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# USER INTERFACE DESIGN FOR MOBILE APPS TO PREVENT AND HANDLE HOME ACCIDENTS FOR YOUNG FAMILIES

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***ABSTRACT***

*As most people know, home is the safest place to be in. However, many risks lurk in the household environment, which can result in Home Accidents. Home Accidents themselves often occur in young families due to high mobility and being busy working because of the Hustle Culture. This makes young families unfamiliar with the environment they live in and it tends to get them confused when Home Accidents occur. On the other hand, guidance regarding Home Accidents, especially for young families, is still difficult to access. Thus, it is necessary to design a guide that is easy to access on how to prevent and handle Home Accidents for young families. Therefore, this guide is designed using a User Interface for mobile apps that is suitable for the target audience's lifestyle so that they can use it easily in the case of emergencies. The User Interface Design for this study uses the Design Council method by the United Kingdom. As a result, this User Interface Design for mobile apps works well to help young families prevent and handle Home Accidents. However, because this simulation requires internet connection, website, and application to operate some of the button icons and images appear late, so this study is also open for further research.*

***Keywords:*** *Guideline, home accidents, mobile apps, user interface design, young families*

## 1. INTRODUCTION

Many people think that home is the safest place. In reality, many dangers and risks lurk in the household environment. These hazards and risks include fire, food poisoning, chemicals, accidents, and so on (Maharani, 2021).

Nurahmartiyani, *et al.* (2009) found that Various events can occur in the home environment, both planned and unplanned. Things that have never been planned before can have a bad impact on the occupants of the house. An event that has an adverse impact can be anticipated and prevented beforehand.

### Home Accidents

According to the KBBI, an accident is an event that causes harm to someone. While Rumhi, *et al.* (2020) found that Home Accidents are defined as any incidents that occur in the house or around it that result in injuries that are not done on purpose but occur due to accidents. Home accidents are also a general problem in society; most are preventable (Doğan & Öztürk, 2021).

Nurahmartiyani, *et al.* (2009) also found that Home Accidents or dangerous occurrences in the home environment can come from external factors that come from outside or from within, which are usually caused by inappropriate behaviour of the house's occupants.

Through a survey from injuryfacts.nsc.org in 2020, an estimated 156,300 preventable injury-related deaths occurred in the home, or approximately 78% of all preventable injury-related deaths in that year alone. The number of deaths also increased by 18.9% from the 2019 by total of

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131,400. An additional 46,800,000 people suffer non-fatal medical consultation injuries. The prevention and management of home accidents should be given urgent attention (Sackitey, 2018).

**Home Accidents in Young Families**

Home accidents often occur in young families who are just getting married because, in general, young families have high mobility (Siregar, 2017) caused by Hustle Culture; in which a person feels compelled to work wherever and whenever (Dedy, 2022). This is why young families, especially in Greater Jakarta, who are also busy working and pursuing careers tend to have home accidents.

This is also evidenced by the data from BPS Provinsi DKI Jakarta for Greater Jakarta as the capital city in Indonesia with the number one population density in 2021 of 14,555 people per square kilometre and with a high percentage of the workforce, namely those aged 20-24 years at 66.55% and those aged 25-29 years at 76.84 %. Because they are busy working, young families often feel unfamiliar with the environment in which they live in, so they tend to get confused about how to handle Home Accidents. Thus, families must be knowledgeable about accidents that originate in the home and their surroundings (Dolgun, *et al*. ,2017)

A survey was also distributed to 65 respondents who were from young families aged 23-27 years. The results of this survey show that almost all young families understand Home Accidents, but many still do not know how to handle them (73.8%). Even though they know the risks, the majority of young families still take the wrong steps or methods; for example, during first aid for burns, they apply toothpaste to the wounds. Education on how to prevent and deal with Home Accidents is still very much needed in young families so that they can take precautionary measures.

**User Interface Design of Application as Guide**

Application is software that is programmed for certain needs (Rustan, 2020). Some of the advantages of mobile applications, include:

a) User Interface and User Experience (UI/UX) for mobile applications that are attractive, easy to use, and varied.
b) Some applications can be used without having to be connected to the internet.
c) Users can access applications anywhere via gadgets (Arsyad, 2011).

Meanwhile, User Interface is a visual representation of a digital product. The obvious use cases are apps and websites. UI is the link between a user and product functionality. UI is used to help achieve the desired result through a series of human-machine interactions. A user interface is a mix of grids, layouts, typography, colors, animations, and micro-interactions (Malewicz, 2020). A good User Interface will help users get information according to what they need. Therefore, every application with a good User Interface and User Experience will make users comfortable (Pratama & Cahyadi, 2020).

In today's digital era, Kurniawan & Cahyanti (2013) found that the majority of people fulfill their needs with smartphones because it provides various conveniences through various applications. Smartphone use in Indonesia has also increased by up to 78%.

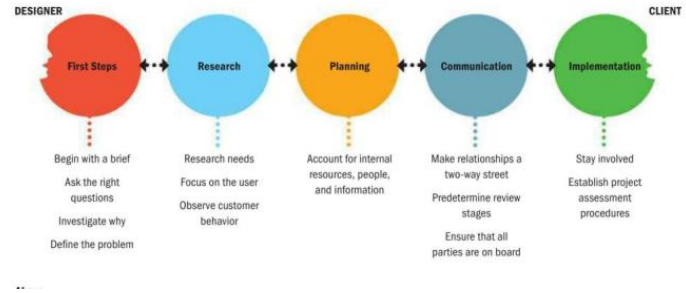
Based on the Hootsuite and We Are Social 2021 surveys, it is recorded that the number of internet users aged 16-64 years in Indonesia who have smartphones is 98.2%. It also shows that almost all smartphone users with internet access also use applications.

This was also supported by a survey that was distributed to 65 respondents who were young families aged 23-27 years. In this survey, 90% of respondents answered that they most often use application media and 80% of them also chose the application as the most suitable media to be used as a guide for Home Accidents. This is why it is necessary to design a guide that is easy to access on how to prevent and handle Home Accidents for young families. Therefore, this guide is designed using a User Interface for mobile apps that is suitable for the target audience's lifestyle so that they can use it easily in the case of emergencies

## 2. RESEARCH METHOD

The method used in this study is the Design Council Method by the United Kingdom (O'graddy, 2006).

**Figure 1**
*Design Council Method*




Based on [Figure 1], the first step of this stage is to find the problems and urgency through observation, then at the research stage, it is carried out with a qualitative research method because this research does not use calculations but is descriptive and tends to use analysis. The qualitative data collection used in this study was an interview with one of the Cipto Mangunkusumo Hospital (Rumah Sakit Cipto Mangunkusumo/RSCM) doctors, the head of publications from the Jakarta Fire and Rescue Agency (Dinas Pemadamdan Penyelamatan DKI Jakarta), and a survey on target to find out information about Home Accidents in young families. Through literature data to collect data on topics discussed through reliable and relevant sources on how to prevent and deal with accidents at home.

Then, at the planning stage, references are collected such as icons, layouts, illustrations, typography, and color palettes to be applied to the design. The communication stage is carried out by determining the contents of the guideline and communication strategy so that it can be conveyed to the intended target audience, and in the final stage, Implementation with creating a design wireframe and prototype by implementing the four previous stages.

## 3. RESULTS AND DISCUSSIONS

### Interview Data

Based on the data collected via Google Forms survey among young families aged 23-27 years old living in Greater Jakarta, it can be concluded that almost all respondents understand what Home Accidents are. However, many still don't know how to handle them (73.8%). Even if they know how to handle it, there are still many wrong steps, for example, during first aid by applying toothpaste to burns. Respondents also used application media the most (90%) and chose application as the most suitable media as a guide (80%). Apart from that, the respondents were also interested in the guides which were made with illustrations, and hoped that the guides could be made simple, interesting, and as informative as possible.

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Based on interviews with a doctor from Cipto Mangunkusumo Hospital and the head of publications Jakarta Fire Rescue and Agency, it can be concluded that Home Accidents that occur among young families range widely from minor injuries in the kitchen due to fires. However, when the Jakarta Fire Rescue and Agency held a socialization, a majority of young families were also busy with careers. It makes it difficult for them to participate in socialization and there was also no specific guidance or training on home accidents, so it is important that an application should be created, especially in today's digital era to prevent home accidents.

**Target Audience**

The target audience for this topic are young families (23-27 years old) in the Greater Jakarta area. The reason for choosing young families is because in general, young families have high mobility (Siregar, 2017) due to Hustle Culture (where a person feels compelled to work wherever and whenever) (Dedy, 2022). That is why young families, especially the ones living in Greater Jakarta, who are also busy working and pursuing careers tend to have more frequent home accidents.

**User Interface Design Concept**

Based on the results of the data analysis phase, an application concept was developed. The User Interface application concept is educative and informative, which can provide complete and integrated information on how to prevent and deal with accidents, as well as complete features according to the needs of dealing with emergencies at home.

The color palette of this User Interface design uses blue and red as primary colors because it is based on the color of psychology. Namely blue is often associated with trust, professionalism, experience, or wisdom, while red symbolizes negative emotions (danger, adrenaline, warning, aggression) (Malewicz, 2020). In addition, according to wonderpolis.org, red and blue are often used as emergency colors because people who have difficulty seeing red often have no trouble seeing blue and vice versa. The use of color codes for text and backgrounds also has a contrast ratio that is much higher than the minimum of 4:5:1.

The typography used in the User Interface of the Home Accidents Prevention and Handling Guide application is Sans Serif, namely Poppins and DM Sans. The use of this typography is because it can give the impression of being modern, smart, and simple. In addition, Sans Serif also has a high level of legibility (Bigelow, 2019).

The illustrations used in the User Interface design for the prevention and handling of Home Accidents guide application are semi-realistic illustrations made with the help of the Adobe Photoshop software. The use of semi-realistic illustrations is a type of illustration that is often used in education (Stefyn, 2021). In addition, the use of this illustration is because it adjusts to the target age, namely 23-27 years. Lastly, the colors used in this illustration are pastel colors to give a calming impression (Pramesti & Sakya, 2022).

An icon can visually help users comprehend the meaning of an application (Kamarulzaman, *et al.*, 2020). The use of icons in this User Interface is also simple & rounded, because the simpler an icon, the greater the chance to understand it. Icons with rounded corners also give a user-friendly impression (Malewicz, 2020).

**Applicating Concept to User Interface Design**

After developing the concept, the next process is creating a site map, wireframe, style guide, design, and prototyping.

**Figure 2**
*Site Map*


Based on [Figure 2], before creating wireframes and designs, a sitemap is created to make it easier for users to find out the flow of using the application from start to end.

**Figure 3**
*Wireframe*

Wireframes are particularly useful for illustrating the rough structure of a page and indicating how images, text, and other content will be arranged on it (Fadli, 2022). Based on [Figure 3], the making of wireframe and User Interface Design using principles according to Galitz includes accessibility, aesthetics, consistency, efficiency, familiarity, forgiveness, recovery, responsiveness, simplicity, and structure (Budiawan, 2019). The wireframe also defines the layout and grid design used for each interface.

**Figure 4**
*Style Guide*


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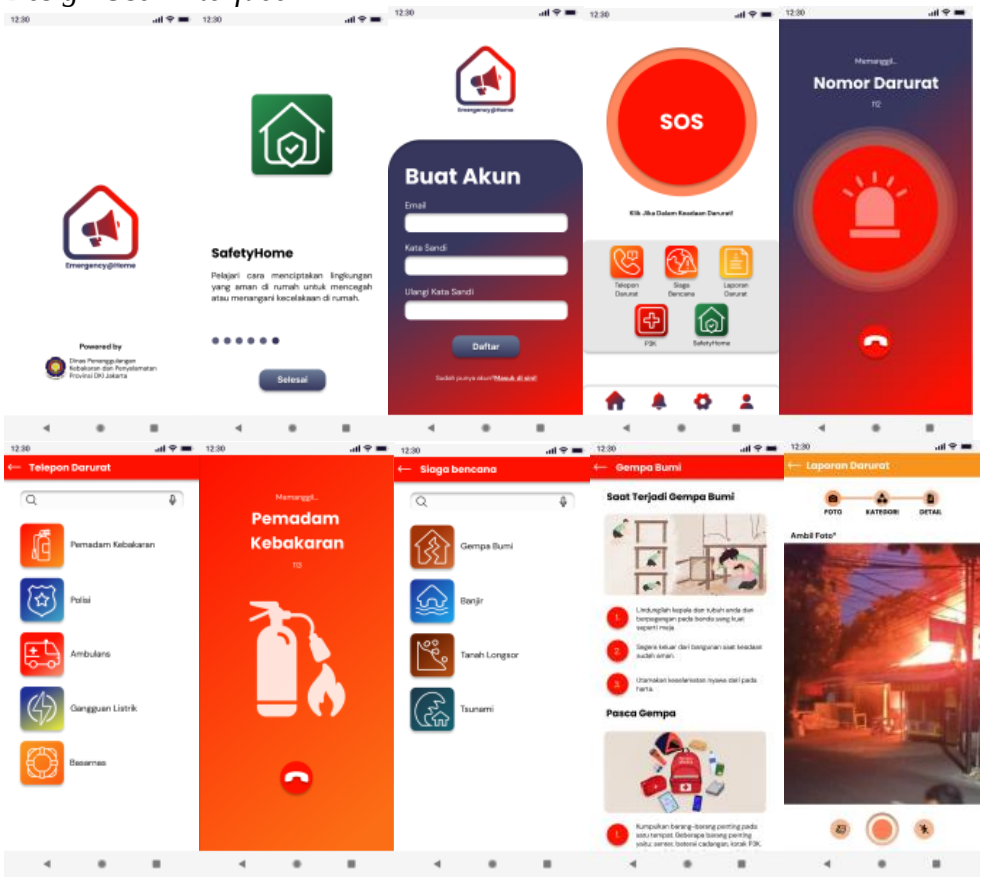
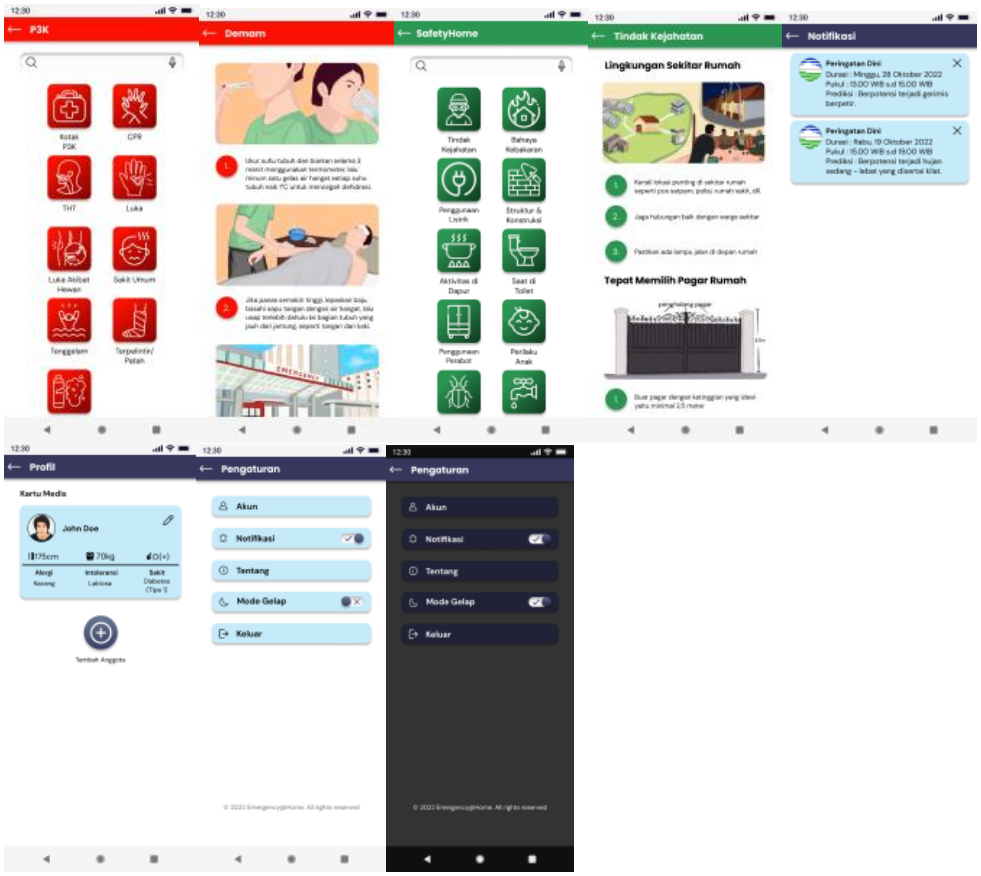
To make it consistent and easier to design the user interface, a style guide is also made [Figure 4], starting from the use of fonts, colors, buttons, and icons. Style guides can also provide basic conventions for a particular product. According to Hasibuan, style guide includes a description of the required interaction style and control of the user interface which includes appearance and behavior.

In using style guide fonts, it explains how to use fonts in terms of thickness and size for various uses such as displays, headlines, callouts, body text, and captions. The use of color guides explains the use of color codes in this application, starting from the primary colors, base colors, semantic colors, illustration colors, and category button colors. The button guide describes the size, corner radius, emphasis, and shape of each button in the application. Lastly, the icon guide describes what icons are used in making the user interface of this application, starting from the bottom navigation menu, categories, sub-categories, settings, and others.

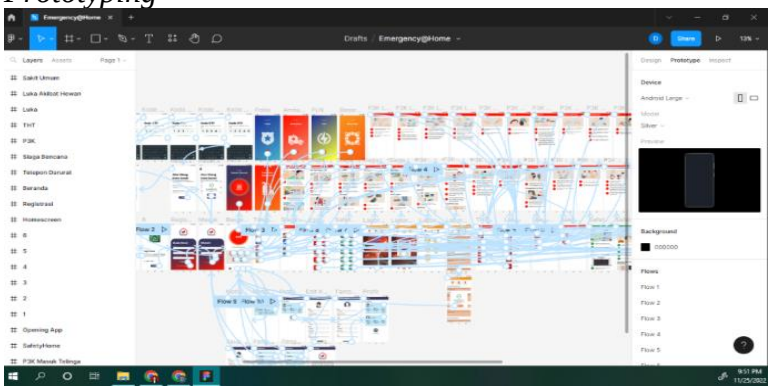
**Figure 5**
*Design User Interface*






[Figure 5] show some of the final User Interface designs after using style guides for the wireframe. Most of these final designs use colourful colors just like the color guide to make users easily differentiate the categories. These final designs include a splash screen at the first opening of the application, onboarding screens (explaining the features of this application), sign-up, home screen, emergency shortcut button call, emergency calls & the interface when calling one of the categories like a firefighter; disaster alert which contains guidance on natural disasters; emergency report interface where user can report with picture and text; first aid which contains guidance on first aid steps; safety home which contains guidance for creating a safe environment at home; notification interface to give notifications about the weather and natural disasters; profile to add medical card of the family members, and settings to set the application according to the user's desire, such as dark mode.

**Figure 6**
*Prototyping*



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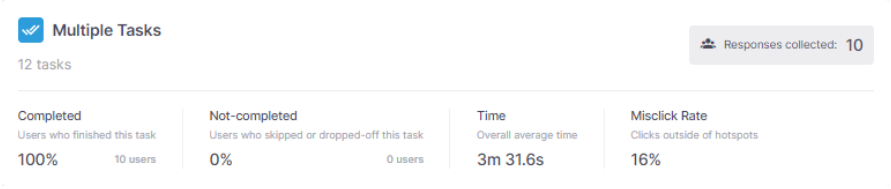
The Prototype stage provides a design for the system that will be made based on the discovery of existing ideas (Suratno & Shafira, 2022). Based on [Figure 6], the making of prototypes is carried out using the Figma software to provide a realistic simulation of the user of the application, both in terms of design and as a whole. So, it can move to the desired page when clicking the button.

## User testing and evaluation

**Figure 7**

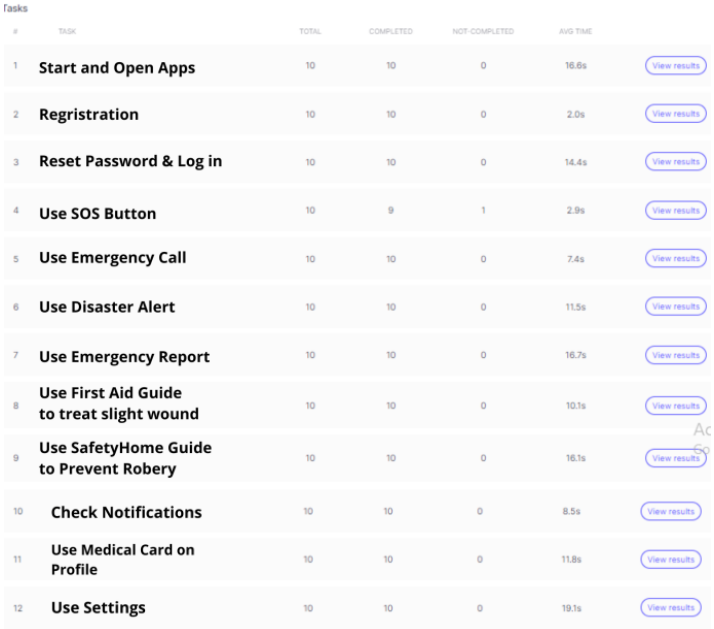
*Overview of the User Testing*




Based on [Figure 7], user testing was carried out using the Userberry website on December 10, 2022, with 10 testers (young families, 23-27 y.o) living in Greater Jakarta. The average testing time is 3 minutes, with 100% completion, 0% incompleteness, and 16% misclicks.

**Figure 8**

*Overview of every Testing task*

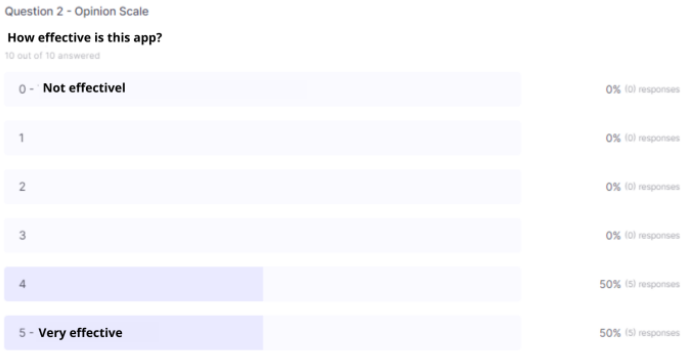



Based on [Figure 8], are some of the existing tasks with the average time and results, one tester failed when using the SOS button due to connection problems. After user testing, an evaluation is also carried out through several questions to find out the tester's opinion on the design of this application.

**Figure 9**
*Evaluation testers: How optimal is this app?*

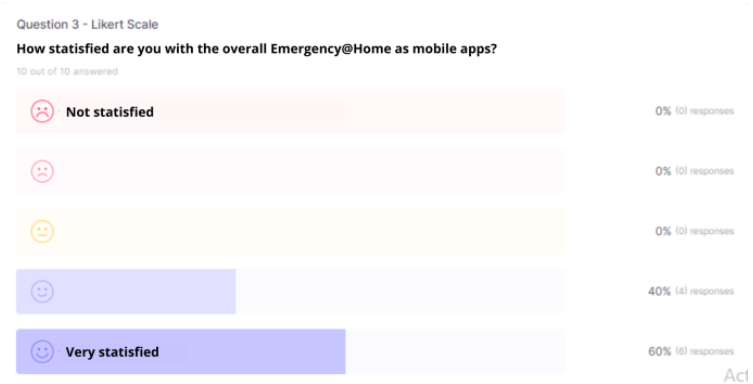

Based on [Figure 9], on this evaluation, 70% (7 testers) chose 4 and 30% (3 testers) chose 5 which is very optimal. So, it can be concluded that this app has been quite optimal and works well.

**Figure 10**
*Evaluation testers: How effective is this app?*




Based on [Figure 10], on this evaluation, 50% (5 testers) chose 4 and 50% (5 testers) chose 5 which is very effective. So, it can be concluded that this app and all its features have been effective.

**Figure 11**
*Evaluation testers: How statisfied are you with the overall Emergency@Home as mobile apps?*




Based on [Figure 11], on this evaluation, 40% (4 testers) chose 4 and 60% (6 testers) chose 5 which is very satisfied. So, it can be concludedthat they are satisfied with the overall Emergency@Home as mobile apps.

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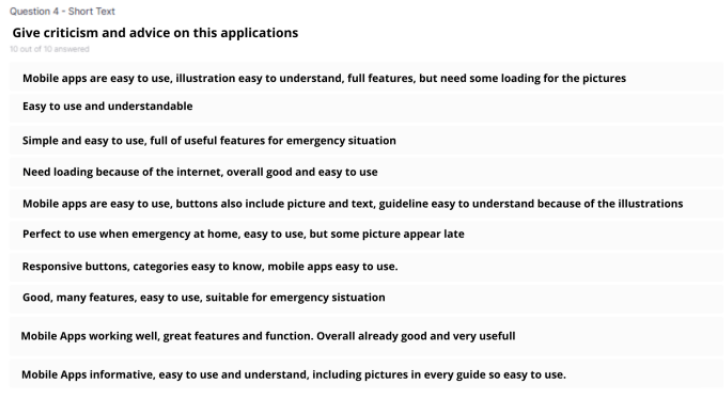
**Figure 12**
*Evaluation testers: Give criticism and advice on this application*




Based on [Figure 12], the following criticism and advice on this application, it can be concluded that the use of user flow, effectiveness, and user interface appearance is quite optimal and can be used properly. However, some guide drawings appeared late, and after analysis, this was also influenced by the Figma application used for prototyping and the Userberry website for testing, both of which use the internet for operation, so that if there is a connection problem, it will disrupt the testing process.

## 4. CONCLUSIONS AND SUGGESTIONS

Based on literature research, survey data, and interviews that have been conducted, it can be concluded that there are still many young families that do not know how to prevent and deal with home accidents. This happens because they have high mobility caused by hustle culture and pursuing careers making young families tend to be negligent about their homes and confused on how to act when a Home Accident occurs. Therefore, this guide is designed using a User Interface for mobile applications as a medium that suits the lifestyle of the target audience, so it can help young families prevent and handle Home Accidents in the future. Through the User Testing and evaluation results, it was also concluded that this simulation UI application works well. However, because this simulation requires an internet connection, website, and application to operate some of the button icons, and images appeared late. Therefore, this study is also open for further research.

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