

Analysis of the Preferences of Younger and Older Indonesian Users Towards the User Interface of Mobile Instant Messaging Applications

Bachelor Thesis

to obtain the degree of Bachelor of Science
in Business and Information Systems Engineering
from the Department of Economics
at Brandenburg University of Applied Sciences

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Brandenburg an der Havel
6 November 2022

Abstract

In recent years, the messaging application has been Indonesia's most widely used mobile app. The number of users of these instant messaging (IM) applications has also been increasing constantly. Unfortunately, research has mentioned that older users often face challenges in using them. Although some papers have created guidelines for designing interfaces for the elderly, these applications are still focused on developing according to the need of young people. In addition, the aging of adults increases their chances of facing some difficulties. Therefore, this thesis aims to give a better understanding of the interface of the mobile instant messaging (MIM) application preferred by its users, specifically Indonesian users. By distributing an online-based survey to 150 Indonesian users of the MIM application, the preferences of several features in the message list and messaging interface of this application are collected. Then, the statistical analysis of the results found that the preferences of both users' age groups differ. Among them are the button or icon each age group finds more suitable, the bottom bar in the messaging interface, and the placement of action options to be performed to the message they prefer most. Thus, this research also presents design recommendations that both younger and older users prefer.

Keywords: Preference, Mobile Instant Messaging, User Interface, Indonesian user, Younger user, Older user

Kurzfassung

In den letzten Jahren war die Messaging-Anwendung die in Indonesien am häufigsten verwendete mobile Anwendung. Auch die Zahl der Nutzer dieser Instant Messaging (IM)-Anwendungen ist ständig gestiegen. Leider wurde in der Forschung festgestellt, dass ältere Nutzer oft Probleme bei der Nutzung dieser Anwendungen haben. Obwohl in einigen Arbeiten Richtlinien für die Gestaltung von Schnittstellen für ältere Menschen erstellt wurden, konzentrieren sich diese Anwendungen immer noch auf die Entwicklung für junge Menschen. Außerdem steigt mit dem Altern der Erwachsenen die Wahrscheinlichkeit, dass sie mit einigen Schwierigkeiten konfrontiert werden. Daher hat diese Arbeit zum Ziel, ein besseres Verständnis der Benutzeroberfläche einer mobilen Instant-Messaging (MIM) Applikation zu schaffen, die von ihren Nutzern, insbesondere indonesischen Nutzern, bevorzugt wird. Durch die Verteilung einer online-basierten Umfrage an 150 indonesische Nutzer der MIM-Applikation werden die Präferenzen verschiedener Funktionen der Nachrichtenlisten- und Nachrichten-Benutzeroberfläche dieser Applikation erhoben. Die statistische Analyse der Ergebnisse zeigt, dass sich die Präferenzen der beiden Altersgruppen der Nutzer unterscheiden. Dazu gehören die Schaltfläche oder das Icon, das jede Altersgruppe für geeigneter hält, die untere Leiste in der Nachrichten-Benutzeroberfläche und die Platzierung der Aktionsoptionen, die für die Nachricht ausgeführt werden können, die sie am meisten bevorzugen. Daher werden in dieser Untersuchung auch Gestaltungsempfehlungen vorgestellt, die sowohl von jüngeren als auch von älteren Nutzern bevorzugt werden.

Keywords: Präferenz, Mobile Instant Messaging, Benutzeroberfläche, indonesische Nutzer, jüngere Nutzer, ältere Nutzer

Table of Contents

Abstract	II
Kurzfassung	III
List of Figures	VI
List of Tables.....	VIII
List of Abbreviations.....	IX
1 Introduction.....	1
1.1 Aim of the Thesis.....	3
1.2 Research Questions.....	3
1.3 Structure of the Thesis	4
2 Theoretical Background	5
2.1 Mobile Instant Messaging (MIM).....	5
2.2 Literature Review.....	7
2.3 Hypothesis	16
3 Methodology	17
4 Results and Analysis	25
4.1 Demographic Data of the Respondents	25
4.2 Overview of the MIM Application Usage of the Respondents.....	26
4.3 Preferences Towards the Message List Interface.....	28
4.3.1 Preference for the Button to Create a New Message	28
4.3.2 Preference for Marking the Individual or Group Message	31
4.3.3 Preference for Seeing People’s Online Status.....	34
4.4 Preferences Towards the Messaging Interface.....	38
4.4.1 Preference for sending photos, attachments, etc.....	38
4.4.2 Preference for seeing people’s profile pictures	41
4.4.3 Preference for performing actions to the message	44
5 Conclusion	48

Bibliography	50
List of Appendices	53
Appendix	54
Declaration of Authorship	65

List of Figures

Figure 1: Messaging Interface.....	6
Figure 2: Message List Interface	7
Figure 3: Question on how self-explanatory the features are	18
Figure 4: Floating action button.....	19
Figure 5: Button located at the top bar.....	20
Figure 6: “New Message” Button options.....	20
Figure 7: Question on how important to see people’s online status	21
Figure 8: Question asking the rank of different bottom bar interfaces from least to most preferred	23
Figure 9: Question asking the rank of different placements of action options from least to most preferred.....	24
Figure 10: Country the respondents currently living in	25
Figure 11: How self-explanatory the features are.....	27
Figure 12: Satisfaction level of the respondents towards the floating action button and button located at the top bar	29
Figure 13: Results on which button suit better as the “New Message” button .	31
Figure 14: Results on which icon suits better to mark an individual or group message as a favorite	34
Figure 15: How the respondents like to see people’s online status in the message list interface	36
Figure 16: How helpful for the respondents to see people’s online status in the message list interface	37
Figure 17: Number of respondents who chose each bottom bar interface option as their least, neutral, or most preferred	38
Figure 18: How necessary for the respondents need to be notified if you have sent the photo, video, or attachment before.....	41
Figure 19: How important is it for the respondents to be able to see people’s profile pictures	42
Figure 20: How often fo the respondents look at people’s profile pictures	43
Figure 21: How often do the respondents perform an action to the message..	44

Figure 22: Number of respondents who voted for each action placement option as their least, neutral, or most preferred	45
Figure 23: The opinion of respondents if they can edit the messages they have sent	47

List of Tables

Table 1: Weighted average score of each feature.....	28
Table 2: Difference between the satisfaction level of younger and older users on the button placements to create a new message.....	30
Table 3: Number of respondents that use and do not use the feature to mark an individual or group message as a favorite	32
Table 4: Option that the respondents find easier to mark an individual or group message as a favorite	33
Table 5: Likert scale point that the respondents choose for how important to see people's online status	35
Table 6: Number of younger and older users who voted each bottom bar interface option as their least, neutral, or most preferred.....	39
Table 7: Number of younger and older users who voted for each action placement option as their least, neutral, or most preferred.....	46

List of Abbreviations

IM Instant Messaging

MIM Mobile Instant Messaging

UI User Interface

1 Introduction

Technology has become a part of the daily life of many people in this digital era. To have at least a technology device and carry a smartphone wherever people go has become normal nowadays. The development of smartphones and their features that keep getting more advanced made even more people interested in using them. Based on the statistic from Statista (2021a; 2021b), the number of smartphone users in Indonesia has been increasing each year. In 2020, there were around 183,68 million smartphone users in Indonesia, accounting for about 67,15 percent of its total population. Later the number is predicted to reach 238,79 million users in 2026, accounting for 82,45 percent of the inhabitants in that year.

With the rise in the number of smartphone users, it is clear that the mobile application market will also thrive. One of the differences between smartphones and other mobile phones is that smartphones can download mobile applications. Therefore, it is very likely to have each smartphone user downloads at least one smartphone application. Referring to the “Digital 2021: Indonesia” report by DataReportal (2021), the most widely used mobile application in Indonesia is the messaging application. The broad survey has found that 96.5 percent of internet users in Indonesia aged 16 to 64 use this application monthly.

Messaging application, also known as an instant messaging application, is a platform used by people to help them communicate with others in real-time over the internet. Some examples of IM applications are WhatsApp, Facebook Messenger, Line, and Telegram. In Indonesia, the current IM application with the most active users monthly is WhatsApp. For the past years, the percentage of internet users in Indonesia that use this platform monthly has been consistently increasing. Comparing Q3 of 2019, 2020, and 2021 the existing data shows a rise from 84 to 87.7 percent and then to 88.7 percent (DataReportal, 2020; 2021; 2022). It proves that the enthusiasm of Indonesian internet users towards one of the leading IM applications is very positive.

Mostly, IM applications have a UI as the interface between the user and the system. Each of these applications has a unique interface design that differentiates them from other applications. It can depend on what features will be available in the app and who the target group is.

Based on the data mentioned previously, internet users who use IM applications have a wide age range. From teenagers around 16 years old to seniors aged 64 years or more even use this platform (DataReportal, 2021). Each of the different age groups will have distinct preferences for the UI of an application. One reason is the difference in priority when using it. For example, young users pay more attention to the aesthetic and minimalist design of the application than the elderly do. On the other hand, older users prioritize easy and understandable applications (Reid, Abdulrazak, and Alas, 2017).

Unfortunately, available IM applications in the market often develop their designs according to the needs of young people. Therefore, it causes older people often face various challenges and difficulties while using the application. Some of the things they often experience among them are UI with too small font and button sizes, many complex features, and complicated navigation.

In addition, the aging of adults increases their chances of facing these difficulties. Dodd, Athauda, and Adam (2017) have summarized the three main problems. The first is declining physical conditions, such as visual impairment, haptic deterioration, and reduced hearing. These deficiencies cause an increase in the number of errors that occur and the time to accomplish a task. Next is related to the user's computer background. Older people have lower experience and acceptance of technological innovations than younger people. It makes them unfamiliar with the interface, limited in their understanding of the processes, and unintuitive in the functions of complex controls. As a result, simple tasks become difficult to do. Lastly, deteriorating cognitive abilities such as attention, working memory, and long-term memory make it difficult for users to remember the chain of steps and actions taken to complete the task.

Sespiani and Ernungtyas (2022) mentioned that for decades parents in Indonesia have experienced a wide technological gap, and it is often difficult for them to adapt to technologies. Along with the previous problems, the elderly's ability to communicate with others will become more limited. Then if this continues to happen continuously, they will face a common problem in their age range, namely loneliness (Restyandito et al., 2020).

In most cases, children will leave their parent's house, either because they have a new family already or are busy with their work. Then when their partner has passed away, these seniors will live alone. Therefore, communicating using their smartphone with friends or family, especially those who are far away, is one of the solutions to avoid loneliness. Sadly, it is not as easy as it sounds because parents often face problems that make them hard to connect with their close ones. In the past years, some papers have already created guidelines for

designing interfaces for the elderly. But there are still many available UIs that only focus on the needs of young people (Krayz Allah, Ismail, and Almgerbi, 2021). Based on these backgrounds, this thesis will examine the different preferences of younger and older users towards the UI of MIM applications. In particular, it is limited to IM applications that can operate on smartphones or so-called MIM applications. With the survey tool offered by Google, namely Google Forms, quantitative data about users' preferences towards the UI of this application, limited to Indonesian users, can be obtained. In this thesis, younger users are restricted to ages between 20 and 30, while older users are those between 50 and 60 years old. Then, the preferences analyzed in this thesis will only focus on two interfaces of the MIM application, namely the message list and the messaging interface.

1.1 Aim of the Thesis

This thesis aims to give a better understanding of the interface of the MIM application preferred by its users, specifically Indonesian users. The differences in preferences by younger and older users towards the UI of MIM applications are aimed primarily at designers, developers, and anyone who wants to create or is developing a MIM application. They can take advantage of this study to help them design a MIM application with UIs that not only meets the needs of young people but can also adjust to the needs of adults. With the MIM application that can meet the needs of these two age groups and adapt to the limited capabilities of adults, the number of users and those who are satisfied with the app will increase. In addition, parents can also use this application with minimal problems and difficulties encountered. Hence, they can communicate regularly with their closest ones easily and won't feel lonely anymore.

1.2 Research Questions

To achieve the objectives presented above, the two mainly used UI of MIM applications, namely the message list and message interface, will be analyzed how the preferences of younger and older users. Then, this paper focuses its analysis only on a few points for each interface. Therefore, the research questions have been formulated as follows.

RQ1 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.

RQ2 What are the preferences of the younger users, those aged 20-30 years, and older users, those aged 50-60 years, toward the messaging interface of an IM application?

Specifically, to:

- a. send photos, attachments, etc.,
- b. see profile picture, and
- c. perform actions to the message.

1.3 Structure of the Thesis

The thesis is organized as follows. After the introduction in Section 1, Section 2 summarizes the theoretical background of the topic, including a literature review of previous research and the hypothesis of this research. Section 3 introduces the survey used to collect the preferences of younger and older users toward the MIM application interfaces. Then, Section 4 presents the results and analysis of the users' preferences. Finally, the conclusion and future work are presented in Section 5.

2 Theoretical Background

2.1 Mobile Instant Messaging (MIM)

In the beginning, humans communicated with each other only face-to-face. Then it developed from writing letters to sending SMS messages using one of the technological innovations, namely cell phones. Nowadays, people use one of the newest and fastest-growing forms of communication, Instant Messenger (Bhullar, Dhablania, and Viridi, 2018). Although communication that usually occurs via SMS will continue to change to instant messaging applications, this will not replace SMS completely but can increase the number of people communicating with each other.

IM is an internet service that allows users to communicate with one another directly in real-time (Bridgewater and Cole, 2009). It connects people regardless of where they are in the world. Not just connecting people one on one, this kind of application also allows people to speak to multiple people in a virtual conference, share ideas and get conclusions (Bhullar, Dhablania, and Viridi, 2018). By using their mobile data plan or Wi-Fi, people can use an IM application to talk to their families, friends, and co-workers, even make new friends and join an engaging discussion or chat room through the internet with almost no cost (Ogara, Koh, and Prybutok, 2014; Bhullar, Dhablania, and Viridi, 2018). All age groups, to varying degrees, currently use IM. Its usage continues to increase across the board (Bridgewater and Cole, 2009).

One clear difference between IM and SMS is that the users can see which of their contacts are online and available to communicate. It is a feature of the IM application that allows users to view the presence and status of their communication partners (Bhullar, Dhablania, and Viridi, 2018). The IM application performs, of course, for people to be able to send text messages to each other. But besides that, IM allows users to share all types of messages, including video, sound, streaming content, web links, documents, and images (Bridgewater and Cole, 2009). Among them, at least users should be able to send text messages, voice notes, and pictures (Kiat and Chen, 2015). Then besides sending text

messages, the type of messages that the users found most important was sharing photos and videos (Bhullar, Dhablania, and Virdi, 2018).

Caro-Álvaro et al. (2021) mention the top 2 IM features that should be available are message exchange and chat management. Message exchange is a fundamental feature of this application. It includes sending, reading, replying, and deleting messages. While the feature chat management should cover listing the active chats, the possibility of deleting them and creating a new message room. The interface where the two main features take place is the messaging and message list interface. The message exchange feature performs in the messaging interface, or Bridgewater and Cole (2009) mentioned it as the chat window. A messaging interface is a UI where you can send your messages to others, read other people's messages, and initiate a call. The message list interface, mentioned as the main section of the IM application by Caro-Álvaro et al. (2021), is where the feature chat management takes place. Furthermore, it is an interface where you can see whoever you have sent messages to, create a new message, pin an individual or group message, delete a message, and click on a chat to send a message to the person.

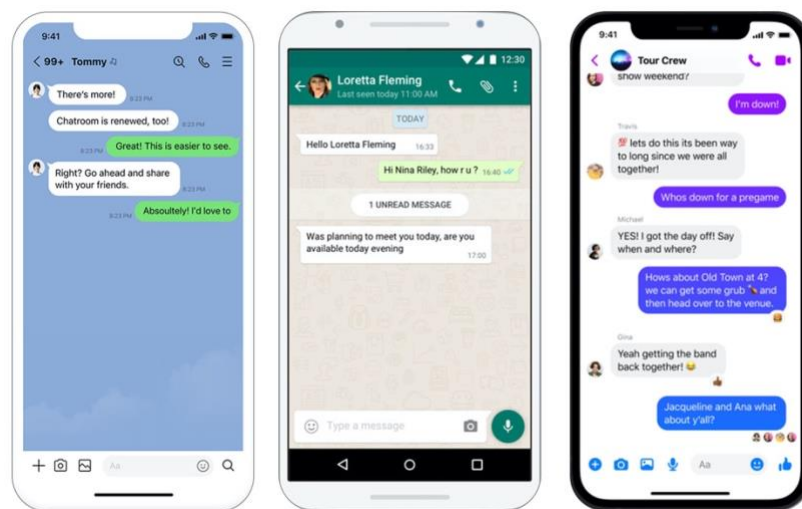


Figure 1: Messaging Interface



Figure 2: Message List Interface

When people use the term IM application, they refer to an application that people may have used on smartphones, tablets, or computers. Its usage is not limited to only a type of technology. While the term MIM is a more specific term for IM applications that only performs on mobile devices, as the first letter represents mobile. The features of a MIM application are generally the same as those of an IM application. The main difference is the display size of the screen, so the placement of elements in the application will also look different. Even so, people can use almost all existing IM applications on mobile devices, so people often get mixed up with these two terms.

2.2 Literature Review

With the spread of the internet, smartphones, and text messaging to the public, MIM applications have grown very well. People have also gotten used to communicating in writing and verbally with their friends or a group of people using their mobile devices. Wang (2019) stated one of the reasons for the rise in popularity of these applications is the low- or no-cost alternatives to texting. Another study also mentioned other factors that cause people to switch from traditional SMS to MIM. Those are cost savings, the ability to group chat, and unlimited text messaging (Kiat and Chen, 2015).

Until now, there are many MIM applications available in the global world. However, human preferences for MIM applications used may differ in each region (Wang, 2019). The MIM application that dominates the current global market is WhatsApp. Some countries that use the application the most are Germany, the United Kingdom, Russia, India, and Indonesia. While in America, Canada, and

Australia, Facebook Messenger is the most popular application. On the other hand, Telegram has become the top application in 8 countries, including Kazakhstan, Cambodia, and Belarus. Then in Asia, especially in Taiwan and Japan, Line occupied the most preferred MIM application (Dallal, 2022).

Research from Bhullar, Dhablania, and Viridi (2018), based on a survey conducted on 200 students in Punjab, a state in India, found that the factor that increases user satisfaction towards MIM application most is the ability of this application to create and maintain social groups. Another study (Ogara, Koh, and Prybutok, 2014) that supports this statement states that the current IM application design with the capability to communicate in real-time helps build an atmosphere for users to communicate, interact and socialize. It allows users to find out information about their communication partners or contacts, such as status (for example, online, available, busy, or in a meeting), activities, location, etc., in real-time, thus helping users to determine the best method of communicating with them and increasing organizational responsiveness. That is the concept of social presence or presence awareness, mentioned in the book by Bridgewater and Cole (2009), which lies at the heart of IM.

However, users frustrated with technology or who have difficulty learning technology will not be able to interact richly with the MIM application and their communication partners, thus often becoming dissatisfied with these applications (Ogara, Koh, and Prybutok, 2014). They have concluded in their study that user satisfaction depends on the user's experience with the technology, the ability to maximize the technology, and the influence of their social environment. Therefore, they suggested that application designers consider variables that can lower the learning curve and enhance social presence in these applications. As a result, users can maximize the use of the available features, and the level of interactivity can increase. Then when these users become motivated to use communication applications such as MIM, they will encourage their friends to use them too and could help each other when difficulties or problems occur (Kiat and Chen, 2015).

Unfortunately, the IM application is still an application with the widest gap between the number of younger and older users among other applications, where it is predominately younger users (Arambepola and Munasinghe, 2020). In contrast, weather applications are used more by the elderly than the younger ones. Therefore, this study suggests designing a different IM application UI for younger and older so that older people can be more familiar with how it looks. As a result, users will experience a more user-friendly interface and an efficient mobile application.

Many studies have studied the possible causes of the wide gap between the number of younger and older users. First, due to the effects of aging, the elderly face extra challenges in interacting with mobile app interfaces compared to younger people (Chang, Zahari, and Chew, 2018). Most studies divide them into three general challenges related to physical issues, cognitive issues, and computer experiences (Yusof, Romli and Yusof, 2014; Dodd, Athauda, and Adam, 2017; Chirayus and Nanthaamornphong, 2019; Sespiani and Ernungtyas, 2022).

Physical issues appear when someone's physical conditions deteriorate, like visual impairment, haptic deterioration, and reduced hearing (Dodd, Athauda, and Adam, 2017; Chang, Zahari, and Chew, 2018). Examples of impaired eyesight are a high level of sensitivity to light and difficulty distinguishing colors (Kiat and Chen 2015; Sespiani and Ernungtyas, 2022). Next, haptic deterioration is the loss of fine motor skills, which becomes an issue for people when interacting with a mouse, keyboard, or touch device (Dodd, Athauda, and Adam, 2017). It also results in difficulty performing hand gestures such as taps, drags, and pinch, so the number of errors that occur on tasks like double-clicking or dragging increases (Dodd, Athauda, and Adam, 2017; Chang, Zahari, and Chew, 2018). Lastly, the ability of parents to listen is limited, so when in a crowded situation, it is difficult for them to catch the sound of the smartphone ringtone (Yusof, Romli and Yusof, 2014).

Next, what is meant by a decline in cognitive abilities as the age increase is limited attention, working memory, and long-term memory (Dodd, Athauda, and Adam, 2017; Sespiani and Ernungtyas, 2022). It makes users render difficulties in optimizing the utility of digital devices primarily designed for younger adults who have not yet experienced these problems (Sespiani and Ernungtyas, 2022). Dodd, Athauda, and Adam (2017) explain that dividing attention into several tasks or sources of information at once for aging people is difficult (Dodd, Athauda, and Adam, 2017). In addition, Krayz Allah, Ismail, and Almgerbi (2021) mentioned confusion, impaired judgments, and difficulties in learning new things as part of cognitive disability. Then Yusof, Romli and Yusof (2014) also stated a decrease in problem-solving, and Chang, Zahari, and Chew (2018) added that there was difficulty in processing information and coordinating mental activities.

Lastly, Dodd, Athauda, and Adam (2017) mention that although a lack of experience in using technology can occur in all age ranges, computer usage in the elderly is lower than in young people. Yusof, Romli and Yusof (2014) said that the lack of experience would reduce the confidence level of parents to use mobile phones, thus limiting them in using the available functions. In addition, while younger users are generally familiar with the terms and interactions between

digital objects, older users who are unfamiliar with these concepts have been shown to exhibit great difficulty understanding a series of tasks or actions (Dodd, Athauda, and Adam, 2017). That is why they often search all layers to find what they want (Sespiani and Ernungtyas, 2022).

As a result of a lack of computer experience, parents are less likely to understand what information systems do, especially if there is no explicit feedback or confirmation (Dodd, Athauda, and Adam, 2017). For instance, when an inexperienced user submits a form on a webpage and the system redirects them to the home page without any feedback, they find it as if the system has deleted their entries. Then Dodd, Athauda, and Adam (2017) also mentioned input elements such as NumericUpDown and DateTimeInput can improve the experience for competent users, while parents or beginners rather have difficulty understanding these more complex controls.

Besides the problems caused by aging, Restyandito et al., 2020 explained that older people, especially in Indonesia, are also experiencing technological leaps. As people's welfare increases, the availability of better infrastructure and increasingly affordable technology, people in Indonesia, a developing country, can already have good access to the internet and sophisticated technology, whereas in the previous years before they may never have access to technologies (Restyandito and Kurniawan, 2017). Therefore, parents in Indonesia do not have enough experience to help them understand the existing technology today (Restyandito et al., 2020). Even though technology has become increasingly affordable, it is common knowledge that for centuries Indonesian parents have experienced a wide technological gap (Sespiani and Ernungtyas, 2022). It means that not everyone has the opportunity to access it due to a lack of skills and knowledge of technology, so they are unwilling to learn how to use it. In addition, because many parents in Indonesia do not have self-efficacy in using technology, this condition creates a further gap in technology between the older and younger generations (Restyandito et al., 2020).

Based on these problems, studies conclude that the elderly have different abilities from young people in accessing and using information communication technology, especially mobile phones (Yusof, Romli and Yusof, 2014; Sespiani and Ernungtyas, 2022). Arambepola and Munasinghe (2020) also concluded that there are different cognitive abilities between younger and older adults, where the elderly have lower cognitive skills to learn new things. Age-related changes in older people also lead to UI interactions that differ from those of the younger population (Chirayus and Nanthaamornphong, 2019). Therefore, it is clear that older users have vastly different requirements than younger users (Dodd, Athauda, and Adam, 2017). Reid, Abdulrazak, and Alas (2017) states the top

priority that seniors are looking for is an experience related to ease, whether it is easy to use, easy to understand, or an easy user guide, while one of the usability requirements they need less is aesthetic design.

Unfortunately, the current mobile phone design does not consider specific user age groups (Chirayus and Nanthaamornphong, 2019). Some UIs of smartphone applications that have the potential to help older people to stay connected also does not appeal to this group of users (Ahmad, Richardson, and Beecham, 2021). Lack of concern towards the usability of the elderly and studies on understanding the needs of older people causes the old ones always have problems in understanding and using the mobile phone (Yusof, Romli and Yusof, 2014). Chirayus and Nanthaamornphong (2019) also said that the existing UI designs do not consider the issues experienced by the elderly. Although the use of MIM has been expanding rapidly along with mobile technology, the current MIM applications have not sufficiently met the needs of elderly users (Kiat and Chen, 2015). Krayz Allah, Ismail, and Almgerbi (2021) also mentioned that the available UI only focuses on the needs and recommendations of youngsters to attract them, but designers neglect the needs of seniors. Therefore, many issues regarding the usage of mobile applications, including MIM applications, are experienced by older people.

The first issue relates to buttons. Yusof, Romli and Yusof (2014) mention that the button design for mobile phones is unsuitable for the elderly. As a concrete example, in an emergency that requires them to make a call, this becomes a crucial problem because the button is too small, causing them to push the wrong number. In addition, many elderly users consider the keyboard on a smartphone as an object with too dense buttons, which exhibits a high error rate for text input (Dodd, Athauda, and Adam, 2017). Therefore, good spacing between buttons is needed to ensure they click the right button. Next, a study by Kiat and Chen (2015) found that older users mentioned the buttons in the MIM application were too small on the touch-screen mobile phone. Because of that, they had problems identifying the correct button to perform a task in the application.

In addition, elderly users found the icons confusing and hard to identify (Kiat and Chen, 2015). For example, less experienced users will have difficulty identifying the icon representing the function to send photos and audio messages. The next issue is the texts with small font sizes (Teixeria et al., 2012; Yusof, Romli and Yusof, 2014; Kiat and Chen, 2015; Baharum et al., 2017). Yusof, Romli and Yusof (2014) explained that the small text size on a mobile phone causes the elderly hard to read it even using a corrective lens.

Then, too many features and confusing UI in communication services are also an issue for parents (Teixeria et al., 2012). Kiat and Chen (2015) stated that MIM

applications appear to have too many unnecessary features that confuse inexperienced elderly users and demotivate them from using the application. Ahmad, Richardson, and Beecham (2021) state that if it is confusing for older people to use the app, they become reluctant to use it.

As a result of the too many features, the menu on mobile phones and applications often becomes complex (Yusof, Romli and Yusof, 2014; Kiat and Chen, 2015). Therefore, it will cause older people to have some problems understanding the menu design (Yusof, Romli and Yusof, 2014). Kiat and Chen (2015) also mentioned that some older users have issues understanding the flow of existing MIM applications. These users consider the application flow unintuitive for navigating from one screen to another in the app. As an example of problematic application flow, older users had problems navigating from adding a new contact to creating a new chat. Further, the inconsistency of the interface design makes the elderly hardly remember the previous pages of the mobile application's interface (Baharum et al., 2017).

Based on the problems found, several studies have provided design recommendations for mobile applications, some specifically for MIM applications. Regarding size, many studies recommend making the font size and button larger (Chang, Zahari, and Chew, 2018; Ahmad, Richardson, and Beecham, 2021; Yusof, Romli and Yusof, 2014; Baharum et al., 2017). A larger size will make it easier for users to find contacts or options to do something (Ahmad, Richardson, and Beecham, 2021). Applying clear fonts in the application is also needed so that the elderly can easily read them (Baharum et al., 2017). Overall, Ahmad, Richardson, and Beecham (2021) recommend enlarging the size of the components used in the application for older people. Providing generous spacing between elements such as buttons is also a recommendation (Ahmad, Richardson, and Beecham, 2021; Chang, Zahari, and Chew, 2018; Barros, Leitão, and Ribeiro, 2013). Since the buttons on the smartphone keyboard are considered too dense for elderly users, Dodd, Athauda, and Adam (2017) suggest a voice input-to-text component to minimize the need for keyboard text input.

To improve the understanding of users towards the elements in the UI, Barros, Leitão, and Ribeiro (2013) suggest providing icons in addition to textual labels or text buttons. Based on their evaluation, older users prefer to tap the icon than the text on a button. Then icon placement and size must be increased optimally to make them higher readable (Baharum et al., 2017). In addition, avoid irrelevant icons and use the icons as minimum as possible so that the appearance achieves simplicity (Kiat and Chen, 2015; Sespiani and Ernungtyas, 2022). However, the choice of icons must be careful because users from different demographics and

cultures may interpret the same icon differently (Kiat and Chen, 2015). Therefore, choose culturally acceptable icons in the application (Ahmad, Richardson, and Beecham, 2021). These icons should also be intuitive so that it is easier to use for the elderly (Kiat and Chen, 2015).

Next, the language in the application must use simple wordings that suit the semantics field of the elderly (Barros, Leitão, and Ribeiro, 2013; Chang, Zahari, and Chew, 2018). The wordings should correspond to older people's vocabulary (Barros, Leitão, and Ribeiro, 2013). Furthermore, elderly users are often confused by long sentences in the application to explain the features. As a solution, make the explanation text as short as possible but still understandable (Dodd, Athauda, and Adam, 2017). Then the choice of words, including the terminology, needs to account for differences in educational and cultural backgrounds to be well received (Ahmad, Richardson, and Beecham, 2021; Barros, Leitão, and Ribeiro, 2013). To check them, Barros, Leitão, and Ribeiro (2013) suggest conducting further testing of the results with actual users in concrete scenarios. Next, Ahmad, Richardson, and Beecham (2021) recommend avoiding technical jargon in the application (Ahmad, Richardson, and Beecham, 2021). Minimizing jargon and substituting it with plain descriptive language also help the interface to be more intuitive for unfamiliar users (Dodd, Athauda, and Adam, 2017).

The recommendation to improve complex applications is eliminating unnecessary functions (Kiat and Chen, 2015; Baharum et al., 2017). Only incorporating the necessary features in the application and better organizing the interface by applying design principles grouping can make the interface look simpler (Kiat and Chen, 2015; Ahmad, Richardson, and Beecham, 2021). Providing fewer options for users to choose from along with its design and application flow that is easily understandable also makes it easier for them to remember the menu path (Chang, Zahari, and Chew, 2018). Baharum et al. (2017) stated that reducing the complexity of the application will lead users to focus more on the essential functions of the application. Besides that, reducing the functionality layer will also make the elderly increase their usability of the system. However, these key features must be easy to access (Caro-Álvaro et al., 2021).

One of the limiting factors of the elderly is color vision, where they cannot take much color in one application. Therefore, Baharum et al. (2017) suggest limiting the number of colors in one interface to increase the comfortability when using the application. The elderly facing visual problems also require a high color contrast between the elements in the application (Kiat and Chen, 2015; Ahmad, Richardson, and Beecham, 2021), such as between the background color and text color (Chang, Zahari, and Chew, 2018). In addition, pay attention to the

choice of color because the elderly have worse color discrimination towards cold colors than warm colors (Kiat and Chen, 2015). Therefore, avoid cold colors such as green and bluish-purple as it is hard for the elderly to tell them apart (Kiat and Chen, 2015; Chang, Zahari, and Chew, 2018).

Next, when designing for users with deteriorating haptics, Kiat and Chen (2015) recommend avoiding gestures that require the elderly to provide extra effort in motor control, such as long-tapping and swiping but design the elements that only need a single tap. Ahmad, Richardson, and Beecham (2021) also suggest making the actions on most functions in the application through tapping rather than drag and drop.

So that elderly users can understand the set of actions needed for a task, having those elements in the application state what is occurring currently to the users identified as very beneficial (Dodd, Athauda, and Adam, 2017). In addition, Dodd, Athauda, and Adam (2017) also recommend having constant feedback during the interaction to ease anxiety and assist elderly users in learning how different controls affect the system. However, Chang, Zahari, and Chew (2018) suggest avoiding pop-ups to display constant feedback.

Another recommendation to help users, especially older users, in using an application is to provide guidance or assistance (Kiat and Chen, 2015; Ahmad, Richardson, and Beecham, 2021; Dodd, Athauda, and Adam, 2017; Baharum et al., 2017). Ahmad, Richardson, and Beecham (2021) suggest presenting a tutorial on the application to teach them how to use the application. Providing simple instructions to the elderly for their interactions with the mobile application may also be an option to ensure they have a good experience throughout their usage (Kiat and Chen, 2015). In addition, use a tooltip to provide small information about the elements in the mobile applications so that users have a better understanding of the mobile apps (Baharum et al., 2017). Lastly, context help, which consists of information about the features or events, is also a helpful feature so that when users cannot continue a process or face a problem, they have available resources to find a solution (Dodd, Athauda, and Adam, 2017).

The last recommendation, commonly for the final stages of development, is to conduct a test (Yusof, Romli and Yusof, 2014; Dodd, Athauda, and Adam, 2017). Although prototyping would help, verifying the designs with user tests and inspection methods to see whether it is easy enough for users is also necessary (Yusof, Romli and Yusof, 2014). People who test the application can be anyone, but running the test on elderly or disabled people can make the product more intuitive to the users and yield higher levels of familiarity (Dodd, Athauda, and Adam, 2017).

Although many recommendations for designing mobile applications are available nowadays, Ahmad, Richardson, and Beecham (2021) mention that the current suggestion for smartphone application designs for older people can be hard to apply and interpret. The elderly still commonly have difficulty with the solutions presented (Dodd, Athauda, and Adam, 2017). The survey results from Chang, Zahari, and Chew (2018) show that 75% of the participants, who were elderly, think that the existing social media mobile applications are not elderly-friendly. Sespiani and Ernungtyas (2022) also said that although there have been many design recommendations, there are still complaints from the elderly who feel that the product is not suitable for them.

The research conducted by Reid, Abdulrazak, and Alas (2017) using a survey found that the first application category currently being used by seniors is social apps, where they can stay in touch with their friends and family. This research concludes that the biggest motivation for seniors to use mobile devices is socializing. Kiat and Chen (2015) mentioned that the MIM application has the potential to support social interactions, which are very important for the well-being of the elderly. They also stated that for the elderly, being socially connected to their families can lead to better cognitive functions.

In addition, good communication is a solution to solve loneliness, a common problem for older people (Restyandito et al., 2020; Sespiani and Ernungtyas, 2022). One of the factors causing loneliness in the elderly is the lack of attention given by family members or closest relatives as a result of increased mobility among the younger generation (Restyandito et al., 2020). Possible impacts of loneliness and lack of interaction experienced by the elderly are isolation and depression (Sespiani and Ernungtyas, 2022). Then social isolation and loneliness can cause negative effects, such as a cognitive decline in the elderly (Chirayus and Nanthaamornphong, 2019). Therefore, the impact of loneliness needs to be recognized and given more attention by the family and relatives (Restyandito et al., 2020).

However, since older adults often experience difficulties interacting with technology, namely smartphones, designers should place special care on how they design the UIs so that they are accessible, usable, and inclusive (Barros, Leitão, and Ribeiro, 2013). In developing a successful smartphone application, it is necessary to consider the particular needs of the elderly (Chirayus and Nanthaamornphong, 2019). Sespiani and Ernungtyas (2022) also suggest that designers should start with a careful understanding of both physical and cognitive challenges experienced by older people before stepping into the design process. Since having the elements in the application as usable as possible is key to building a UI for the elderly (Dodd, Athauda, and Adam, 2017). Therefore, a

proper UI design for mobile applications that are developed specifically for older people is significant to help them have better interactions with people through social media (Chang, Zahari, and Chew, 2018). In addition, understanding the difference between all age groups will provide user satisfaction for each age group (Yusof, Romli and Yusof, 2014).

The studies in the literature review indicate that there is a need for further research on the existing design recommendations. Comparing the preferences between younger and older people is meaningful to see how the choices differ between the two groups so that people can find a solution that could satisfy both groups. In addition, presenting recommendations in a concrete form can make a practical contribution compared to text-based design guidelines.

2.3 Hypothesis

Based on the findings in the literature review, younger people aged 20-30 and older people aged 50-60 have different abilities and experiences in using the MIM application. As a result, each age groups have different needs and requirements when finding a MIM application that they are comfortable using. Therefore, the null hypothesis is stated as follows.

“Both age groups have the same preferences towards the UI of an IM application.”

3 Methodology

The method to collect the preferences of younger and older Indonesian users toward the interface of MIM applications is to use a survey that collects quantitative data. This type of data is chosen over qualitative data to get a large number of opinions in a short time. The more responses obtained here, the better the results on representing the preferences of Indonesian users. The result will also be objective and could cover the opinion of Indonesian users of MIM applications that lives in any part of the world with different demographic backgrounds. In addition, since the survey is online, the distribution can be done via social media in minutes, and the respondents can fill them out immediately. Knowing that there are differences in the abilities and needs between younger and older people in their usage of MIM applications, the null hypothesis has stated that these two age groups have same preferences. Therefore, quantitative analysis is the method to test the statement.

The online survey designed using Google Forms consists of 4 sections. The first section asks for the demographics of the respondents. Here they need to choose their age category, between 20 to 30 years old or 50 to 60 years old. Then, respondents will answer questions about their gender and the country they currently live. Where they live is collected as it can influence their choices in the following sections. As Wang (2019) mentioned, human preferences for messaging applications differ by region. When an individual lives in a country for a long time, they will have to use the application the locals use to interact with them. As a result, the choices they prefer most in the next sections could follow how the applications they became used to look. The next question is regarding the current employment status, whether they are student, employed, unemployed, or retired. Last, this section questioned what type of mobile device they use, either iOS or Android. These two types have different types of display even though the application is the same. Therefore, the selected preferences later can also be influenced by this factor.

The second section collects the experience of the respondents on using the MIM applications. It questioned how long they have been using the MIM applications and how long they use them in one day accumulatively. The next question is what

MIM application they often use. Respondents could check more than one checkbox. Among them are WhatsApp, Line, Telegram, Snapchat, and Facebook Messenger. If they use any applications besides these options, they could also type the application name in the option “others.” Next, they had to fill out a Likert scale from 1 to 5 on how self-explanatory the features are. The first point means that it is not self-explanatory, or they cannot understand it independently without explanation. Contrastingly, the fifth point means that the feature is self-explanatory, or they can understand it directly. The last question asks if they need a user manual as a guide when using these applications. The overall results of the second part will give information on the respondent’s proficiency level and experience in using MIM applications so that the preferences of users who are less experienced and those with good abilities to use this application can be analyzed.

From 1 to 5, are the following features self-explanatory? (1 = Not self-explanatory, 5= Self-explanatory) *

	1	2	3	4	5
a) Sending messages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Sending photos/videos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Sending files	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Creating new message room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Creating new group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Pin an individual/group message	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Reply a specific message bubble	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Delete a message	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Voice/video call	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 3: Question on how self-explanatory the features are

The last two sections of the survey consist of questions that could summarize the respondent’s preferences for the UI of MIM applications. Each following section will have three subsections that will address each subpoint of the research questions. The third section will collect the respondent’s preferences towards

some features in the message list interfaces. This interface is the main section of the IM application and is where the chat management feature occurs (Caro-Álvarez et al., 2021).

The first subsection collects the preference for the button to create a new message. Generally, there are two ways to place the button to create new messages, either on the top bar or bottom-right corner, usually named floating action buttons. Therefore, in this subsection, interfaces with these different button placements were assessed individually by the respondents from 1, very dissatisfied, to 5, very satisfied, on how pleased they are with each of them. The last question for this subsection is which button is the most suitable for creating a new message among the three options. Button A is the icon that WhatsApp uses. Button B is an icon that describes the feature's name, which is to create a new message. The + (plus) symbol symbolizes the word create, while the message bubble represents the new message. Finally, button C is a button that Leitão and Ribeiro (2013) suggest, namely to add text on an icon button to increase the understanding of users towards the function of the feature.

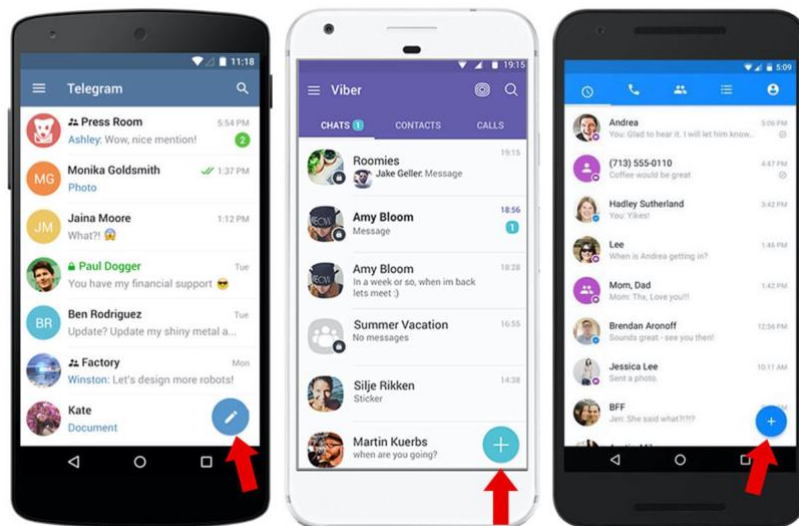


Figure 4: Floating action button

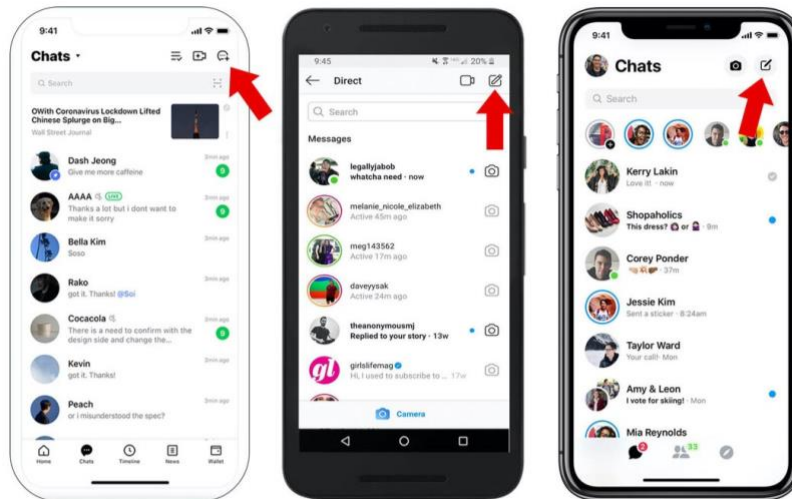


Figure 5: Button located at the top bar

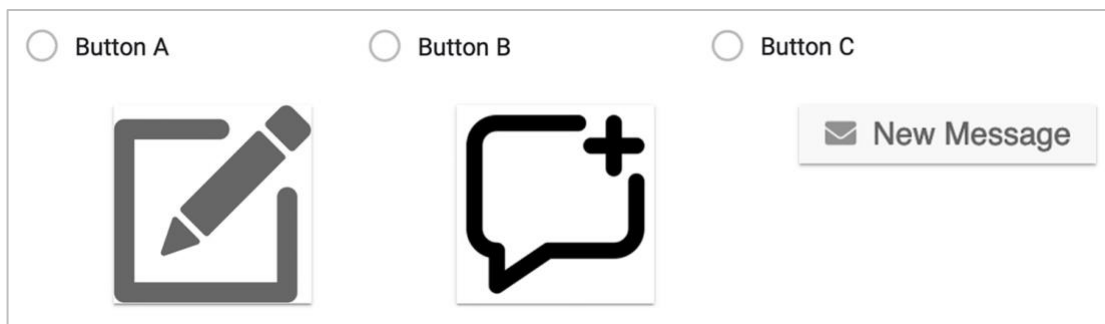


Figure 6: “New Message” Button options

The second subsection questioned the respondent’s preferences on the UI to pin or mark the individual or group message as a favorite. However, since not everyone uses this, the first question will ask whether they use this feature or not to see if the experienced one and without any experience may affect the preference they choose. Next, those, who use this feature, will be asked how they usually mark a message. For this question, there are two options that respondents can choose, either “Swipe the chat and click on the button” or “Click edit, choose message and pin or mark them.” On the following question, those, who have ever used it, are asked if any of the given options are more convenient, or those, who have never used this feature, need to select which of the choices they find best to pin a message. Two of the options were the same as in the previous question. The additional option was “Tapping the message longer and having the option to pin it.”

Usually, when the user taps on a message longer, they can find options to give to the message, like mute, archive, mark as unread, and delete. Kiat and Chen (2015) adopted Gestalt’s grouping principles by grouping features with similarities and placing them in the same place at the application interface. Since the featured pin a message has a similarity like the mute and other options, which are to be executed to the message, placing the option to pin a message after

tapping the message longer could be one of the options. Last, all respondents will choose the most suitable icon to pin or mark an individual or group message as a favorite. The first option is a pin icon, as the feature name is “pin a message,” and the second option is a star icon, usually used to symbolize something special or favorite. The last option is the bookmark icon because people commonly use it to mark the last page they read in a book. So maybe users might find it suitable too to mark a message.

The last subsection in the third section regarding the message list interface is to find the respondents’ preferences in viewing the online status of their contact. Ogara, Koh, and Prybutok (2014) stated that viewing the online status of the user’s contacts is a concept of social presence, or Bridgewater and Cole (2009) mentioned as the presence of awareness, which lies at the heart of IM. So first, they will have to rate how important it is to see people’s online status from 1, not important, to 5, very important. Then, Bridgewater and Cole (2009) mentioned that this feature is located in the contact list, the interface that lists all the users’ contacts and initiates an IM conversation. But WhatsApp, the IM application with the most monthly active users in Indonesia based on DataReportal (2022), placed their online status on the messaging interface. Therefore, the next question asked if the respondents 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, they will have to give their thoughts on how helpful it was to see people’s online status from the message list interface from 1, not helpful, to 5, very helpful.

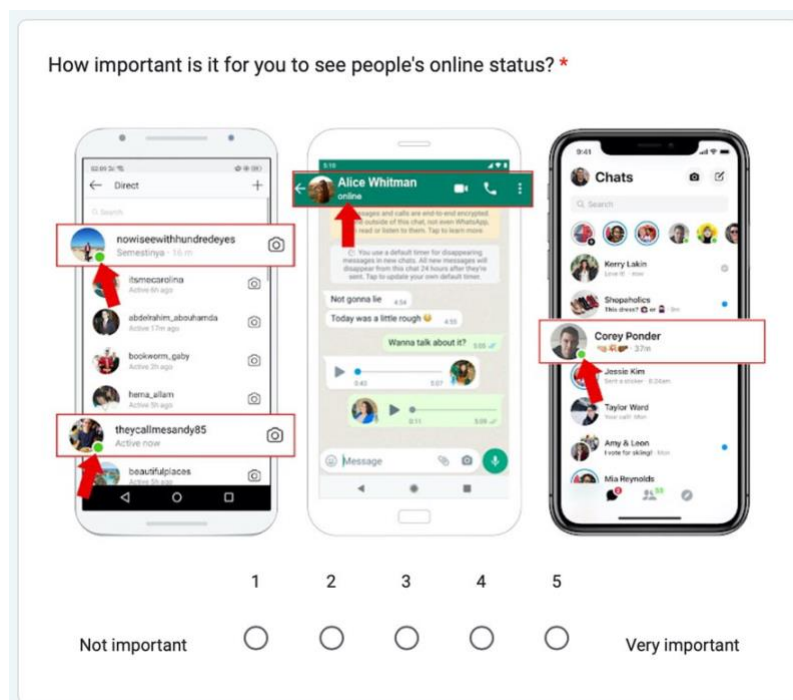



Figure 7: Question on how important to see people’s online status

Finally, the last section of the survey will summarize the respondent's preferences towards some features in the messaging interface, where one of the fundamental MIM features, namely message exchange, takes place. As mentioned earlier, it also has three subsections. The first subsection is regarding sending media such as photos, attachments, and locations. Besides text messages, users should be able to send all types of messages, like audio, videos, photos, and documents (Bridgewater and Cole, 2009). Among them, the most important thing for users to share were photos and videos (Bhullar, Dhablania, and Viridi, 2018). Unfortunately, Kiat and Chen (2015) discovered that users found the icon for this feature confusing and hard to identify. Therefore, this subsection will collect the respondents' preferences towards this feature to find the best design solution. One MIM application and others have different bottom bar interfaces for this feature. Some use the + (plus) button or the paperclip button to display what kind of media the user can send. Some applications show the option to send photos or videos explicitly beside the input text box, and the remaining options are inside the + (plus) button. Therefore, on the first question, respondents will choose which of these three interfaces they least, neutral, or most preferred. Sending the same photo, video, or attachment more than once may often be done by many people. Thus, the following question asked the respondents if they had ever sent a photo, video, or attachment twice to others to see how big the percentage of people have done that. Lastly, the respondents need to give an opinion on how necessary they want to receive a notification when they would like to send the file they have ever sent before, using a 5-point Likert scale.

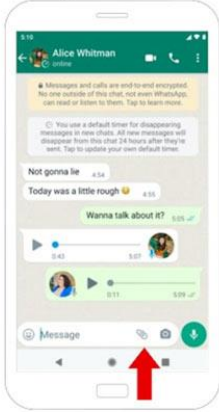
Please rank these interfaces below which have different bottom bars from your least to most preferred. *

Option 1



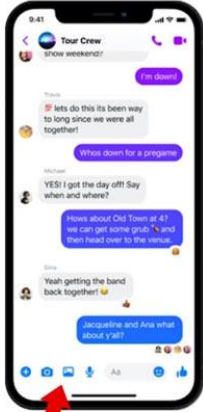
Option 1: + (plus) button to send photos, attachments, etc.

Option 2



Option 2: paperclip button to send photos, attachments, etc.

Option 3



Option 3: "picture" button to send photos/videos and + button to send attachments, etc.

Least preferred	<input type="radio"/>	<input type="radio"/>
Neutral	<input type="radio"/>	<input type="radio"/>
Most preferred	<input type="radio"/>	<input type="radio"/>

Figure 8: Question asking the rank of different bottom bar interfaces from least to most preferred


The second subsection is about seeing people's profile pictures. Profile pictures may be helpful for some users to see whether the contact they wanted to send a message to was correct. Therefore, this survey will summarize how important it is for the respondents to see their contact's profile picture and how often they see them. Both of these questions collect the responses through a five-point Likert scale. The first Likert scale starts from not important to very important, while the second is from never to always. There are MIM applications, like Line, that locate the profile picture next to each chat bubble. Other MIM applications, like WhatsApp, place the profile picture above beside the contact's name. Therefore, the last question in this subsection asked where the respondents prefer the placement for the profile pictures.

Caro-Álvaro et al. (2021) mentioned that one of the MIM application's must-have features is managing messages, including sending, reading, replying, and deleting messages. Therefore, the last subsection will collect the respondents'


preferences on performing actions to the message, such as deleting, forwarding, copying, and reacting. They will first answer how often they use this feature. Then there are three different interfaces to perform this feature presented. The first interface has actions below the selected message bubble, like how Line and WhatsApp for iOS present them. The second interface has the actions option in the top bar, like the interface of WhatsApp for Android, and the last one has its choices presented in the bottom bar, like how Facebook Messenger does. Respondents must choose their least, neutral, and most preferred from these three interfaces. Last September, Apple launched its latest operating system, iOS, allowing iMessage users to edit the messages they have sent. Since other MIM applications have not implemented this feature, the final question will collect respondents' opinions on whether they would be interested if they could edit the messages they had sent instead of deleting them.

Please rank these interfaces below. *
Choose which option you preferred most, neutral, and least preferred.


Option 1



Option 2



Option 3



	Option 1: actions under the message bubble	Option 2: actions at the top bar	Option 3: actions at the bottom bar
Least preferred	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Neutral	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most preferred	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 9: Question asking the rank of different placements of action options from least to most preferred

4 Results and Analysis

4.1 Demographic Data of the Respondents

The number of respondents targeted for the survey is 150 people that are Indonesian users of the MIM application located anywhere in the world. Since the analysis of this thesis focuses on comparing the preferences of younger and older users towards the UI of the MIM application, the number of respondents between these two age groups must be equal. Therefore, the survey distribution was to 75 young users aged 20-30 years old and 75 older aged users between 50 and 60 years old. From the results obtained, 66 respondents identified themselves as male, and 84 were female. The countries where the respondents live vary, although most of them, 112 out of 150 respondents, live in Indonesia. Others are living in Germany, Australia, America, and Canada. Next, almost half of the respondents, or 73 of them, have the employment status as employed. Then, the number of respondents who are students is 38. Following that, 22 respondents are unemployed, and 17 people have retired. Last, regarding the type of mobile device used by respondents, the number of Android and iOS users is almost equal, namely 72 and 78 people.

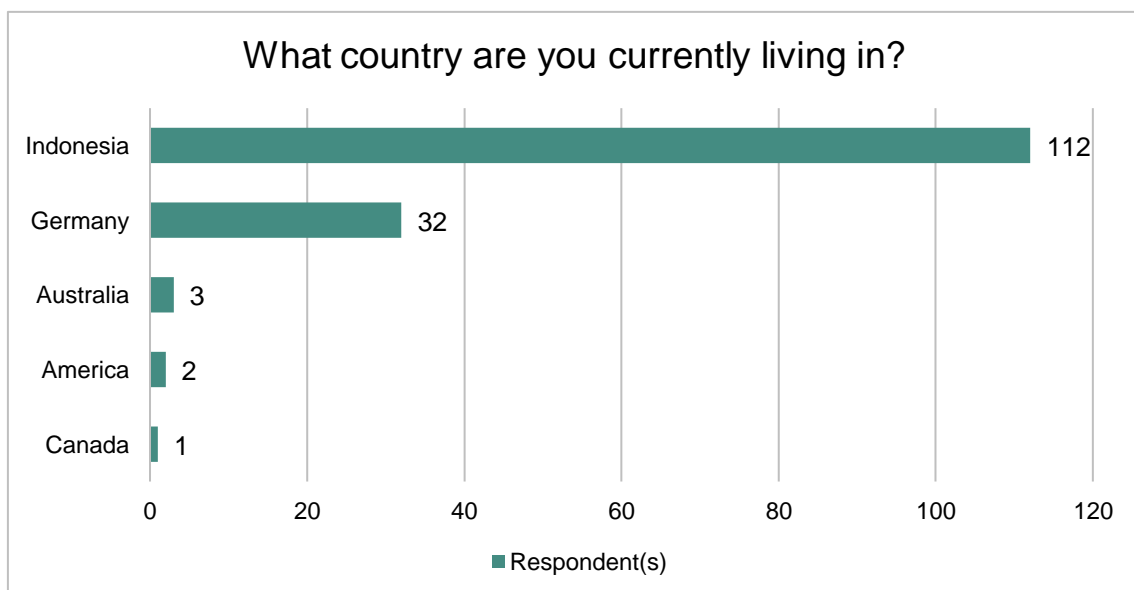


Figure 10: Country the respondents currently living in

4.2 Overview of the MIM Application Usage of the Respondents

The results of the first question showed that the respondents were users who had been using the MIM application for a long time. All of them have used this application for more than three years. Even 140 out of 150 respondents have used it for more than five years. In the following question on how long they used MIM applications daily, mostly or 62 respondents answered 3-5 hours. Then, 49 respondents used the application for more than 5 hours, 30 respondents said their use was around 1-2 hours, and only nine people used it for less than one hour. These results show that almost all respondents already have lots of experience with the MIM applications. By using these applications for more than three years, they should have been able to operate various features already or at least be proficient in using the main features of this application. In addition, the respondent's daily usage of the MIM application is above the average time spent by Indonesians on the WhatsApp application, according to Data.ai (2022), which is about 1 hour.

In the question on what MIM applications the respondents often use now, almost everyone, or as many as 149 people, answered using WhatsApp. This result corresponds to the statement from Dallal (2022) that WhatsApp is the most popular messaging app in Indonesia, and also the data from DataReportal (2022) that the IM application with the most monthly active users in Indonesia is WhatsApp. Then the second most used application by the respondents is Line, with 29 people. Next, 25 respondents used Telegram, and 20 people used Facebook Messenger to communicate. There are also five people using Instagram and four people using Snapchat. Besides that, several respondents use iMessage and Signal, two people each. Last, one person mentioned using Teams to connect with other people.

The respondents' opinions on the question "how self-explanatory some features in the MIM application are" show the overall of their level of understanding in accessing MIM applications. The figure below shows the results of that question.

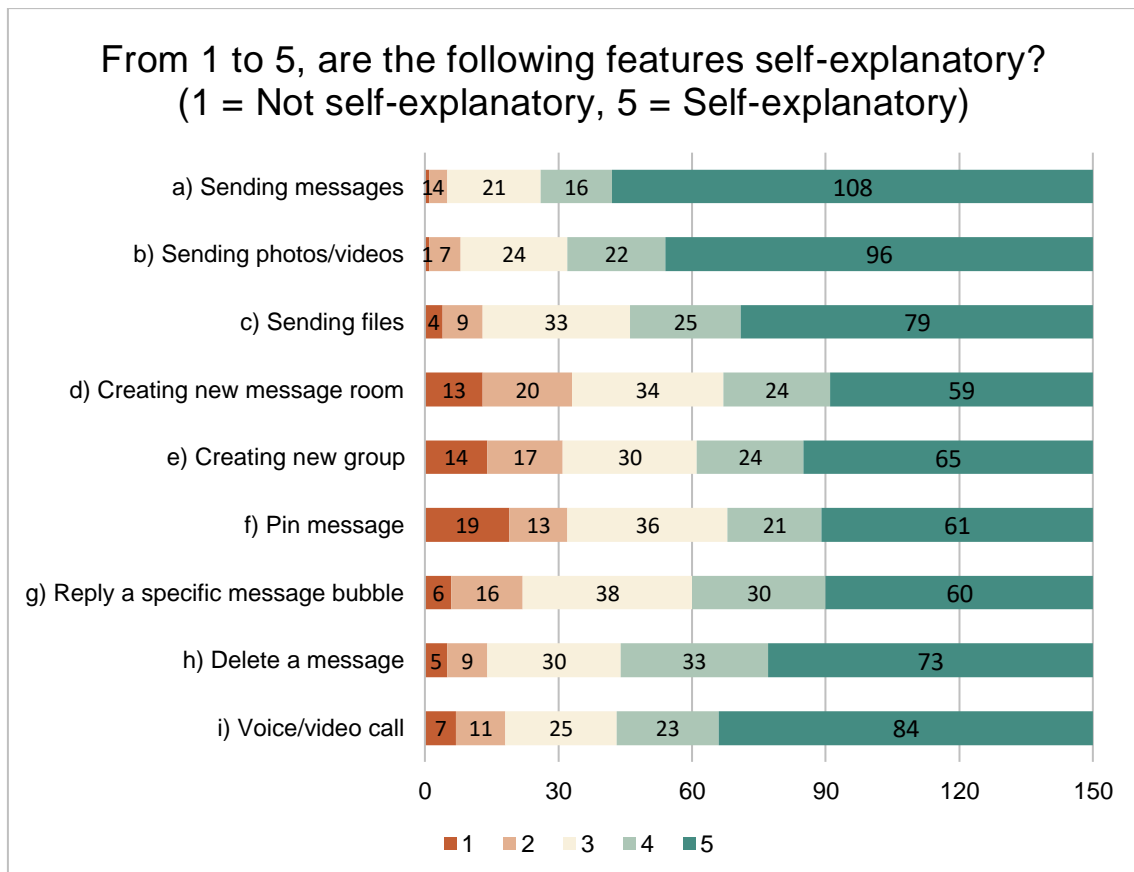


Figure 11: How self-explanatory the features are

The figure above shows that on every feature number of respondents who gave a 4 or 5 points was above 50%. It means that most of the respondents have no difficulty using the mentioned MIM application features, especially the features “sending messages” and “sending photos/videos.” However, looking at the number of respondents who answered 1 and 2 for a feature, the features “creating a new message room,” “creating a new group,” and “pin an individual/group message” have a higher number of respondents than the other features, which is above 30. Therefore, it is most likely that these three features are the features that the respondents could not understand directly the most.

The rank of these features is determined by calculating the weighted average score for each of them, then ordering them from the most to least self-explanatory based on their scores. First, multiply the number of respondents who chose a point from the Likert scale for a feature by the point’s weight. Here each Likert scale point weights the number itself. For example, point 1 on the Likert scale weighs 1, and point five, or self-explanatory, weighs 5. Then add the five multiplications and divide them by the total number of respondents, 150, to get a weighted average score for a feature. After calculating the score for each feature, arrange the average score from highest to lowest. The highest average value means that the feature is the easiest for respondents to understand without

needing guidance. Meanwhile, the lowest weighted average score means that the feature is the least self-explanatory or the respondent needs guidance to understand it.

Rank	1	2	3	4	5	6	7	8	9
Weighted Average Score	4,51	4,37	4,11	4,11	4,07	3,81	3,73	3,64	3,61
Feature	a)	b)	c)	i)	h)	g)	e)	d)	f)

Table 1: Weighted average score of each feature

Based on table 1, the most self-explanatory feature is sending messages. Meanwhile, the feature that is the least self-explanatory is pin messages. Overall the results show that respondents can understand each feature well because all weighted average scores have a value above 3. In addition, the average of all weighted average scores is 3,99. It means the respondents' average ratings for these nine features are almost 4 out of 5. Even though the score is good enough, efforts to optimize these features are necessary because some respondents still mention these features are not self-explanatory enough.

From the last question of this section, do they need a user manual when using the MIM application, which uses a Likert scale of 1, not at all, and 5, very much needed, to answer it, the number of respondents who answered 1 was 66 out of 150 respondents. Then, as many as 36 people answered point 2. Next, 25 respondents are neutral about this question. Only a few people chose points 4 and 5, namely 11 and 12 respondents. These results indicate that many respondents do not need a user manual. The average answer from the respondents in this question is also leaning more towards not requiring a user manual, which is 2,11. However, providing a user manual in the MIM application is still a must because not everyone does not need it, but there are a small number of people who even really need it.

4.3 Preferences Towards the Message List Interface

4.3.1 Preference for the Button to Create a New Message

In the first question, the number of respondents who were very satisfied or chose point 5 for the floating action button was 42, and those who answered point 4 were 46. In total, 88 respondents were pleased with this type of button. Meanwhile, four respondents felt very dissatisfied, and 18 people gave 2 out of 5

points for the floating action button. In total, 22 people felt unhappy with this type of button. The rest of the respondents were neutral to this question.

On the following question about the respondent's satisfaction level on the button at the top bar, 50 respondents said they were very satisfied, and 55 were satisfied. Altogether, 105 people were happy with this button placement. On the other hand, eight people were dissatisfied, and three were very unsatisfied. The rest of them, namely 34 respondents, have a neutral opinion. Comparing the number of respondents who were satisfied with the floating action button and the button at the top bar indicates that more people are pleased with the button at the top bar. The calculation of the average satisfaction level of respondents for these two button placements shows that the respondents liked the button to be located at the top bar more. It is because of the higher average score this button placement has, which is 3,94 out of 5, than the floating action button, with 3,69 out of 5.

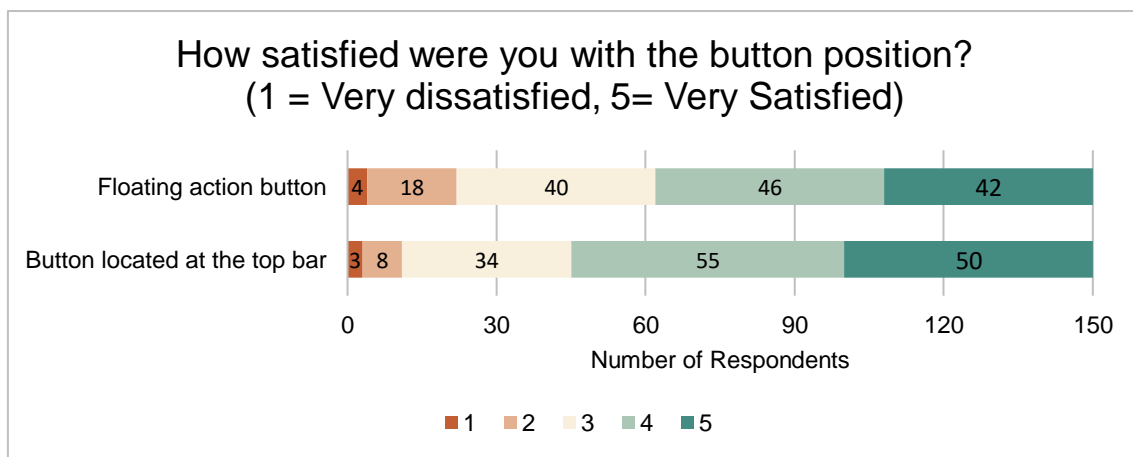


Figure 12: Satisfaction level of the respondents towards the floating action button and button located at the top bar

Separating the answer from younger and older respondents shows differences in their preferences. The number of younger people satisfied and dissatisfied with the floating action button is 43 and 15, whereas the number of older people satisfied and dissatisfied is 45 and 7. The number of satisfied respondents shows that older people prefer the floating action button more than younger people, and there are more younger people who are dissatisfied with this view.

The proportion of younger people who are satisfied and dissatisfied with the button at the top bar is 56 and 8. Meanwhile, the opinion of older people stated that 49 people were satisfied, and three people were dissatisfied with the placement of this button. These results indicate that the button located at the top bar is more preferred by users in the age group between 20 to 30 years, although the number of younger people who are dissatisfied with the placement of this button is higher.

	Age Groups	Likert Scale Point				
		1	2	3	4	5
Floating Action Button	Younger	2	13	17	27	16
	Older	2	5	23	19	26
Button Located at the Top Bar	Younger	3	5	11	29	27
	Older	0	3	23	26	23

Table 2: Difference between the satisfaction level of younger and older users on the button placements to create a new message

The average satisfaction level of younger users on the floating action button is 3,56, while the average score from older users is 3,83. The scores prove that older users have more satisfaction with this button placement than younger users. Then, for the button at the top bar, the average satisfaction level of young people is 3,96, and the average satisfaction level of older people is 3,92. These average scores show that this button placement is more satisfied by younger users, although the score is slightly higher than the average satisfaction score of older users. But between the average satisfaction of older people on the floating action button and the button at the top bar, their satisfaction is higher when the message list interface locates the button to create a new message on the top bar. Therefore, the preference for button placement for the two age groups is the same. Both age groups like the button at the top bar better.

The type of button used for this feature can be just an icon and can also be a button icon with text. Everyone can have different preferences in the type of button they think is more suitable for the "New Message" button, or it is more understandable that the button serves to create a new message. The results from the third question show that the button with the chat bubble icon with the + (plus) symbol or button B is the option most respondents chose as the most suitable button. As many as 60 people have chosen this. Furthermore, 54 out of 150 respondents think that the first button option is better to be the button to create a new message. Meanwhile, according to 36 respondents, button C is the most suitable.

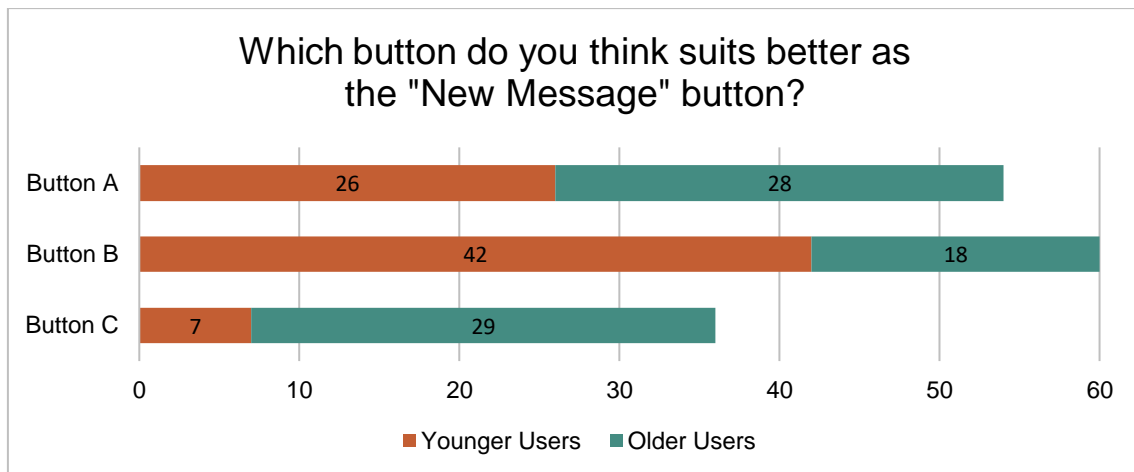


Figure 13: Results on which button suit better as the “New Message” button

Figure 13 shows that the two age groups have different preferences for the button to create a new message. Even though button B is the button that received the most votes from among 150 respondents, it does not mean both age groups find that button the most suitable one. Respondents who choose button B are primarily between 20-30 years old. Therefore, this button is only considered most suitable by the younger users because this button eventually received the least voting from the senior people among the other button option. It means button B is the least to be found suitable by older respondents, while the button most elderly vote is button C, with 29 votes. They may choose this option because of the text that directs them if they want to create a new message. The number of older people contrasts with the number of younger people who voted for this button. The button C is the least rated as a suitable button by the younger ones. Then, the number of parents who chose button C is slightly different from the number of parents who chose button A. Button A received one vote less than option C, which was 28 votes from older respondents. The number of younger and older respondents on button A is almost the same, namely 26 and 28 people. According to the results, button A is the most suitable option to be implemented as a button to create a new message in the message list interface because this button received a balanced vote from both groups. Button B is very suitable to be used when the target group of a MIM application is young people. On the other hand, if a MIM application is tailored specifically for the elderly, it is best to implement button C.

4.3.2 Preference for Marking the Individual or Group Message

86 respondents mentioned using the feature to pin or mark an individual or group message as a favorite. More than half, or 52 people, are younger users of MIM

applications. Meanwhile, 64 respondents do not use this feature. Most of them were older people, namely 41 people. Therefore, it is understandable that the age group that uses this feature more is young people compared to older people.

	Number of Respondents		
	Total	Younger	Older
Yes	86	52	34
No	64	23	41

Table 3: Number of respondents that use and do not use the feature to mark an individual or group message as a favorite

Most of those who use this feature says the way they mark a message is to swipe the chat and click on the button to pin them. The number who said it was 50 out of 86 respondents. While 35 people said they usually do it by clicking edit, selecting the message, then clicking the button to pin or mark them. The button to pin a message found after swiping the chat is the interface implemented usually in iOS mobile devices. In contrast, the second way is how Android users typically do it. Although the proportion of respondents between iOS and Android mobile device users who use this feature is the same, namely 43 people each, more respondents mentioned swiping the chat first, then clicking on the button to mark a message. Besides, one person usually pins a message by tapping it longer and clicking on the option to pin it.

Since the question “Are there any options below that you find easier to mark a message?” is not a required question, the number of respondents who answer this is only 128 people. Among the three options, namely “Swipe the chat and click on the button,” “Click edit, choose message and pin or mark them,” and “Tapping the message longer and having the options to pin it,” more than half of them, 69 respondents, choose the first option. It means that this option is considered the easiest one. The following easy option is the third option, with 36 votes. The second option was the least selected by the respondents, as it only received 23 votes. Based on these results, option one, which is also the option that respondents usually use to use this feature, remains the option they find the easiest. It may be because respondents are already familiar with the first option, so they consider it the easiest. Since the number of respondents who are comfortable with the third option is more than the second option, which they usually used to use, MIM application designers may consider providing a pin option when the user taps the message longer.

	Number of Respondents		
	Total	Younger	Older
Swipe the chat and click on the button	69	41	28
No Click edit, choose message and pin or mark them	23	8	15
Tapping the message longer and having the options to pin it	36	21	15

Table 4: Option that the respondents find easier to mark an individual or group message as a favorite

Between the two age groups, both voted for the same option as the easiest, namely, swipe chat first to click the pin chat button. More than half of younger and almost half of older respondents chose the first option as their most comfortable. In the second option, the ratio of the number of younger and older people who chose it was 8 and 15 people. Older users prefer this option more than younger users because by clicking edit, they understand that they can do something on the message list interface. So, having an edit button in the message list interface made it more self-explanatory for older users to pin a message. Meanwhile, this option is less effective for young people because it requires more steps than the other options. For the last option, the younger users found it more comfortable than the older users. It is most likely because the older one would have difficulty finding the button to mark a message since the user needs to tap longer on a message first.

On choosing which button is suits better to mark an individual or group message as their favorite, 79 respondents selected the star icon. It may be because people often use the star symbol for something special. As a result, many respondents consider this icon suitable for marking messages they value as important. The icon with the second highest number of votes is the pin icon, with 66 respondents. People often use a pin to stick notes on the corkboard. Therefore, many consider that the pin icon is suitable for marking messages that are important to them, as if they pin the message on the message list interface. Unfortunately, only five people chose the bookmark icon. So this icon is unsuitable for marking a message because people usually use bookmarks to keep track of the last book page they are reading.

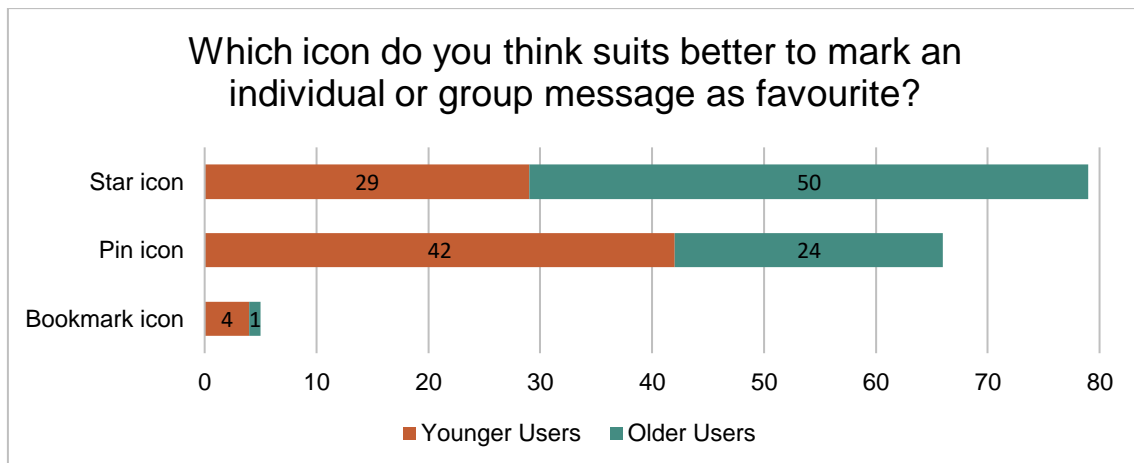


Figure 14: Results on which icon suits better to mark an individual or group message as a favorite

The preference of the two age groups for the icon that is considered the most suitable for this feature is different. Younger users think the pin icon is more suitable than the star icon. On the other hand, the number of older users who chose the star icon was double the number of those who chose the pin icon. So, when designing the messaging list interface, it is recommended to use a star icon to mark the messages that the user's put as favorites so that it looks more elderly-friendly and also because most of the respondents choose this icon. However, if the name for this feature is pin a message, not mark a message, the better icon to use is the pin icon so that users are not confused by the difference in the name of the feature and the icon used.

4.3.3 Preference for Seeing People's Online Status

Most respondents find seeing their contact's online status important. Forty-five respondents selected point 4 on the 5-point Likert scale. Then, 32 respondents considered the feature of seeing people's online status as very important. The number of respondents who think this feature is not important is 23 people, and 11 people find it not so important. In total, 77 people think this feature is important, and 34 consider it not so important. It means more respondents consider this feature essential. However, because the remaining 39 respondents answered neutrally for this question, the results of the average weighted score indicate that the respondents are neutral on how important this feature is, as the average value is 3,35.

		Number of Respondents		
		Total	Younger	Older
Likert Scale Point	1	23	13	10
	2	11	8	3
	3	39	17	22
	4	45	22	23
	5	32	15	17
Note: 1 = Not important, 5 = Very important				

Table 5: Likert scale point that the respondents choose for how important to see people's online status

By analyzing answers from the 20-30 and 50-60 years old respondents more deeply, each age group mostly chooses point 4. There are 22 younger users, and 23 older users of the MIM application think this feature is important. Between the number of respondents who consider this feature important and not so important, both age groups mostly found this feature important. The number of young respondents who answered that this feature was important and not so important was 37 and 21. Meanwhile, 40 elderly users said this feature was important, and 13 felt it was not so important. The average weighted score from the respondents aged 20-30 years is 3,24, and from the respondents aged 50-60 years is 3,45. It shows that the older respondents found the online viewing feature of their contact status slightly more important than the younger respondents.

Since the MIM application Indonesian users mostly use is WhatsApp, which locates a person's online status on the messaging interface, the survey collected the respondents' opinions if they would like to view the people's online status on the message list interface. From the answers obtained, 66 people like to see them in the message list interface. It consists of 28 respondents who strongly like it and 38 who like the idea. Then, the respondents who disliked the online status shown in the message list interface were 36 people. Sixteen respondents among 36 are those who strongly dislike it. Although more people like this idea than dislike it, the average weighted score is just between the average or 3,28 because 48 respondents chose point 3 on the Likert scale or neutral.

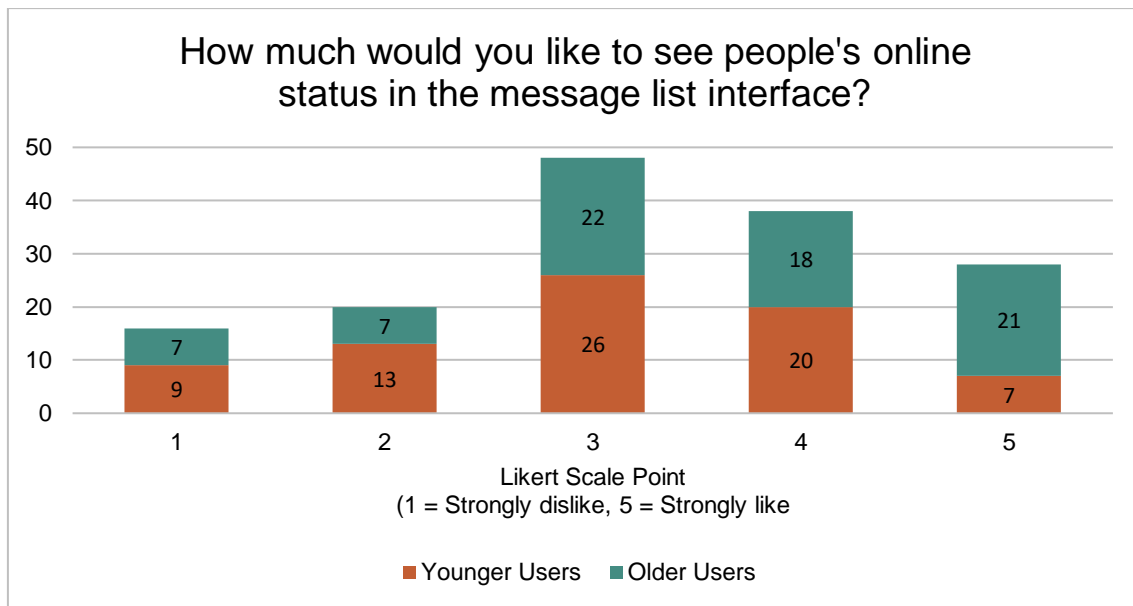


Figure 15: How the respondents like to see people's online status in the message list interface

These two age groups mostly gave 3 points or neutral in answering how much they liked the interface that shows the contact status on the message list interface. The number of younger and older users is 26 and 22 people. The number of younger and older respondents who answered strongly liked was quite different. Only seven younger people strongly liked the idea, while the number of older people strongly liked it is 21. Between the number of respondents who liked and strongly liked, the older age group seemed to have more interest than those aged 20-30, namely 39 and 27 respondents. In contrast, the accumulated number of respondents for each age group who dislike and strongly dislike it shows that the number of young people who do not like it is more than that of older people, namely 22 and 14. So, for this question, older users were more interested than younger users, as their average answers were higher, which was 3,52, while the average response of younger users was 3,04.

Although the number of respondents who like this idea does not reach half the total number of respondents, the number of respondents who think placing people's online status in the message list interface is helpful is more than half, namely 81 people. Forty-two people among them even think that it is very helpful. On the other hand, 17 respondents find it not so helpful, and nine even think it is not helpful. Then 43 people have a neutral opinion on whether it is helpful to see people's online status in the message list interface. The average weighted score, whether it is helpful, is higher than the average weighted score for whether respondents like to have it, which is 3,59.

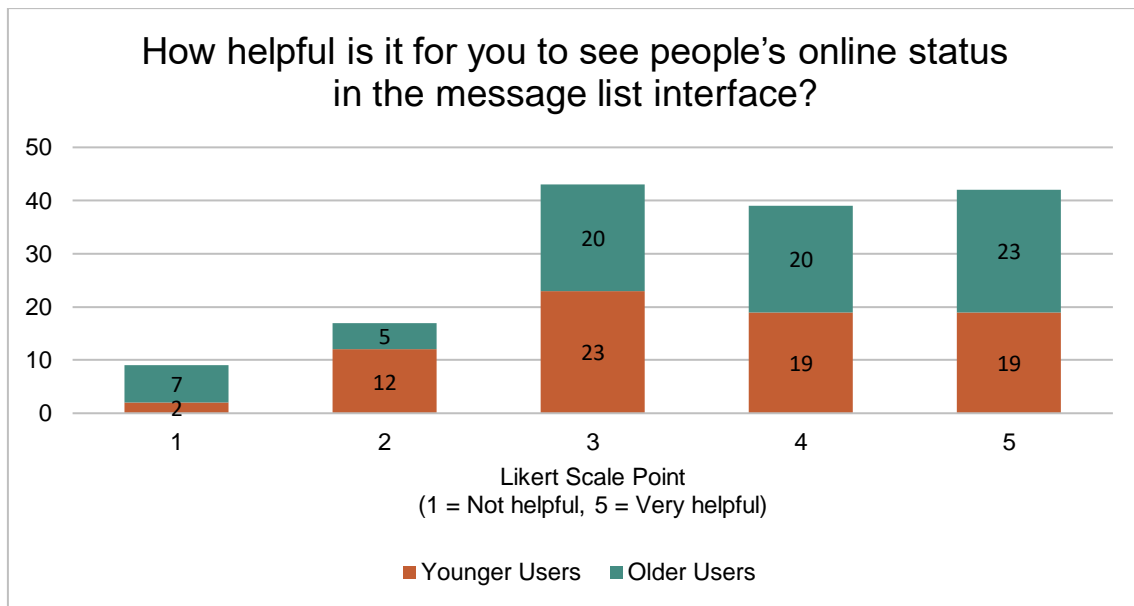


Figure 16: How helpful for the respondents to see people's online status in the message list interface

The most chosen Likert scale points for this third question differ for each age group. Respondents aged 20-30 mainly chose point 3 or neutral, as many as 23 people. Meanwhile, respondents aged 50-60 primarily chose point 5 or very helpful, with 23 respondents answering this. Therefore, the number of older users of the MIM application find this idea helpful is more than the number of younger users, namely 43 and 38. Between the two age groups, the number of respondents who mentioned this not so helpful mainly was those aged 20-30 years, namely as many as 14. These results indicate that older people find this idea more helpful than younger people. The average answers from each age group also show a slightly higher score on the average responses of older people, which is 3,63. In comparison, the average answer of younger people is 3,55. Although more respondents like and feel helpful about having people's online status on the message list interface than those who dislike and feel unhelpful, the enthusiasm of respondents on this idea was not so good, as the number of respondents who are neutral with this idea is quite a lot. It may be because the average answer from respondents on the importance of viewing people's online status in this interface is not too high. However, MIM application designers should still consider this idea when designing a MIM application because many users are interested in it and find it helpful, especially those aged 50-60. So if a MIM application implements this idea, there is a possibility that the message list interface will be more elderly-friendly. In addition, this idea can also provide more assistance to users so that they can increase their convenience in using MIM applications.

4.4 Preferences Towards the Messaging Interface

4.4.1 Preference for sending photos, attachments, etc.

Among the three interfaces with different bottom bars, most respondents put the first option, which uses the + (plus) symbol, as their least preferred option, precisely 59 respondents. Then, for the neutral option, most respondents choose the second option, which uses a paperclip as an icon to send media. There were as many as 63 people who voted for it. Furthermore, among the three options, the third option was chosen by the respondents as their most preferred. The number of respondents who chose the bottom bar display that includes an image icon and a + (plus) symbol to send photos, videos, attachments, etc., as their most preferred is 54 people.

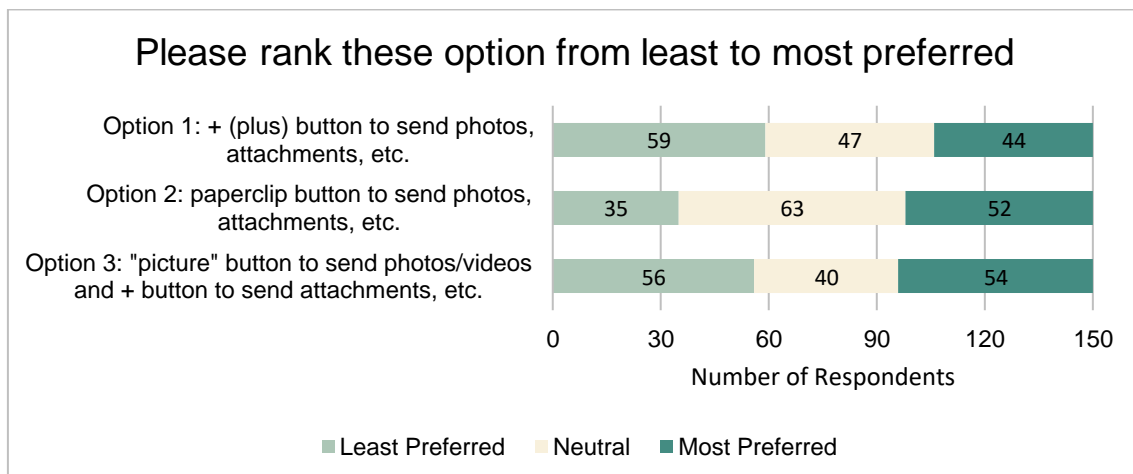


Figure 17: Number of respondents who chose each bottom bar interface option as their least, neutral, or most preferred

However, the order of the options from the least to most preferred is different when the rank corresponds to the average weighted score of each option. The rank "least preferred" weighs 1, the rank "neutral" has a value of 2, and the rank "most preferred" weighs 3. The option with the highest average value is the most preferred option by the respondents. On the other hand, the option with the lowest score is the option that the respondent least preferred. Based on the calculated average weighted score, option 1 is still the respondents' least preferred option. The average score for option 1 is 1,9 out of 3. Meanwhile, the option with the highest average score was the second option, and the option determined as the neutral option was the third option. The average scores for the second and third options were 2,11 and 1,99.

Although many of the respondents chose the third as their most preferred option, the number of respondents who chose it as their least preferred was even more. That causes the third option not to be the respondent's most preferred option. On the other hand, even though most of the respondents voted for the second option as their neutral option, the number of respondents who chose it as most preferred is more than as least preferred, namely 52 and 35. As a result, option 2 has the highest average score and became the most preferred option. Therefore, the option order from least to most preferred cannot be determined based on which option the respondent has chosen the most in each ranking, but it must be ranked based on the average weighted score of each option.

Younger users and older users have a different order of preference for the bottom bar. The only thing that is the same is only for the option they prefer the most, namely the second option. The ranking from the respondents aged 20-30 shows that the second option was the option most of them chose as their most preferred one, namely 27 people. Meanwhile, from the answers of respondents aged 50-60, 36 older users chose this second option as their neutral option, and 25 chose it as their most preferred option. Therefore, those who chose this option as their least preferred are only a few, namely 14 parents. The average score from both age groups for option 2 is the highest among the other options. The average score from younger users is 2,08 and from older users is 2,15 out of 3.

	Least Preferred		Neutral		Most Preferred		Average Score	
	Y	O	Y	O	Y	O	Y	O
Option 1: + (plus) button to send photos, attachments, etc.	23	36	28	19	24	20	2,01	1,79
Option 2: paperclip button to send photos, attachments, etc.	21	14	27	36	27	25	2,08	2,15
Option 3: "picture" button to send photos/videos and + button to send attachments, etc.	31	25	20	20	24	30	1,91	2,07
Note: Y refers to younger users, O refers to older users								

Table 6: Number of younger and older users who voted each bottom bar interface option as their least, neutral, or most preferred

Each age group has a different option that they find neutral and least preferred. Younger users chose the first option as their neutral option, while this option became the least preferred one by older users. Younger respondents mainly chose this option as neutral, namely 28 people. Twenty-four chose this option as their most preferred option, and 23 found it their least preferred one. So, the average rating from younger users is 2,01 out of 3. Meanwhile, older users mainly chose this option as their least preferred one, namely 36 people. The number of older users who chose it as the most preferred option is only 20. Therefore, the average score by older users for the first option is only 1,79.

Then, the third option was the younger user's least preferred option and the older user's neutral option. The number of younger people who answered this option as least preferred already indicated that the average weighted score for this would be pretty low. The average score is even below the weighted value of the neutral ranking, which is only 1,91 out of 3. Meanwhile, older users mostly ranked this option as their most preferred option, precisely 30 people. But since the number of older users who placed it as their least preferred is 25, the average value of this option is below the average value for the second option, which is 2,07.

Therefore, the ranking of the three options by younger people from most to least preferred is option 2, option 1, and option 3. In comparison, based on older respondents' answers, the rank from the most, neutral, and least preferred choice starts from the second option, first option, and last, the third option. Both groups consider the second option their most preferred. Email providers also use a paperclip icon for the users to attach media to a message they are composing. Therefore, MIM users who have used email before the MIM application can easily understand that the paperclip icon is to send photos, videos, files, etc. Then the first option with the + (plus) symbol is considered better by younger people than older people because the bottom bar looks simpler. But for older people, this symbol can confuse them with the use of this button. Finally, the third option, which shows the button to send photos with an image icon and the + (plus) symbol for other media, is considered better by older than younger people because they have a better understanding that the function of this button is to send photos. At the same time, the bottom bar interface like this will look more complex, so young people like it less.

Regarding the feature to send media such as photos, videos, attachments, etc., 131 respondents said they had ever sent the same media to an individual or group chat more than once. Sixty-five of them are younger people, and 66 of them are older people. Meanwhile, only 19 out of 150 respondents said never, with ten respondents aged 20-30 and nine respondents aged 50-60.

As a result, many respondents, precisely 86 people, think that notification is necessary when they want to send a media they had previously sent. Fifty-four of them even mentioned that this kind of notification was very necessary. The number of those who do not need it is only a few, namely 17 people, and ten people find it very unnecessary. The remaining 37 respondents have a neutral opinion on this topic. The average value of respondents' answers, which is 3,69, shows that they are neutral but tend to need a notification than do not need it.

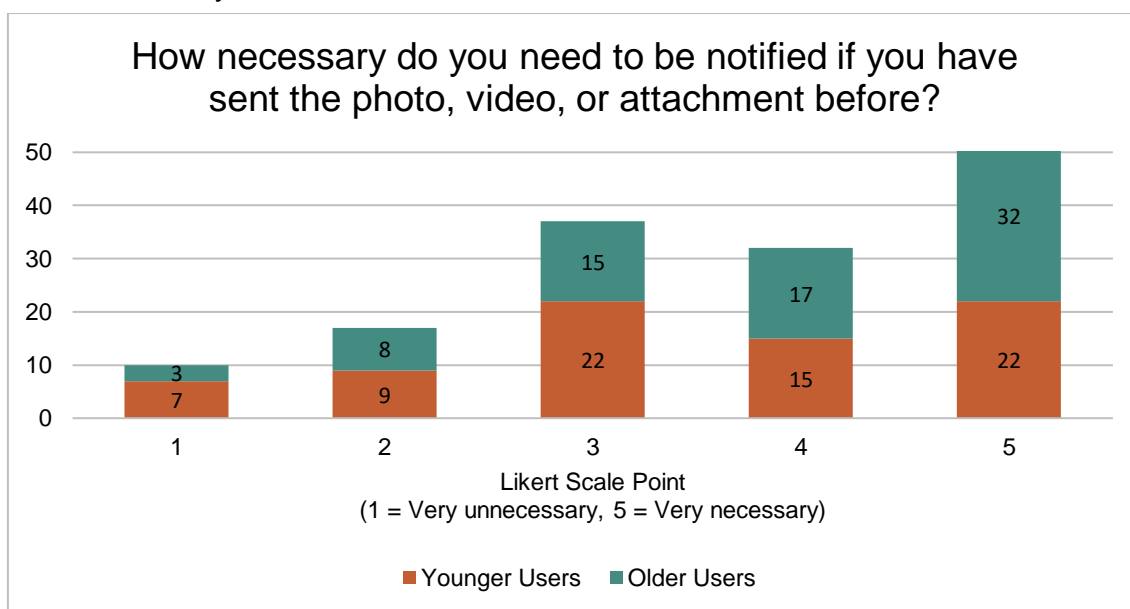


Figure 18: How necessary for the respondents need to be notified if you have sent the photo, video, or attachment before

The number of respondents who find the notification if they have sent the media before necessary is mostly those aged 50-60. The proportion between younger and older people is 37 and 49. Young people mainly voted neutral and very necessary, with as many as 22 people each. Meanwhile, the seniors mostly voted point 5 on the Likert scale, exactly 32 people. Then, respondents who do not need notifications for this are mostly younger than older people, by 16 and 11. Therefore, when a MIM application user wants to send media they have previously sent, older users consider a notification more necessary than younger users. The average score of the answers from each age group shows that the average opinion from older people is higher, namely, 3,89, while the average response from those aged 20-30 years is only 3,48.

4.4.2 Preference for seeing people's profile pictures

In the question of how important it is for respondents to see people's profile pictures, more respondents think that it is more important than not important, namely 92 and 15 respondents. Their answers also show that most respondents

chose point 4 on the Likert scale, with 48 people. The average weighted score of the respondents' opinions on this question is 3.77.

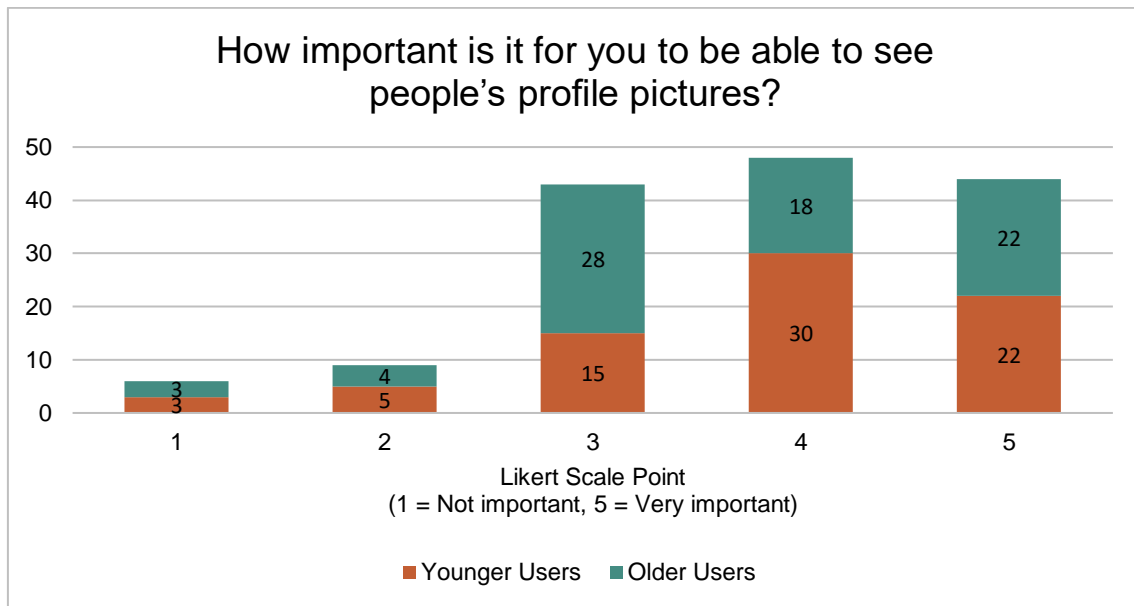


Figure 19: How important is it for the respondents to be able to see people's profile pictures

Between the two age groups, younger respondents consider the ability to see their contact's profile picture to be more important than older respondents. The proportion of those aged 20-30 and 50-60 years is 52 and 40. But, there are also more younger people who consider it not so important than older people, although the difference is only by one person, specifically 8 and 7 people. Then the respondents who had a neutral opinion were primarily the seniors. The proportion is 28 and 15 people. The average score of the answers from each age group shows that the average answer from younger people is higher, namely, 3,84, while the average response from those aged 50-60 years is 3,69. It means younger MIM users feel that the ability to view people's profile pictures is more important than older users.

Respondents' opinion that seeing a profile picture is important does not indicate they will always see it. Almost half of the respondents, precisely 60, selected point 3 on the Likert scale, which means sometimes, to answer the question of how often they see the profile picture of their contacts. The number of respondents who often see it is 38 and who always see it is 24. It shows that although 44 people consider this very important, the number of those who always see it does not reach that much. Then, the number of respondents who rarely see it is 20 and have never looked at people's profile pictures is eight. So, the average score of the respondent's opinion is 3,33. It means that, on average, the respondents only occasionally look at their contact's photos.

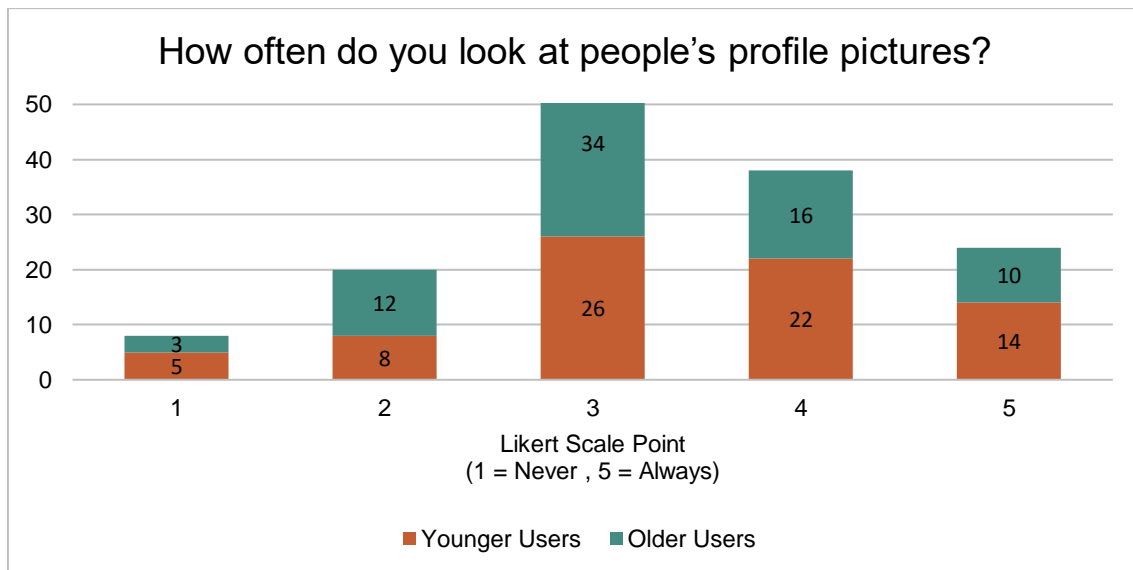


Figure 20: How often do the respondents look at people's profile pictures

Both age groups mostly chose point 3 in answering how often they look at people's profile pictures. The number of younger and older respondents is 34 and 26. Respondents who answered often and always are primarily those aged 20-30. Then, the respondents who rarely see it are mainly those aged 50-60, precisely 12 out of 20, while the respondents who never saw it are more those who were the younger ones, exactly five from eight respondents. These results show that younger people look at the profile picture of their contact more often than older people as their average answers are higher, which is 3,43, while the average responses of the older ones are 3,24.

Although the answers from younger respondents indicated that they considered viewing other people's profile pictures more important and more frequent than the older respondents, both age groups had the same preference for placing the profile picture in the messaging interface. The preferred placement is next to the contact's name at the top bar. In total, 123 out of 150 respondents chose this placement, consisting of 56 younger and 67 older people. While 27 other respondents chose the other option, which places the profile picture beside each chat bubble from the sender. 19 out of 27 are those aged 20-30 years, and 8 out of 27 are those aged 50-60.

One of the reasons more respondents prefer placing the contact's profile picture at the top bar is because this interface seems more practical. It doesn't put the contact profile picture multiple times in the messaging interface so that the interface looks simpler, and the area to state messages from each other also becomes wider. Although many respondents think that seeing a photo of a contact is essential, they only look at it sometimes. Therefore, the MIM application users prefer the interface that only puts the contact profile picture next to the

contact name over the interface that puts the profile picture on each side of the chat bubble.

4.4.3 Preference for performing actions to the message

In the first question about how often the respondents perform an action to the messages, most respondents choose point 4 on the 5-point Likert scale. Precisely 49 respondents often perform actions such as deleting, copying, forwarding, or reacting to the message. The accumulated number of those who often and very often perform these actions is far more than those who rarely and very rarely. The comparison is between 94 and 10 people. Of the ten respondents who rarely take action, two are those who very rarely do it. Then, the remaining 46 respondents have a neutral answer, meaning they neither often nor rarely perform actions to the message. Therefore, the average response from respondents is between neutral and often, which is 3.61 out of 5.

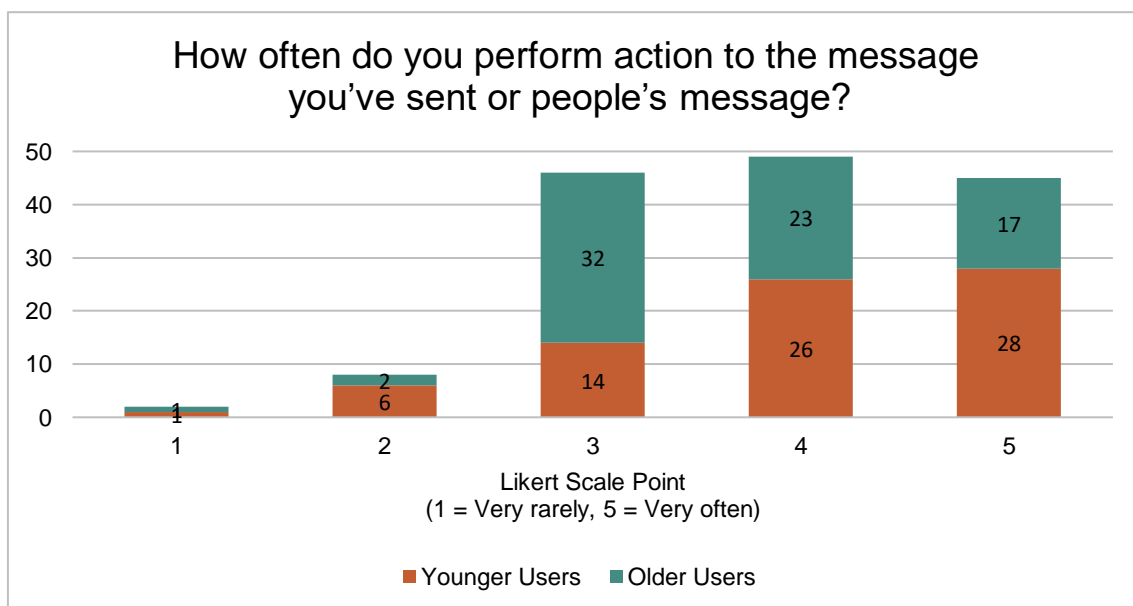


Figure 21: How often do the respondents perform an action to the message

Between these two age groups, more younger users mentioned they often perform an action on messages, namely 54 people, while the number of older users who do this is only 40. The respondents who rarely execute an action to a message are also mostly younger than older people, with 7 and 3. Then, more older users voted neutral than younger users, namely 32 and 14. From the respondents' answers, where the younger ones mostly answered very important, while the older ones mainly answered neutral, it shows that the respondents aged 20-30 more often deleted, copied, forwarded, reacted, etc., to the messages than those aged 50-60. The average response of young people is also higher than parents, with a value of 3,99 and 3,71.

Most respondents, precisely 55, chose the first option between the three options, with each different placement of action options to be done to the message, which puts the actions option under the selected message bubble as their least preferred. Then for the neutral, respondents mostly choose the second option, whose action position is at the top bar. There are 70 people in total. Lastly, in the most preferred ranking, the first option also became the most chosen one than the other option, with a total of 61 respondents. The third option with the action option position in the bottom bar was neither mostly voted as least nor neutral nor most preferred since the number of votes is almost equal on each rank position. Based on the average weighted score for each option, the option with the highest score, meaning the most preferred one, is the first option, with an average of 2,04. Then the option with the second highest average value is the third option, with an average of 2,01. It means that the respondents found this option is their neutral option. Last, the second option is the respondent's least preferred because the average score is the lowest one, which is 1,95.

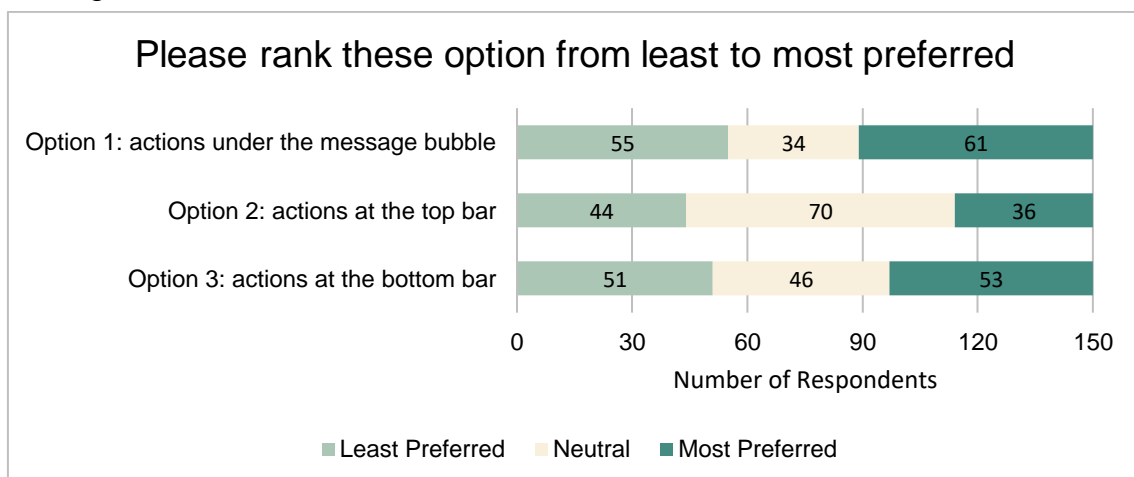


Figure 22: Number of respondents who voted for each action placement option as their least, neutral, or most preferred

The order of options from the least to most preferred differs between those ranked by younger and older users. The answers from younger respondents showed that many chose option 1 as their most preferred, namely 45 people. In contrast, 41 more aged respondents chose option 1 as their least preferred. As a result, the average answers of the young respondents for the first option were ranked the highest among the other options, which means the most preferred choice. Then, the average rating of the older respondents was ranked the lowest among the other options, which means this option is their least preferred option. The average score for the first option from the younger ones is 2,41, and from the older ones is 1,67.

	Least Preferred		Neutral		Most Preferred		Average Score	
	Y	O	Y	O	Y	O	Y	O
Option 1: actions under the message bubble	14	41	16	18	45	16	2,41	1,67
Option 2: actions at the top bar	30	14	33	37	12	24	1,76	2,13
Option 3: actions at the bottom bar	31	20	26	20	18	35	1,83	2,2
Note: Y refers to younger users, O refers to older users								

Table 7: Number of younger and older users who voted for each action placement option as their least, neutral, or most preferred

For the second option, the two groups mostly ranked it as neutral. However, many younger respondents, namely 30 people, rated the second option as their least preferred, while only 14 older respondents chose it as their least desired. Then, two-thirds of respondents who chose this option as the most preferred were those aged 50-60 years. Therefore, the option2 was voted by younger people as their least preferred and by older people as their neutral option. The average weighted score of the answers from younger users for option 2 was the lowest among the other options, namely 1,76. At the same time, this option has the second highest average score among other options that the older users rated, which is 2,13.

Last, most respondents voted for the third option as their least preferred were those aged 20-30. However, the number of those who chose option 3 as most preferred was more than those who chose option 2 as most preferred. Therefore, the average score of the younger people's answers for this option is the second highest, 1,83. It means option 3 was the younger users' neutral option. On the other hand, half of the older respondents chose the third option as their most preferred action option placement. As a result, the average answer for option 3 is the highest among other options' average score, 2.2 out of 3, making this option their most preferred.

Therefore, based on younger respondents' answers, the rank from the most, neutral, and least preferred choice starts from the first option, third option, and last, the second option. In comparison, the ranking of the three action option placements by older people from most to least preferred is option 2, option 1, and option 1. Since the order of the options between these two groups is very different, the third option, which locates the actions at the bottom bar, is the best to be considered for implementation, as this option is not ranked as the least

preferred from both age groups. If a MIM application implements the first option, which puts the actions under the selected message bubble, younger users may like it. But at the same time, many parents will not like it, so that the MIM application would become less elderly-friendly. Meanwhile, if a MIM application places the action option at the top bar, neither of the two age groups would like this. Therefore, the best choice is to put the action option on the bottom bar.

Usually, if the user has sent a wrong message to their recipient, the user must delete the message and resend the correct message. When the question given in the survey asked the respondents if they were interested in being able to edit the messages they had sent, many respondents mentioned being interested if this feature existed. 115 out of 150 respondents were enthusiastic about this feature. Eighty-four among 115 respondents even said they were very interested. There were only 14 respondents who were not interested, and 5 of them were not even interested at all. Then, 21 people are neutral about this. From the respondents' responses, the weighted average score is 4.2, which indicates a very positive level of interest from the respondents.

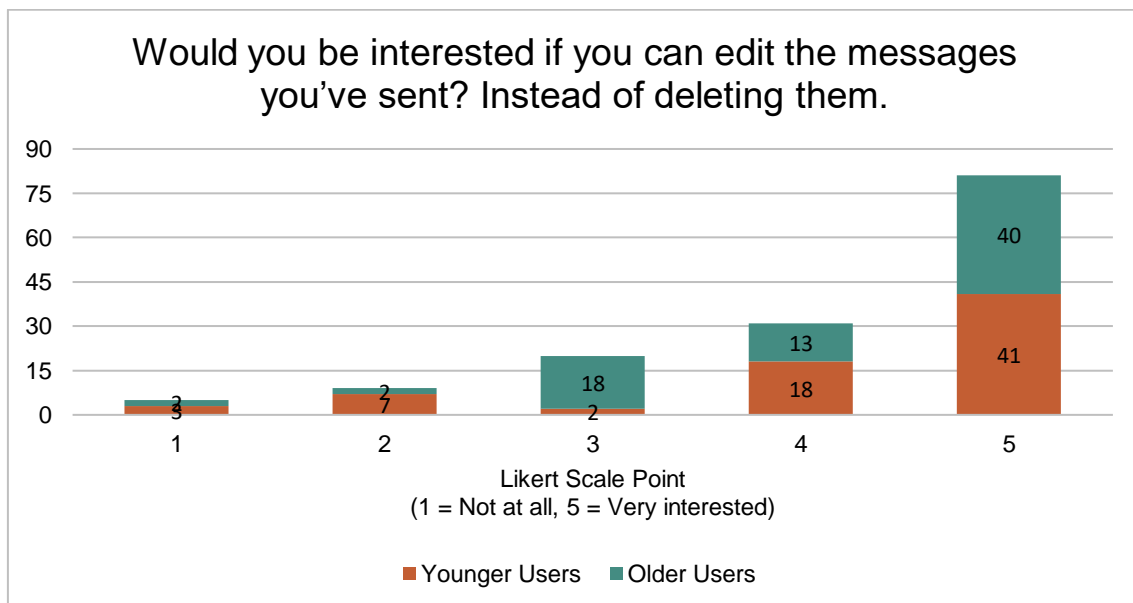


Figure 23: The opinion of respondents if they can edit the messages they have sent

From the answers of respondents aged 20-30 and 50-60, the interested respondents are mostly younger people. The respondents who were less interested in the feature to edit the message are also primarily those aged 20-30. However, more respondents who gave a neutral opinion were those older than the younger respondents, with a difference of 16 people. Therefore, the average weighted score from older people's answers is slightly higher than from the younger ones, by 4.16 and 4. Based on the positive feedback from both age groups to this last question, having the feature that allows respondents to edit messages the users have sent is highly recommended in a MIM application.

5 Conclusion

The existing design guidelines have not managed to present recommendations for designing UIs of the MIM application that can satisfy both younger and older users. Solving the problem is essential to reduce the gap between the number of younger and older MIM application users because communication, supported by the IM application, helps the elderly not feel lonely (Arambepola and Munasinghe, 2020; Restyandito et al., 2020; Sespiani and Ernungtyas, 2022). However, as a result of aging, adults have different needs and requirements compared to young people (Dodd, Athauda, and Adam, 2017; Chirayus and Nanthaamornphong, 2019). Unfortunately, IM application on the market often designs their interface according to the needs of young people, whereas the age range of these application users is broad (Krayz Allah, Ismail, and Almgerbi, 2021; DataReportal, 2021). In addition, the messaging application is the most widely used mobile application in Indonesia, with its users increasing (DataReportal, 2020; 2021; 2022).

By distributing a survey to Indonesian users of the MIM application, the preferences of several features in the message list and messaging interface of this application are collected. From 150 responses, the results showed that the null hypothesis might not be rejected entirely since, for some elements, both age groups have the same preferences.

Regarding the preferences on the button to create a new message in the message list interface, younger and older users preferred the button at the top bar over than floating action button. Each age groups have different opinions on the type of button for this feature. Younger users liked the icon button with the chat bubble icon and a + (plus) symbol at the corner better, while older users preferred the icon button with text. Then, on marking a message, both age groups prefer to place the option to do that besides the swiped chat. However, they each have a different icon choice that suits them better. Younger users like the pin icon better, while older users find the star icon more suitable. Last, about seeing people's online status in the message list interface, more older users liked and found it helpful to have the online statuses in this interface.

Both age groups preferred the bottom bar, which uses a paper clip icon to send media on the messaging interface. More older users find it necessary to be notified to prevent sending media twice. Then, seeing people's profile pictures was more important for younger users. For the profile picture placement, younger and older users prefer to place it at the top bar next to the contact's name. Regarding the feature to perform the action to the message, each age groups have a different opinion on which action option placement they find better. Younger users preferred those placed under the selected message, while older users found it better if the action options were at the bottom bar. Lastly, both age groups were interested in having a feature that allows them to edit a message but mostly those older users.

When these two age groups have different preferences, the preferences that are suitable to be implemented are those that become their neutral or most preferred option. If either younger or older users choose the element as least preferred, then it is not recommended to implement that. So, the recommended button to create a new message is the button with a pen on a paper icon. Then, for the icon to mark a message, it is best to use the star icon. Those developing a MIM application should consider placing people's online status in the message list interface.

The first recommendation for the feature in messaging interface is to give a notification to users when they are about to send media that have been sent before. Regarding the action option placement that each age group chose differently, placing the action button at the bottom bar is the recommended placement. Then for the feature edit message, it is highly suggested to be implemented.

This analysis has presented recommendations to be implemented in a MIM application that can fulfill both younger and older users' needs. These concrete recommendations are hoped to give a better understanding of what the users preferred most. So, the MIM applications existing in the market can minimize the problems and difficulties experienced by older users while still being preferred by younger users.

As future works, this research can be extended to analyze users' preferences with different demographic backgrounds. Then, a face-to-face interview may also be conducted to collect more specific opinions from the users on these features. For example, the reason why they think the options are least or most preferred. Moreover, this can be extended to identify the preferences of younger and older users towards the UI of other features in the MIM application, such as voice or video calls, notifications, settings, and broadcast messages.

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List of Appendices

Appendix A: Section 1 of the survey	54
Appendix B: Section 2 of the survey	55
Appendix C: Section 3 of the survey.....	57
Appendix D: Section 4 of the survey.....	61

Appendix

Appendix A: Section 1 of the survey

Preferences Towards the User Interface of an Mobile Instant Messaging Application

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* Required

Demographic Data

Which age groups are you categorized in? *

20-30 years old

50-60 years old

Which gender do you identify yourself with? *

Male

Female

Other

What country are you currently living in? *

Indonesia

Germany

Australia

America

United Kingdom

Canada

Other: _____

What is your current employment status? *

Student

Employed

Unemployed

Retired

Which mobile device do you use? *

Android

iOS

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Appendix B: Section 2 of the survey

Preferences Towards the User Interface of an Mobile Instant Messaging Application

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* Required

Overview of Your Mobile Instant Messaging Applications Usage

How long have you been using mobile instant messaging applications? *

<1 year

1-2 year(s)

3-5 years

5+ years

How long do you use mobile instant messaging applications every day? *
(Note: accumulation of time being online)

<1 hour

1-2 hour(s)

3-5 hours

5+ hours

Which mobile instant messaging applications do you often use now? (Could be *
more than 1)

- WhatsApp
- Line
- Telegram
- Snapchat
- Facebook Messenger
- Other: _____

From 1 to 5, are the following features self-explanatory? (1 = Not self-explanatory, 5= Self-explanatory) *

	1	2	3	4	5
a) Sending messages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Sending photos/videos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Sending files	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Creating new message room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Creating new group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Pin an individual/group message	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Reply a specific message bubble	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Delete a message	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Voice/video call	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you need a user manual when using mobile instant messaging applications? *

	1	2	3	4	5	
Not at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very much needed

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Appendix C: Section 3 of the survey

Preferences Towards the User Interface of an Mobile Instant Messaging Application

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* Required

Preferences Towards the Message List Interface

A message list interface is an interface where you can see whoever you have sent messages to, create a new message, pin an individual or group message, etc.

Below are some examples of that.



Preference for the button to create a new message.

How satisfied were you with the floating action button? *



1

2

3

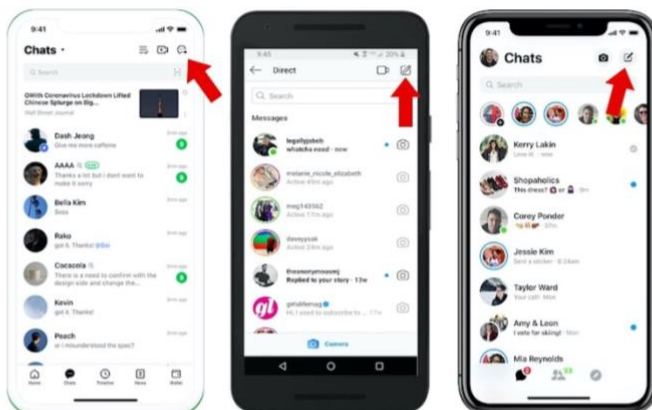
4

5

Very dissatisfied

Very satisfied

How satisfied were you with the button located at the top bar? *



1 2 3 4 5

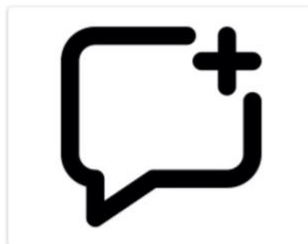
Very dissatisfied

Very satisfied

Which button do you think suits better as the "New Message" button? *

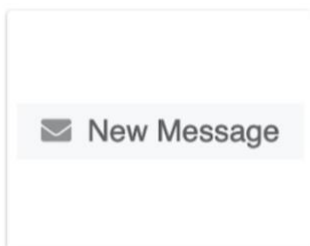


Button A



Button B

Other:



Button C

Preference for marking the individual or group message.

Do you use the feature to pin or mark an individual or group message as favourite? *

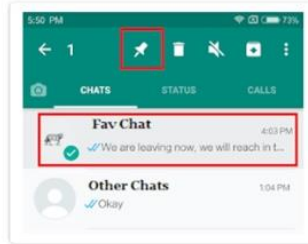
Yes

No

If yes, how do you normally mark a message?



- Swipe the chat and click on the button
- Other:

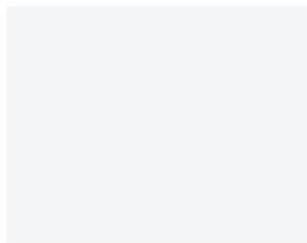


- Click edit, choose message and pin or mark them

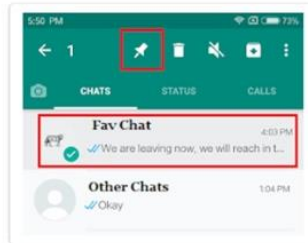
Are there any options below that you find easier to mark a message? If no, choose the same as above



- Swipe the chat and click on the button



- Tapping the message longer and having the options to pin it



- Click edit, choose message and pin or mark them
- Other:

Which icon do you think suits better to pin or mark an individual or group message as favourite? *



- Pin icon



- Star icon



Bookmark icon

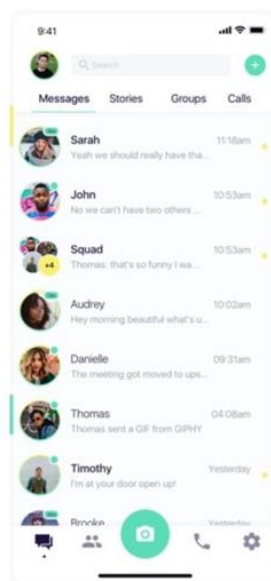
Preference for seeing people's online status.

How important is it for you to see people's online status? *

1 2 3 4 5

Not important Very important

How much would you like to see people's online status in the message list interface? Like below. *



1 2 3 4 5

Strongly dislike Strongly like

How helpful is it for you to see people's online status in the message list interface? *

1 2 3 4 5

Not helpful Very helpful

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Appendix D: Section 4 of the survey

Preferences Towards the User Interface of an Mobile Instant Messaging Application

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* Required

Preferences towards the messaging interface

A messaging interface is an interface where you can send your messages to others, receive other people's messages, etc.

Below are some examples of that.

attachment before?

1 2 3 4 5

Very unnecessary Very necessary

Preference for seeing people's profile pictures.

How important is it for you to be able to see people's profile pictures? *

1 2 3 4 5

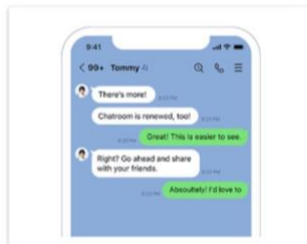
Not important Very important

How often do you look at people's profile pictures? *

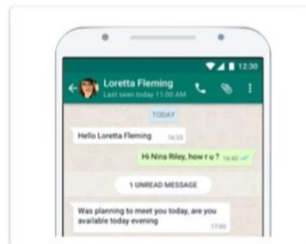
1 2 3 4 5

Never Always

Where do you prefer most to see people's profile pictures?



Beside the bubble chat



Above, besides their name

Preference for performing actions to the message.

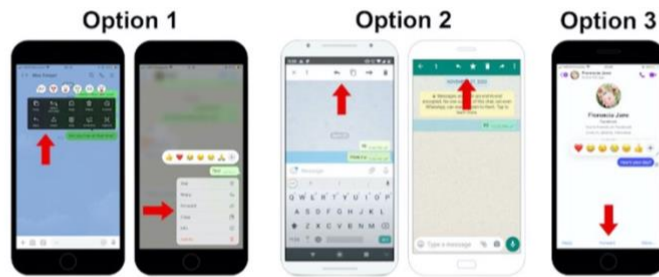
How often do you perform action to the message you've sent or people's message? Like deleting, forwarding, copying, reacting, etc. *

1 2 3 4 5

Very rarely Very often

Please rank these interfaces below. *

Choose which option you preferred most, neutral, and least preferred.



Option 1: actions
under the message
bubble

Option 2: actions at
the top bar

Option 3: actions at
the bottom bar

Least preferred	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Neutral	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most preferred	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Would you be interested if you can edit the messages you've sent? Instead of deleting them *

	1	2	3	4	5	
Not at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very interested

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I hereby confirm that I have written this thesis myself independently, that I have used no sources or aids other than those cited and that this thesis has not been submitted in the same or similar form to any other examination authority.

Place, Date

Signature

(Jennifer Surjanto)