Mobile Instant Messaging and User Interface Design - Different Age Groups, Different Requirements?

A survey of Indonesian users

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Abstract—**Instant Messaging (IM) is an increasingly popular form of communication in which two or more people exchange text-based multi-media messages in real time. However, as a result of aging, users have different needs and requirements towards the design of the communication application. This paper examines the preferences of users of different ages towards the User Interface (UI) design of Mobile Instant Massage (MIM) applications, i.e., instant message applications that can operate on smartphones. An online survey data about users' preferences towards the UI of this application type, limited to Indonesian users, was obtained. The results indicate that for some UI elements, both age groups showed the same preferences, while other requirements were significantly different. This paper aims to give a better understanding of the interface of the MIM application preferred by its users according to their age and thus inform application designers and product owners.**

Keywords: application requirements; usbality; user interface; age-based requirements; socially-aware information systems.

I. INTRODUCTION

With more than 3.5 billion smartphone users worldwide, their considerable proportion is constituted of so-called non-generic users such as children, older people and users with impairments. Hence, many applications and devices that are designed to cater to these users already exist. User Interface (UI) design is one of the most important aspects when developing a mobile device application, as the success of an application mainly relies on its usability and User eXperience (UX).

Instant Messaging (IM) can be seen as one of the first manifestations of digital communication technologies, which can reasonably be used as a substitute for real-life human interaction [1]. Being a text-based form of communication between two or more people exchanging text messages in real time, it can also provide asynchronous communication. Increasingly, it can be enriched with other forms of media such as pictures, videos, or audio files. For interpersonal exchanges, using instant messaging apps is associated with decreased feelings of loneliness for both young adults [2] and older users [3][4].

However, as a result of aging, adults have different needs and requirements for the design of communication applications compared with young people [5][6]. Current IM applications often design interfaces according to the needs of young people [7]. Based on these observations, this paper examines the user preferences of different age groups towards the User Interface (UI) design of Mobile Instant Massage (MIM) applications, i.e., instant message applications that can operate on smartphones.

An online survey was conducted. The user preferences analyzed in this paper will focus on two interfaces of the MIM application, namely, the message list and the messaging interface. The survey was distributed to Indonesian users. Sespiani and Ernungtyas [4] outlined a technological gap in Indonesia between age groups, as well as the difficulty in adapting to novel technologies for elderly Indonesian users. The results of the online survey indicate that for some UI elements, both age groups showed the same preferences, while other requirements were significantly different. This short paper aims to provide a better understanding of the interface of MIM applications preferred by its users, specifically Indonesian users. These insights are useful for designers, developers, and product managers of mobile messaging applications.

The paper is structured as follows: First, the current research on age-related UI preferences is described in section 2. The research method and results of the online survey are presented in sections 3 and 4 respectively. A discussion of the findings and further research directions are outlined in section 5.

II. STATE OF THE ART

IM is an internet service that allows users to communicate via text-based short massages directly in real time [8], while also allowing for asynchronous communication. In addition, IM allows users to share all types of messages, including video, sound, streaming content, web links, documents, and images [8][9]. The interface of IM is therefore focused on creating messages and displaying received massage, i.e., messaging and message list interface. A messaging interface is a UI where messages can be created and sent, as well as read and a voice over IP call can be associated.

The message list interface, mentioned as the main section of the IM application by Caro-Álvaro et al. [10], is where the feature chat management takes place. Furthermore, here

received messages can be displayed, new messages can be created, individual or group messages can be pinned, among other functionalities. Given the focus on short, informal, unlimited, one-to many and many-to-many chat modes [9], as well as the charge-free [11] communication mode, IM applications are widely spread among smart phone users.

With the increase of user requirements and usage of mobile devices the number of UI guidelines also increases. Differences in UI requirements between different age groups have been abundantly discussed in research, e.g., in [12], [13]. Older users have been shown to exhibit difficulty understanding a series of tasks or actions in application menus designed for mobile applications [5]. Age-related aspects also lead to different UI interactions between the age groups [6]. Krayz et al. [7] showed UI mostly focuses specifically on the needs and recommendations of younger users to attract them. Hence, users frustrated with technology or who have difficulty learning technology will not be able to interact richly with the MIM application, thus often becoming dissatisfied with these applications [14].

Several age- related issues with UI design, as well as the potential solutions have been already discussed in research. Faisal et al. [15] show that the button design for mobile phones is unsuitable for the elderly, i.e. the buttons in the UI are too small. Similarly, many older users consider the positioning of the letters on the mobile keyboard as too dense, which exhibits a high error rate for text input [5]. Research by Kiat and Chen [9] shows that elderly users found the icons confusing and hard to identify. However, the choice of icons is not trivial as users from different demographics and cultures may interpret the same icon differently. The authors also state that that some older users have issues understanding the flow of existing MIM applications. Ahmad et al. [16] state that if it is confusing for older people to use the app, i.e., the application provides too many features, they become reluctant to use it.

Following these research insights, this paper explores the requirements for MIM messaging interface between different age groups using an online survey distributed among Indonesian users.

III. RESEARCH METHOD

In developing countries, such as Indonesia, older population is experiencing technological leaps [3]. As the average welfare increases, the availability of better infrastructure and increasingly affordable technology for people in Indonesia is also rising. Even though digital technology has become increasingly affordable, elder users in Indonesia have experienced a wide technological gap [4]. Due to a lack of skills and knowledge of technology, the motivation of older users to grapple with the understanding of IT is moderate. Thus, a further gap in technology understanding and user competence between older and younger generations is persistent [3].

Hence, the research question here is: What are the preferences of the younger users, those aged 20-30 years, and older users, those aged 50-60 years, toward the message list interface of an IM application? Specifically, to:

a. create a new message,
b. mark an individual or group message, and
c. see online-status information.

To answer this question, an online survey was created based on the results of usability research and recommendations described above. The survey included text-based questions, as well as A/B-test images to better understand the usability requirements. The online survey was designed using Google Forms and consists of four sections. The first section surveys for the demographics of the respondents. Also, some geographical data such as place of residence was gathered, as MIM preferences often depend on the region [11]. The second section collects the experience of the respondents on using the MIM applications.

The last two sections of the survey consist of questions that could summarize the respondent's preferences for the UI of MIM applications. Thus, they have three subsections that address each subitem of the research question. The first subsection collects the requirements for the preference for the button to create a new message (see Figure 1). Two types of floating action buttons were suggested (buttons A and B), as well as button C following the suggestion by Barros et al. [17], to add text on an icon button to increase the understanding of users towards the function of the feature.
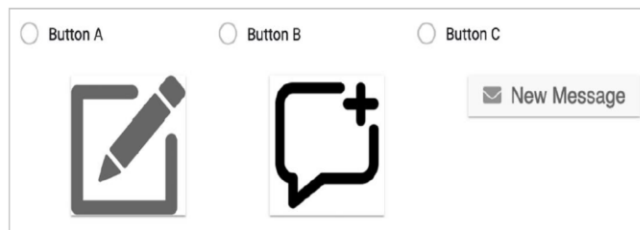

Figure 1. Selection of "create new message" buttons

Then, the respondents are asked to choose an icon to pin or mark an individual or group message as a favorite. The first option is a pin icon, according to the function "pin a message," the second option is a star icon. The last option is the bookmark icon.

Finally, the requirements regarding the message list interface are surveyed. The focus is to find the respondents' preferences in viewing the online status of their contacts. Ogar et al. [14] stated that viewing the online status of the user's contacts is a concept of social presence.

First, the importance of the online status visibility is questioned. Then, the respondents are asked whether they would like to have the contact's online status available on the message list interface. This question collects the responses through a 5-point Likert scale, ranging from "strongly dislike" to "strongly like". Next, the participants are asked about how helpful it was to see people's online status on the message list interface (Figure 2).
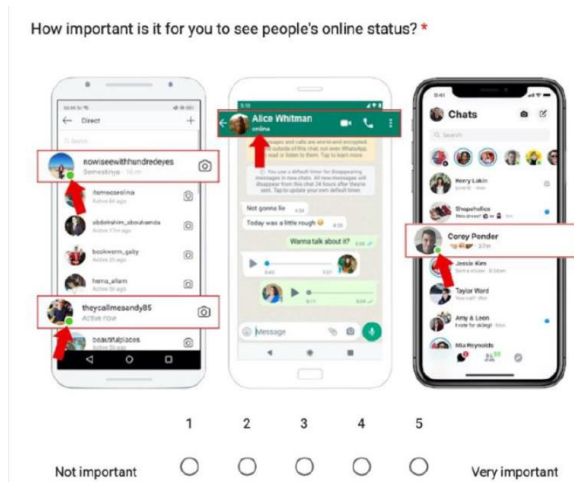
Figure 2.   Overview of potential message interfaces for MIM

The different possibilities of the indication of the online status are visible in Figure 2. The left and right screen show the status in the message overview, while the screen in the middle provides the status information in the dedicated chat.

IV.   RESULTS

A total of 150 Indonesian MIM users participate in the online survey. Among the respondents, 75 users are aged 20-30 years old (group A) and 75 users are in the age group of 50 and 60 years old (group B). From the results obtained, 66 respondents identified themselves as male, and 84 as female. The countries where the respondents live vary, although the majority (112 out of 150 respondents) live in Indonesia. Others live in Germany, Australia, United States of America, and Canada. Regarding the type of the operation system on their mobile device used by respondents, 72 respondents use Android and 78 use iOS- based devices.

A total of 149 survey participants stated that they use WhatsApp as their MIM. The second most used application by the respondents is Line, with 29 people, 25 respondents used Telegram, and 20 people used Facebook Messenger to communicate. When asked how self-explanatory the features in the MIM were, most of the features were rated as self-explanatory (see Figure 3).
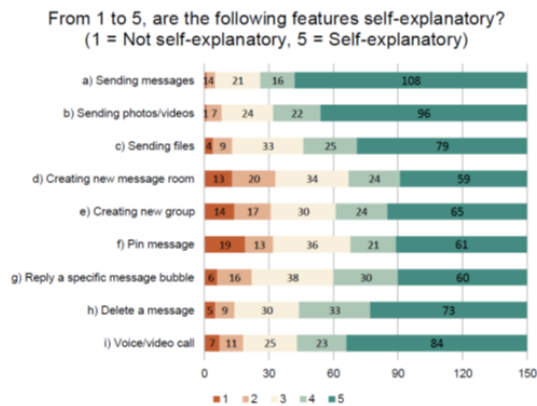

Figure 3.   Understanding of the MIM features

Hence, the most self-explanatory feature is sending messages, while the feature that is the least self-explanatory is "pin messages".

When asked to rate the need for a user manual on a scale from 1 "not at all" to 5 "very much needed", the responses of different age groups varied significantly. With an average 2.44 for older users (group B) an average of 1.70 for young users (group A), group B was more likely to have an additional explanation of the application and its functions.

To assess UI preferences a 5 point Likert scale was used with 1= "very dissatisfied" to 5 = "very satisfied" with a specific feature or option. The position of the floating button on the top bar of the MIM application to create new messages was equally satisfactory for both age groups. Group A showed an average satisfaction of 3.96 and group B of 3.92. Significant differences between the button preferences for the function "create new message" (see Figure 1) were also visible: group B prefers button B, with an average of 2.01, while group A (younger users) are not clear for the preference between button A or B with an average of 1.75.

In addition, for the function of marking the message as favorite, group B preferred the start, while group A preferred a pin. Both age groups have similar preferences for the visibility of the online status of their contacts, with the average importance rated as 3.24 for younger users and 3.45 for older users.

Nevertheless, the importance of where the online status of contacts is displayed differs among age groups. The visibility of the online status in the message list is significantly more important for older users (group B) with an average importance of 3.52 than for younger users, with an average of 3.04.

Both age groups find it equally helpful to see online status in the message list interface, with an average of 3.55 (group A) and 3.63 (group B).

V.   CONCLUSION

This research analyzed the UI requirements for MIM applications depending on the age of the users. An online survey was conducted, with 150 responses to answer the question about the preferences of the younger users and older users toward the message list interface of an IM application. The analysis of the results showed that for some UI elements, both age groups had the same preferences, while other features were met with different preferences.

Regarding the preferences for the button to create a new message in the message list interface, younger and older users preferred the button at the top bar over the floating action button. Each age group had different opinions on the type of button used for this feature. Button A was equally preferred by both age groups, while button B (chat bubble) and button C (text marker) were more preferred by younger and older users respectively. In terms of the function of marking a message as favorite, both age groups prefer to place the option to do that besides the swiped chat. However, each age group has a different icon choice that suits them better. Younger users like the pin icon better, whereas older users find the star icon more suitable. Finally, regarding

seeing people's online status in the message list interface, more of the older users liked and found it helpful to have the online status in the message interface.

This analysis provided some insights into the usability factors that can help design user-friendly and efficient user interfaces for MIM in different age groups. These insights can be used by product owners and application developers to adopt their products to the aging population and minimize the inconveniences experienced by older users.

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