A Simple-Designed Mobile Chat Application for Elderly People

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ABSTRACT

In the digital era, the Internet and mobile apps have played a vital key to communication, especially in this pandemic. This study aimed to design an app that overcomes the digital barriers and challenges elderly people face when using a chat application. While the most modern chat apps have a lot of interactive features for more usability, elderly users often struggle to navigate them because of lack of technical capabilities. Making things worse, older model of cell phones and apps are slowly discontinued, leaving them to choose between missing out or straining themselves from using cell phones. Thus, the authors came out with the main objective of this paper: to design a minimalistic and user-centric app specifically for elderly people in order to reduce their digital boundaries and simplify communication with their closed ones or anyone via online calls and text messages. To create a personalised solution for this issue, authors used a human-centred design approach in creating the app. The authors first reviewed relevant existing literatures and existing data, before incorporating the information with the findings from the interview and observing target users. It was found that not only the elderlies have difficulties in complex app, but they also struggle with compact contents, small fonts, and low contrast colours. Responding to these needs, the authors designed a simpler system that provide the basic features to make them feel more comfortable. The app also includes a spacious and accessible layout with essential features such as Profile, Contacts, Call Logs, Text Messages, Emergency, and Star Contacts. It's easy navigation flow allows users to immediately use the features after a quick sign-up. Authors It is expected that this elderly-centred designed app will create a unique platform for elderly people to engage and participate in the digital era. Relevant to the simplicity concept, the app is named Easy Chat

Key Words: Elderly People, Digital Barriers, Challenges, Human-Centred Approach.

1. INTRODUCTION

We currently live in a digital age, in which the world receives innovations and technologies every year. Digital divisions and boundaries are changing constantly due to the exponential growth of ICT (information and communication technology). Thanks to technological advancements, everyone in the world is known as a global community, whereby people from all corners of the globe can communicate with each other. Mobile chat applications, specifically, have made our lives simpler and easier in an infinite number of ways. It's difficult to imagine a day without a chat application now, and they are getting more advanced on a rapid scale. Regardless, the attractive design of most mobile-based communication platforms comes with a price: difficult to understand functionalities. Due to this setback, Generation X who had a hard time coping with fast technology growth was confounded by the latest updates, navigation changes, and complicated operations. All they wanted to do was communicate, and all they needed to communicate were basic features, easy navigation, and a clear design. Unfortunately, according to Phiriyapokanon (2011), current software was intended for young users only, with fewer considerations towards age-related changes. However, it cannot be denied that the situation arose from the community's digital and technological demands, whereby was mostly used by young people.

The challenges that elderly people face when using a chat application were summarized in this paper, before a comprehensive solution to help them communicate more easily was proposed. The

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techniques and strategies used in this study were carefully selected and applied to effectively organise and utilise information, which consequently developed and served the needs of elder users. The proposed solution also aims to help elderly people communicate efficiently and simply by providing a well-organised interface, minimalistic design, and a simple navigation process. To cater to this issue, the authors addressed Human-Computer Interaction (HCI) in this paper and examined some design concerns from the perspective of older adults' experiences. Ultimately, a suitable chat application prototype is proposed, based on a knowledge of the difficulties encountered by the elderly. The design of the application, which is focused on elderly users, emphasized simplicity and minimalism, which was hypothesized to ease the elderly to connect to their family members through mobile technology.

2. LITERATURE REVIEW

Our life is now heavily dependent on several digital platforms. This fact was supported by Williams et al. (2016), mentioning that e-mail, video, web browsers, and reminder management services are all capable of assisting and enriching older adults' daily lives. While digitalisation of physical services is inevitable, the COVID-19 pandemic had sped it unexpectedly. The need for maintaining contactless transactions and social distances had pushed people to stay at home for professional, social, and personal tasks. Thus, communication with anyone is now completely got reliant on chat applications. In a study, Ellison and Hancock (2020) stated that digital technologies, such as social networking sites, video chat, and online games, can help people maintain social connections during this period of physical complete distance. However, it is frequently difficult for the elderly to use these applications, resulting in lagging and failing to adapt in this new digital era. With this pandemic, they were indirectly forced to turn towards these online services. Yet, instead of making their lives easier, these applications only give them a harder time.

2.1. Design Challenges Encountered by Elderly People

There were already studies made to determine the challenges and complications that older adults experience when using technological tools. According to some, lack of digital understanding was the most prominent problem. Singh (2019) suggested that this problem persisted even if elderly people figure out how to operate smartphones. If they were not accustomed to the movements, they can get confused and be at a loss on how to navigate. Other than that, elderly users also face physical limitations related to natural aging. This phenomenon was explained by Caprani et al. (2012), who mentioned that aging affects stiffness in motion, making it hard for the elderly to navigate small interface elements. Elderlies over the age of 65 may also have trouble pressing buttons on digital devices. These issues were supported by Mohamad Faisal et al. (2014), who pointed out that when building smart technology for the elderly, these aspects should be carefully considered: vision, hearing, and figure movement.

Besides physical capabilities, Faisal et al. (2014) mentioned that an elderly's cognitive abilities were also among those that decline with age, which included grasping the conceptual representations that underpin smartphone settings and knowing who their major social contacts are. It may also result in information overloading and hardship in concentrating. This situation was worsened with the fact that most of the contemporary chat applications were designed with a high level of interactivity and complexity, mostly focused on the younger generation. These suggestions were aligned with the findings from Anam and Abid (2020), most elderly and low-literate users avoid using smartphones because they have difficulty communicating with it. The main culprit was found to be multi-touch problems. Due to this issue, they were unable to register the button's activity. Thus, our inexperienced older generation who was unfamiliar with the concept and lacked the required digital literacy often struggle to comprehend and use those programs.

Additionally, since modern applications are mostly aimed at young people, the design and structure were mainly following their preference and popular trends. On this matter, Moore and Hancock (2020) emphasized that when it comes to utilizing digital media to socialize, one challenge that older adults face is that they are less likely to have access to it than younger people. In fact, the contemporary smartphone infrastructures may also not correspond to the demands and technological needs of the elderly. This situation should not be taken lightly since even though the usage of smartphones and mobile apps was dominated by the young generation, the number of older people utilizing mobile phone applications is growing with the rise of interest in new chat application platforms. Still, the challenges the elderly faced

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resulted in an unsatisfying user experience and them considering social networking less enticing. Thus, developing and designing a digital platform, particularly for elderly people, required more attention.

3. METHODOLOGY

This study followed descriptive analysis to understand the connection and interaction between elderly people and their experiences with digital platforms including chat applications. This study was participated by four senior citizen volunteers from Dhaka, Bangladesh, aged between 59 years old and 65 years old. All participants shared similar digital exposure and literacy. They had used Viber and WhatsApp for 1 year, and none of them used more than two chat applications at a time.

The authors followed a mixed-method approach to gather primary data, which included online interviews and face-to-face observation. The interview consisted of an informal semi-structured set of questions to evaluate and share their requirements. Among the questions were as listed below:

  i. What are the major issues you face when navigating a chat application?
  ii. For an elderly-centred designed chat application, what will be your first requirement?
  iii. Which features do you think are non-essential for you while you use a chat application from the perspective of an elderly person?
  iv. Do you think physical condition can be a barrier for you to use a chat application?

The prototype of the application was first designed based on the interviews and existing literatures. Upon the completion of the first design, the participants tested it in the User Acceptance Test (UAT). The process flow of the UAT started with (1) inviting the expected guests for testing, then (2) letting the participant navigate through the system, followed by (3) providing the questions and explaining the flow, before (4), asking them to use the features, while (5) computing the time taken for each activity before (6) closing the test and (7) collecting the feedback and recommendations. The prototype was adjusted according to the comments, producing the high-fidelity prototype. The UAT was then conducted again on the final prototype.

4. PROPOSED DESIGN SOLUTION "EASY CHAT" ON THE PERSPECTIVE OF ELDERLY PEOPLE
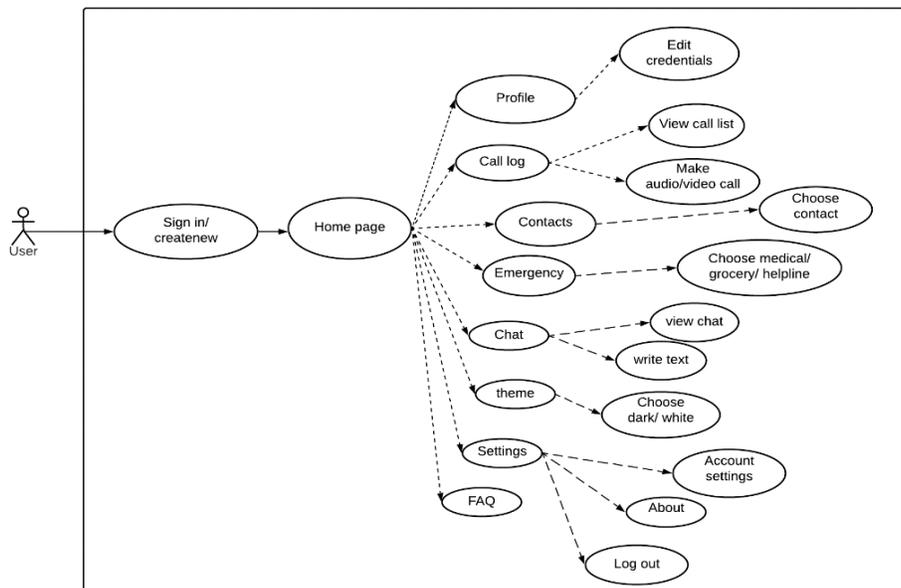
4.1. Physical Design of Easy Chat

Figure 1: Use case diagram for Easy Chat App

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Figure 1 displays the use case diagram of the proposed mobile application 'Easy Chat'. Existing users can choose to easily sign in to the app with their fingerprints. For new users, they must create an account by simply providing their name, phone number, about, and fingerprint. After submitting, they will immediately get access to the Home Page and other features, including Call Log, Profile, Contacts, Themes, Emergency Contact, and Star Contact.

4.2. User Interface and Interaction Design

A good user interface is one of the key elements for a successful interaction between the mobile app and users. The prototype of "Easy Chat" has designed with Figma , Adobe Xd and adobe illustrator. This design has been uniquely and especially designed with necessary features and senior-friendly colours which were illustrated in the figures below.
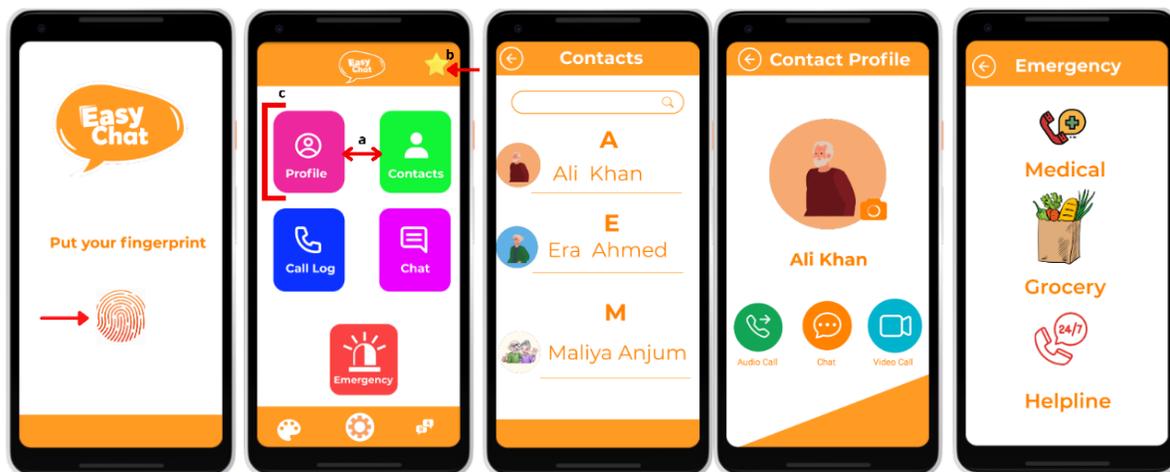

Figure 2-6: Sign-In Page, Home Page, Contacts Page, Profile Page, Emergency Page in Easy Chat App

As seen in Figure 2, for a secured user sign-in method, the authors only offer the fingerprint option, which will remove the need for elderly users to type passwords or other easy-to-forget credentials. This feature will enable them to easily sign into the app, suiting their cognitive capabilities. In the Home Page, as seen in Figure 3, users will have access to all the functionalities in a spacious interface: (a) Showed the wide space between each button, which will decrease miss click tendency of older adults, (b) indicated the Star Contact feature, which will allow the elderly user to call directly a person they contact on regular basis, such as the user's child, and (c) presented spacious area in a button (144px*169 px) to maintain the accuracy of navigation flow. As seen in Contact Page in Figure 4, Easy Chat used an easy-to-read font with much bigger font size (Montserrat, 40, 48 px) than contemporary chatting apps. The sizing can help to overcome their vision restriction. When the user clicks on a contact's name or profile picture, they can easily choose the button to send a text or make a call – audio or video, directly to the contact. Instead, if a user clicks on Emergency Button as shown in Figure 6, users can immediately contact medical assistance, grocery shopper, and helpline for any kind of emergency – such as 911. This simpler navigation process will decrease information overloading and provide a user-friendly interface which will help the user to communicate in a simple and efficient way.

5. RESULTS FROM USER ACCEPTANCE TEST (UAT)

After the prototype design was completed, the participants were invited to perform the UAT. From the feedback gathered, the design was polished into a high-fidelity prototype and the UAT was conducted again. Significant results and feedbacks from the UAT is represented in Table 1 below.

Table 1: User experience and feedbacks

Gender	Age	Activity	Duration		Feedback
			First Test	**Final Test**	
Male	65	Create an account and log in with a fingerprint	1 minute	52 seconds	Easier than before
Female	63	Navigate landing page and select feature	43 seconds	38 seconds	Enough space to click and icons are clear
Female	66	Send and read text	1 minute 15 seconds	1 minute	Moderate, voice text will help more
Male	59	Choose to contact and make emergency call	40 seconds	25 seconds	Simplified enough and star contact make the communication easier

6. DISCUSSION

This study intends to showcase a simplified design that reduces the digital obstacles and complexities that elderly people face when using a smart communication app. "Easy Chat" design is particular and specially made to meet the needs of older persons. This design simply has basic functionalities and a minimalistic user interface so that users don't miss click any buttons, have visual issues, or other digital struggles that authors mentioned above. Next, this study's main goal is to design a simple communication platform for the elderly, so they are not left behind in the digital age and participate.

From the existing literatures and interviews authors analysed that elderly people prefer simple designs and a basic navigation flow. Participants stated during the interviews about their design demands and requirements which are based on their previous technological experiences. The method succeeds because it prioritizes the users' requirements and conducted with a humanistic approach. Besides from the face-to-face interviews, the authors discovered that older people had trouble navigating because of the use of colour, fonts, and non-essential features. To make the design more user-friendly, the authors included extra-large fonts, spacious interfaces, and necessary features. Easy chat design was developed utilizing a flexible methodology which will help respond to changes in the user's wants and requests, as well as continuously improve the design according to the users' demands. Also, by user acceptance tests, users' direct involvement helped in decision-making, resulting in positive user feedback and recommendations. As authors mentioned earlier, to perform the study properly and make it more interactive for the target consumers, the authors used user-centered design. Due to the COVID-19 pandemic, just a few elderly persons were able to participate. The authors plan to conduct larger experiments in future to understand this issue better and enhance the system. As a result, knowing how older individuals prefer to use their phones and apps would help developers produce better systems that meet the needs of their target demographic. Lastly, the designed prototype's main purpose is to help the elderly users and navigate a chat application easily as well as it will save them time and let them communicate with friends and family in a simpler way.

7. CONCLUSION

Even though we now live in a digital world, the older generation struggled to keep up with the technological advances due to the lack of elderly-friendly designs. That is where this Easy Chat application comes as a solution. Easy Chat helps older people in utilizing a chat application by allowing them to navigate through the application easily. It offers freshly developed conversation software specifically for the elderly. They will be able to easily make phone calls, send texts, and use their smartphones daily without assistance from younger people. Easy Chat enables the bridging of the digital gap between different generations. This solution can also increase the awareness to the public that a more user-friendly platform is crucial in encouraging the elderly to become more interested in ICT. Since technological advancements now becoming a necessity in our everyday lives, these ICT accessibilities should be available to the elder generation as well. However, due to the current COVID-19 pandemic, the design can only be tested on a small number of participants, thus the results cannot yet be generalised to the whole elderly population. It is suggested that the study is continued on a larger scale for better effectiveness. The obstacles and opportunities addressed in this paper are not specific or restricted to this period only but will continue to be relevant in the future.

In conclusion, the purpose of this paper is to introduce a platform for older people and assisting them in navigating it in a user-friendly manner. The authors aimed to develop a more interactive and assistive designed application that will allow target users to converse and socialize with ease. Most significantly, the target users will be able to master the features and navigations without any additional help. This application will provide a creative and novel platform for senior citizens to participate in the digital realm.

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