	5	5	4	5	6	5	5	6	4	5	5	6
45	2	1	1	1	5	5	6	5	6	6	5	5	6	5	6	5	6	5	5	5	5	6	6	6
46	2	2	1	2	5	5	5	5	6	5	5	5	6	6	6	5	5	5	6	6	5	5	6	6

- KSB : Kelompok Siaga Bencana / Disaster preparedness group, with options 1= KSB and 2 = Non-KSB
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- **A1-A4** : Device preparedness with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree
- **SMS notification services B1.1-B1.4** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.5** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	B1.1	B1.2	B1.3	B1.4	B1.5	B1.6	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C2.1	C2.2	C2.3
31	6	6	5	5	6	6	6	5	6	6	6	6	5	6	6	6
32	3	3	4	3	4	3	3	4	4	4	4	3	4	4	4	4
33	6	6	5	5	5	5	6	5	6	6	5	5	6	6	5	5
34	3	2	4	3	3	4	3	2	3	4	5	4	3	3	2	3
35	6	6	4	5	5	6	5	6	5	5	5	5	5	6	6	5
36	4	2	3	2	2	3	3	3	2	4	4	4	3	3	3	3
37	2	2	4	2	3	3	3	2	4	4	3	3	3	3	4	3
38	2	2	3	2	4	3	3	2	4	3	4	3	3	3	4	3
39	5	4	5	5	5	5	5	5	5	5	5	4	4	5	5	5
40	6	1	1	5	2	6	6	6	6	6	2	2	1	2	1	2
41	6	1	1	5	2	6	6	6	6	6	2	2	1	2	1	2
42	2	2	4	3	3	3	3	2	3	3	4	5	3	3	2	3
43	2	2	5	3	3	2	3	3	2	3	3	4	3	4	3	3
44	3	3	5	2	3	3	2	2	3	4	3	4	3	4	4	3
45	2	3	2	2	3	3	3	3	3	3	5	4	3	4	3	3
46	2	2	5	2	3	3	3	2	3	4	4	4	3	5	3	3

- **SMS Verification services B1.1-B1.6** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.3** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	KSB 2	Gender	Ages	Education	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C1.4	C1.5	C2.1	C2.1	C2.3
47	2	1	1	1	6	6	5	6	6	6	5	5	6	5	5	5	5	5	5	5	4	6	5	6
48	2	2	3	1	3	3	2	3	6	6	5	5	5	5	5	6	6	5	5	5	6	6	6	6
49	2	2	2	1	5	5	4	5	5	6	6	5	5	5	6	6	5	5	5	5	4	6	5	6
50	2	1	3	1	4	4	3	4	6	6	5	5	6	5	5	6	6	5	5	5	5	6	6	6
51	2	1	1	1	6	6	5	6	6	6	5	5	6	5	5	6	5	5	6	6	5	6	5	6
52	2	2	3	3	5	4	5	4	5	6	5	6	6	5	5	5	6	6	6	5	4	6	6	6
53	2	1	1	2	5	5	4	5	2	2	3	3	3	3	3	4	3	2	2	3	3	3	2	3
54	2	1	1	1	6	6	5	6	6	5	5	5	6	6	5	6	5	5	6	6	4	6	6	6
55	2	1	1	2	5	5	5	5	6	5	5	6	6	6	5	5	6	6	5	5	5	6	5	6
56	2	1	3	3	3	3	2	3	4	3	3	3	3	4	2	4	3	4	3	3	2	3	3	3
57	2	1	2	3	5	5	4	5	4	2	2	3	3	3	3	4	3	4	3	3	2	3	4	3
58	2	1	1	1	6	6	5	6	5	5	5	6	6	5	6	6	6	6	5	5	5	5	6	6
59	2	1	1	2	5	5	3	5	6	6	5	5	6	5	5	5	6	5	6	5	5	6	6	6
60	2	2	3	2	4	4	3	4	6	6	5	6	6	5	5	6	5	6	5	5	5	6	6	6
61	2	2	1	2	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
62	2	2	1	3	5	5	6	5	6	5	5	6	6	5	5	5	5	6	5	5	5	6	6	6
63	2	2	3	3	5	5	3	4	6	5	4	4	4	5	5	4	5	5	4	4	3	4	5	5

- KSB : Kelompok Siaga Bencana / Disaster preparedness group, with options 1= KSB and 2 = Non-KSB
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- Education, with options : 0 = no education; 1= elementary; 2= Junior high school; 3 = Senior high School; 4= Undergraduate
- **A1-A4** : Device preparedness with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree
- **SMS notification services B1.1-B1.4** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.5** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	B1.1	B1.2	B1.3	B1.4	B1.5	B1.6	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C2.1	C2.2	C2.3
47	3	3	5	2	2	3	3	2	3	3	4	3	3	4	2	3
48	2	3	3	2	3	3	3	2	3	4	4	4	3	4	3	3
49	3	2	2	3	2	3	3	3	4	4	3	4	3	4	4	3
50	2	2	3	3	3	4	3	2	2	3	3	2	3	4	4	3
51	2	2	3	2	3	2	3	2	3	4	3	3	2	4	3	3
52	5	5	6	5	4	5	4	4	5	5	5	4	5	5	5	5
53	6	6	5	5	6	6	6	6	5	5	5	6	5	6	6	6
54	2	2	3	2	2	3	3	3	2	4	3	4	3	3	3	4
55	2	2	3	2	2	3	3	2	2	3	3	4	3	3	2	3
56	6	6	5	5	6	6	5	5	6	6	5	5	6	6	6	6
57	6	6	5	5	6	6	6	5	5	6	5	6	5	6	1	6
58	3	3	2	2	2	2	3	2	2	3	3	4	3	3	2	3
59	3	3	2	2	3	3	3	3	2	4	3	4	3	3	3	3
60	2	2	4	2	3	2	3	2	3	4	4	3	4	3	2	3
61	6	1	2	4	1	6	6	6	6	6	3	1	1	2	1	1
62	4	2	3	2	2	4	3	3	3	4	3	4	3	3	2	3
63	3	3	2	3	2	2	3	2	2	2	3	2	2	2	2	2

- **SMS Verification services B1.1-B1.6** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.3** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	KSB	Gender	Ages	Education	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C1.4	C1.5	C2.1	C2.1	C2.3
64	2	2	4	0	4	3	3	4	5	5	5	5	5	5	4	4	5	4	5	5	5	4	5	5
65	2	2	1	3	5	5	5	5	5	5	5	5	4	4	5	5	5	5	4	5	4	4	4	5
66	2	1	1	2	4	6	4	5	5	4	4	5	5	5	4	5	4	5	5	4	4	4	5	4
67	2	1	2	2	3	3	3	4	2	3	2	2	3	2	2	2	3	2	2	2	3	2	2	3
68	2	1	2	2	4	4	6	4	4	6	6	5	6	6	6	3	2	2	1	1	1	2	1	1
69	2	1	3	2	4	4	6	4	4	6	6	5	6	6	6	3	2	2	1	1	1	2	1	1
70	2	1	4	1	3	3	3	4	5	4	4	6	5	4	5	4	4	5	5	4	4	5	5	4
71	2	2	4	2	3	3	3	3	5	4	5	5	4	5	5	4	4	4	5	4	5	4	5	6
72	2	2	3	1	4	4	3	3	5	5	4	5	4	4	5	4	5	5	4	4	5	4	5	4
73	2	1	4	1	4	4	3	4	4	4	5	5	5	5	5	4	4	5	4	4	4	4	5	4
74	2	2	2	3	5	5	4	5	5	5	5	6	4	5	5	4	4	5	4	5	4	4	5	5
75	2	2	1	3	4	4	4	5	4	4	3	3	3	3	2	2	2	2	2	2	2	3	2	3
76	2	2	2	3	5	5	3	3	6	5	4	4	4	5	5	4	5	5	4	4	3	4	4	4
77	2	2	3	1	4	3	3	4	5	5	5	6	5	5	4	4	5	4	5	5	5	4	4	5
78	2	1	2	3	5	4	5	5	5	5	5	5	4	4	5	5	5	5	4	5	4	4	4	5
79	2	1	1	2	4	5	4	5	5	4	4	5	5	5	4	5	4	5	5	4	4	4	5	4
80	2	2	3	1	4	4	3	3	5	5	4	5	4	4	4	4	5	5	4	4	5	4	5	4

- KSB : Kelompok Siaga Bencana / Disaster preparedness group, with options 1= KSB and 2 = Non-KSB
- Gender, with options 1 = male and 2 = female
- Ages, with options: 1 = 20-30 ; 2 = 31-40; 3= 41-50; 4 = over 50
- Education, with options : 0 = no education; 1= elementary; 2= Junior high school; 3 = Senior high School; 4= Undergraduate
- **A1-A4** : Device preparedness with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree
- **SMS notification services B1.1-B1.4** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.5** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	B1.1	B1.2	B1.3	B1.4	B1.5	B1.6	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C2.1	C2.2	C2.3
64	2	2	2	2	3	2	2	3	3	2	2	2	3	3	2	3
65	3	2	2	2	2	3	2	3	3	2	2	2	3	2	3	2
66	3	2	3	2	3	2	3	2	2	3	3	2	3	2	2	2
67	5	5	4	5	5	4	5	4	4	5	4	4	5	5	4	4
68	6	6	6	6	6	6	6	6	6	6	6	6	1	5	6	6
69	6	6	6	6	6	6	6	6	6	6	6	6	1	5	6	6
70	3	2	2	3	2	2	2	2	3	2	3	2	2	2	3	2
71	3	2	2	3	2	2	2	2	3	2	2	3	2	3	2	2
72	3	2	2	3	2	2	3	2	3	2	3	3	2	3	2	2
73	4	3	3	2	2	3	2	3	2	2	2	2	3	3	2	2
74	3	2	2	3	2	3	3	2	2	3	3	2	3	2	2	2
75	4	5	3	4	3	5	4	3	4	5	4	5	4	5	4	5
76	3	3	2	3	2	2	3	2	2	2	2	2	2	2	2	2
77	2	2	2	2	3	2	2	3	3	2	2	2	3	3	2	3
78	3	2	2	2	2	3	2	3	3	2	2	2	3	2	3	2
79	3	2	3	2	3	2	3	2	2	3	3	2	3	2	2	2
80	3	2	2	3	2	2	3	2	3	2	3	3	2	3	2	2

- **SMS Verification services B1.1-B1.6** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.3** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree

ID	KSB	Gender	Ages	Education	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C1.4	C1.5	C2.1	C2.1	C2.3
81	2	1	3	1	3	3	3	3	5	4	5	5	4	5	4	4	4	4	5	4	5	4	5	6
82	2	1	1	0	3	3	3	3	5	4	5	5	4	5	4	4	4	4	5	4	5	4	5	6
83	2	2	2	2	5	4	5	5	5	5	5	5	4	4	5	5	5	5	4	5	4	4	4	5
84	2	2	1	4	5	6	6	6	6	6	6	6	6	6	6	5	6	6	5	5	5	6	6	6
85	2	2	4	2	5	5	4	4	5	5	5	6	5	4	5	5	1	5	5	5	4	6	6	6
86	2	2	3	2	4	4	3	4	4	4	5	5	5	5	4	4	4	5	4	4	4	4	5	4
87	2	2	4	2	3	3	3	4	5	4	4	6	5	4	4	4	4	5	5	4	4	5	5	4
88	2	2	4	2	5	4	3	4	6	5	4	5	4	5	5	4	5	5	4	4	3	4	4	5
89	2	1	4	3	3	3	3	4	2	3	2	2	3	2	2	2	3	2	2	2	3	2	2	3
90	2	2	4	1	5	4	5	5	5	5	5	4	4	4	5	5	5	5	4	5	4	4	4	5
91	2	2	2	3	4	4	4	5	4	4	3	3	3	3	2	2	2	2	2	2	2	3	2	3
92	2	1	4	2	4	5	4	5	5	4	4	4	5	5	4	5	4	5	5	4	4	4	5	4
93	2	1	3	3	3	3	3	4	5	4	4	5	5	4	4	4	4	5	5	4	4	5	5	4
94	2	1	1	2	3	3	3	3	5	4	5	4	4	5	4	4	4	4	5	4	5	4	5	6
95	2	1	3	3	5	5	4	4	5	5	5	4	5	6	6	6	6	6	6	5	5	6	6	6
96	2	1	3	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6
97	2	1	1	3	5	5	3	4	6	5	4	4	4	5	5	4	5	5	4	4	3	4	4	5
98	2	2	2	2	4	3	3	4	5	5	5	5	5	5	4	4	5	4	5	5	5	4	4	5
99	2	2	2	1	4	4	3	3	5	5	4	4	4	4	4	4	5	5	4	4	5	4	5	4
100	2	1	3	2	4	4	3	4	4	4	5	4	5	5	4	4	4	5	4	4	4	4	5	4

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ID	B1.1	B1.2	B1.3	B1.4	B1.5	B1.6	B2.1	B2.2	B2.3	B2.4	C1.1	C1.2	C1.3	C2.1	C2.2	C2.3
81	3	2	2	3	2	2	2	2	3	2	2	3	2	3	2	2
82	3	2	2	3	2	2	2	2	3	2	2	3	2	3	2	2
83	3	2	2	2	2	3	2	3	3	2	2	2	3	2	3	2
84	5	4	5	4	5	5	5	4	6	6	5	4	6	6	6	6
85	4	4	4	5	5	4	4	5	4	5	3	3	3	6	6	6
86	4	3	3	2	2	3	2	3	2	2	2	2	3	3	2	2
87	3	2	2	3	2	2	2	2	3	2	3	2	2	2	3	2
88	3	3	2	3	2	2	3	2	2	2	3	2	2	2	2	2
89	5	4	4	5	5	4	5	4	4	5	4	4	5	5	4	4
90	3	2	2	2	2	3	2	3	3	2	2	2	3	2	3	2
91	4	5	4	4	4	5	4	4	5	5	4	5	4	5	4	5
92	3	2	3	2	3	2	3	2	2	3	3	2	3	2	2	2
93	3	2	2	3	2	2	2	2	3	2	3	2	2	2	3	2
94	3	2	2	3	2	2	2	2	3	2	2	3	2	3	2	2
95	4	5	5	5	5	6	6	5	6	5	5	4	5	5	5	5
96	5	5	5	5	4	5	5	5	4	5	5	6	4	5	4	5
97	3	3	2	3	2	2	3	2	2	2	3	2	2	2	2	2
98	2	2	2	2	3	2	2	3	3	2	2	2	3	3	2	3
99	4	2	2	3	2	2	3	2	3	2	3	3	2	3	2	2
100	4	3	3	2	2	3	2	3	2	2	2	2	3	3	2	2

- **SMS Verification services B1.1-B1.6** : Ease of use (EOU); **B2.1-B2.4** : Confidence with skill; C**1.1-C1.3** = Usefulness; **C2.1-C2.3** = satisfaction , with options: 1= strongly disagree; 2= disagree; 3= somewhat disagree; 4= Somewhat agree; 5= agree and 6= Strongly agree