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Exploring the elderly user experience in using digital health interventions: a case study of the MySejahtera application

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ABSTRACT

In recent years, there has been increased interest in using digital health tools to improve healthcare outcomes and encourage healthy lifestyles. However, older adults, who often face challenges with technology, may encounter difficulties when using these tools. This study focused on understanding how elderly individuals experience the MySejahtera app, a digital health tool designed to help manage health during a pandemic. The research involved 30 elderly users through focus groups, interviews, and user experience evaluations. The study identified key themes in the elderly user experience, such as the need for simplicity, efficiency in the app's interface, ease of learning, concerns about security, and emotional reactions. Recommendations were made to enhance the engagement of elderly users with digital health apps. While the MySejahtera app shows promise for older adults, the study highlights the importance of addressing specific design considerations and providing support to improve user satisfaction. Overall, the research offers valuable insights and recommendations for designing and implementing digital health applications that better meet the needs and preferences of elderly users.

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1. INTRODUCTION

According to Medeci [1], the world has experienced changes in its population and health due to improved living conditions and advancements in medicine and public health. On October 20, 2022, the Department of Statistics Malaysia (DoSM) announced that Malaysia has officially become an aging country [2]. The elderly population in Malaysia refers to individuals aged 60 years and above [2]. This year, it is projected to reach 7.3% of the national population, in line with the United Nations' definition of an aging nation where 7% of the total population consists of individuals aged 60 years and older [2]. However, the increasing number of elderly individuals poses significant implications for healthcare, financial resources, and facility spending required to improve their health and quality of life [3]. The global outbreak of COVID-19 since the beginning of 2020 has brought about significant challenges and hardships for the elderly

population, and in the post-pandemic world, they face new challenges in developing health technology for elderly well-being [1].

In recent years, there has been a rapid growth in the use of terms like "mobile healthcare applications," "mHealth," "mobile health," or "healthcare application." The World Health Organization (WHO) defines a mobile healthcare application as a practice that combines mobile technology, such as mobile phones, with medical and public health services [4]. Particularly during the COVID-19 pandemic, where social distancing is crucial, these healthcare applications have gained even more importance [5]. The concept of providing healthcare through mobile technology has become popular, and some argue that mobile health applications have the potential to expand healthcare delivery options and address health-related concerns for the elderly [6]–[8]. Mobile healthcare apps offer a convenient way for older individuals to take care of themselves, access health information quickly, and become more involved in managing their health. Despite these advantages, the adoption of mobile healthcare apps by the elderly remains limited. Older people are known to be slow in adopting new technologies, and when it comes to mobile health applications, they lag even further behind the general population.

The concept of user experience (UX) is highly relevant in understanding the challenges faced by elderly users in utilizing mobile health applications. In Malaysia, where the majority of elderly have low health literacy, providing a platform for the elderly to access health-related information is crucial for empowering them to take better care of their health [9]. Mobile health applications have been recognized as ideal tools for self-management in healthcare services, particularly for the elderly [10]. However, many existing mobile healthcare applications fail to meet the needs of elderly users. Previous studies have highlighted that the complicated design interface and features that do not align with the expectations and requirements of the elderly contribute to their difficulties in using these applications [11]–[13]. These challenges are often attributed to issues related to the user interface (UI), navigability, and the complexity of functionalities within the apps [14]–[17]. Certain features may be difficult to understand and time-consuming for elderly users, impeding their ability to effectively use the applications in their daily lives. This situation arises due to a lack of prioritizing the needs of the elderly during the design and development process of these applications, resulting in limited usability and decreased likelihood of usage among the elderly population. It is vital to take into account which elements of user experience can help improve the existing mobile health apps for elderly users. Therefore, the objective of this study was to investigate how elderly users perceive and interact with the MySejahtera application, a digital health intervention created to assist with health management during the pandemic.

2. METHOD

In this study, researchers employed in-depth exploration through user experience evaluation to gain comprehensive understanding of elderly users experience in using digital health apps. The prosess starts with developing the case study protocol and research instruments. Next, is execution of user experience evaluation through a series of focus group, semi-structured interview, and observation. And lastly, all the collected data being analyzed using qualitative analysis. In qualitative analysis, the gathered information is systematically analyzed through coding, categorization, and thematic identification. Figure 1 depicted the user experience evaluation flow. The detailed explanation of each process is being discussed in detail in the following section.

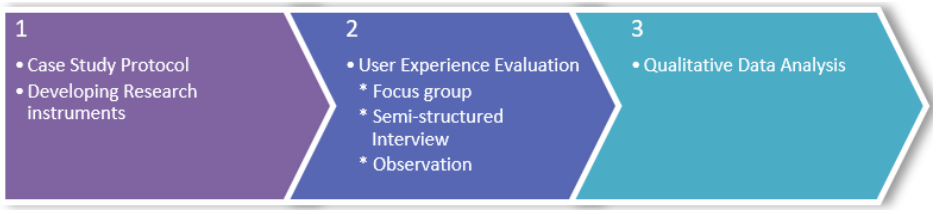

Figure 1. User experience research design

2.1. Case study protocol and developing research instruments

The purpose of developing research instruments involves creating interview questions and designing focus group protocols. Focus group protocols primarily outline the necessary steps for conducting the focus group. For instance, the initial step entails the moderator introducing and briefing the focus group, followed by dividing elderly participants into groups. Subsequently, there will be a session where the elderly learn about using mobile healthcare applications. The learning method involves the moderator teaching participant

A, who will then teach participant B, and so on. Essentially, this process serves as the groundwork for developing focus group protocols. The same approach is applied to crafting semi-structured interview questions. Once the preparation of focus group protocols is completed, the preparation for semi-structured interview questions will be undertaken, utilizing the CUE-model adopted from [18].

2.2. User experience evaluation

The user experience evaluation session begin with focus group and start with the introduction to the mobile healthcare application, specifically the MySejahtera app. A focus group consists of 2 to 4 elderly users per group as depicted in Figure 2. Prior to the session, all participants will be asked for their consent to participate in the learning activity. The learning session will be facilitated by a moderator who will guide the participants through the process of using the MySejahtera app. To ensure equal participation, one participant will be randomly chosen from the group to be the first to receive instruction on app usage. The moderator will demonstrate the usage of the app to the first participant, providing step-by-step guidance and addressing any questions or concerns. Once the first participant has grasped the usage of the healthcare app, they will be responsible for teaching the app to the second participant. This peer-to-peer learning approach will continue until all participants in the group have a clear understanding of how to use the MySejahtera app effectively. To supplement the learning process, all participants will be provided with a user manual that serves as a comprehensive guide to using the MySejahtera application. This manual will further support participants in navigating the features and functionalities of the app. By implementing this strategy, it ensures that all participants in the group acquire a thorough understanding of the MySejahtera app, enhancing their ability to utilize the mobile healthcare application to its full potential.

Figure 2. Focus group session

Next, is to execute the semi-structured interview session. The interview step by step protocol is listed as following:

a. Before the interview
- Inquire if they are available to participate in the interview session.
- Show them the permission letter to collect data.
- Brief them on the topic of the interview.
- Seeks permission to videotape the entirety of the interview session in order to have it for later use in data analysis and documentation.
- The interview will be handled anonymously.

b. During the interview
- Interviewers introduce themselves.
- Interviewees have the option to withdraw from the interview at any time. Also, you can stop the interviewer during the interview session and have time if you need to rest or take a break.
- Interviewee needs to sign the consent form for filing purposes.
- The interview session started.

c. After the interview
- Thanking the interviewee for participation.
- Interviewee's contact number is required for any inquiries when analyzing the data.
- The interviewee received an emolument as an appreciation token for participating in the interview session and sharing valuable experiences for the current study.
- All the data will be transcribed and analyzed.

The interview was structured into two parts in which section A encompasses demographic questions, while section B encompasses inquiries related to the evaluation of user experience. Each interview

session with each elderly participants lasted within 20 to 40 minutes. Figure 3 shows the field semi-structured interview with the participants.

Figure 3. Semi-structured interview session

2.3. User experience evaluation

Next step is to analyze all the datas that were gathered from the focus group, interview and from interviewers' observation. All obtained data were analyzed qualitatively using thematic analysis. The triangulation of qualitative data collection through semi-structured interviews, focus group and observation was done. All the data will be analysed verbatimly using thematic analysis to produce the themes. The process of identifying, analyzing, and reporting themes in this study was based on thematic analysis, which is also known as qualitative analysis techniques [19]. In this study, the thematic analysis was produced by using the procedures as stated by [19]. The thematic analysis starts with familiarizing of the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and producing the report.

3. RESULTS AND DISCUSSION

In this section, it is explained the results of research and at the same time is given the comprehensive discussion. Results can be presented in figures, graphs, tables and others that make the reader understand easily [20], [21]. The discussion can be made in several sub-sections.

3.1. Participants demographic

Thirty individuals of the elderly population were recruited as respondents through purposive sampling for this study. The age range of the participants was from 60 years of age up to 78 years old as depicted in Table 1. Twenty-seven of the elders were aged between 60 to 73 years of age, which puts them into the young elderly category. Two of the remaining participants were aged 75, and another participant was aged 78, which places the three of these participants in the mid-elderly category. As for the racial factor of the elders, 25 of the participants are Malay, 2 are Chinese, and the remaining three are of the Indian race. The variation of race in this study is to avoid biases in terms of looking into user experience in using digital health application used by only one race. Total number of female participants is 24 and the remaining 6 is male.

Table 1. Demographic information of participants

Participant ID	Age	Gender	Race	Participant ID	Age	Gender	Race
P1	60	Female	Malay	P16	66	Male	Malay
P2	70	Female	Malay	P17	67	Female	Chinese
P3	61	Male	Malay	P18	62	Female	Malay
P4	60	Female	Malay	P19	70	Female	Indian
P5	61	Female	Malay	P20	64	Male	Malay
P6	61	Female	Chinese	P21	65	Female	Malay
P7	75	Female	Malay	P22	64	Female	Malay
P8	75	Female	Malay	P23	64	Male	Malay
P9	73	Male	Indian	P24	61	Female	Malay
P10	73	Male	Malay	P25	62	Female	Malay
P11	68	Female	Malay	P26	61	Female	Indian
P12	72	Female	Malay	P27	78	Female	Malay
P13	71	Female	Malay	P28	71	Female	Malay
P14	72	Female	Malay	P29	71	Female	Malay
P15	66	Female	Malay	P30	65	Female	Malay

All the study participants meet the selection criteria to be included in this current study. All the participants are over 60 years of age and have a basic understanding of operating a smartphone. Each of the

respondents also has experience using the mobile health application MySejahtera and is familiar with the basics of the applications. All the elders are currently not working, some are retired, and some are housewives who have never worked before.

3.2. User experience evaluation findings

Elderly users have voiced multiple concerns regarding their experience with the MySejahtera application. The following issues were outlined:

3.2.1. Simplicity of the apps

Participants emphasized the importance of designing mobile health applications with simplicity in mind to meet their needs and requirements. They found the MySejahtera app easy to use and straightforward. Initially, some participants had concerns or fears about using mobile health apps, but their perspective changed once they started using MySejahtera and realized its simplicity. However, a few participants reported issues with the app, such as occasional lagging, crashing, and slow loading times, which were attributed to internet connection problems as highlighted in the following. These issues caused frustration and stress among the participants. Some suggested that the app should not rely heavily on internet connectivity, as it can be inaccessible in areas with poor or no internet access, particularly for those who cannot afford it. Another concern raised by participants was the latest update of MySejahtera. They found it challenging because it introduced significant changes, which were particularly difficult for elderly users who tend to forget or have difficulty adapting to new interfaces. Participants expressed their dissatisfaction with the complexity and structure of the new update, as it made it harder for them to find the features they needed, such as check-in and history. Creating digital applications for elderly users necessitates a prioritization of simplicity and user-friendliness. The design should emphasize straightforward functionality and information presentation, considering common aging-related challenges like memory issues [22]. Developers should strive to keep the application as simple as possible, taking into account the specific needs of elderly users. Addressing these factors during application development is essential to facilitate easy access and enhance overall usability for this target audience [23].

It is simple for me to use MySejahtera. It's only that the application crashed slightly. Also, one of the pages is lagging, and this stresses me out. Perhaps too many people use the apps, and there is also a problem with the internet connection. This makes things worse. If only the apps didn't need an internet connection, it would be easier for me.

Audit trail (R6, 31/3/2022, 6.00 pm)

The disadvantage is that I must always carry my phone with me. It is inaccessible if you go to a location without an internet connection. So, if we don't have any money, how will we get the internet? MySejahtera, in my opinion, should be an application that does not require internet access; otherwise, MySejahtera cannot be used. What if the poor people in the village cannot afford to buy internet?

Audit Trail (R24, 30/5/2022, 12.05 pm)

3.2.2. Efficiency of application user interface

The findings of this study demonstrate the significance of the structural elements, including font, buttons, symbols, and color scheme, in influencing the usage experience of elderly users in mobile applications. Participants generally expressed positive feedback regarding the readability of text, ease of clicking buttons, and appropriate use of colors. They also acknowledged their understanding of the meanings conveyed by symbols in the MySejahtera application, although some participants initially found them unfamiliar. Furthermore, the inclusion of descriptions below symbols was noted to be particularly helpful for elderly users, as it provided clarity and a sense of comfort. However, there were instances where participants reported difficulties in comprehending the symbols despite the accompanying descriptions. This suggests that additional measures might be necessary to improve symbol recognition and understanding for elderly users.

Regarding language options, two participants expressed challenges in understanding and learning the application due to the absence of language alternatives. The MySejahtera app is exclusively available in English, which poses difficulties for users who are not proficient in the language, especially the elderly. These participants recommended the inclusion of language options, such as Malay, Mandarin, and Tamil, to enhance efficiency and usability for a wider range of users.

The font is readable. The button is functioning all good, and I've no issue with the use of color. The symbol is suitable for the description.

Audit Trail (R23, 30/5/2022, 1.33 pm)

I can read the text in MySejahtera. The button is acceptable, as well as the use of color. The red color is for high COVID-19 cases, right? The symbol is understandable.

Audit Trail (R24, 30/5/2022, 12.15 pm)

All writing can be read, but all are written in English. So, it's difficult for me. I prefer Mysejahtera is written 100% in Malay. The button is okay. The use of color is acceptable. The apps look modern.

Audit Trail (R28, 26/06/2022, 1.00 pm)

3.2.3. App's learnability

Elderly participants indicate variations in the time required to learn how to use the MySejahtera application. Some participants reported being able to learn and navigate the app within a short period, ranging from a few minutes to a day. These participants found the app easy to understand, particularly the check-in function, which they considered a crucial feature. They highlighted the simplicity of the check-in process and the importance of scanning the barcode when entering buildings. On the other hand, several participants faced challenges in learning how to use the app independently. They relied on assistance from their children, demonstrations, or user manuals to grasp the app's functionalities as explained in the following transcription. These participants expressed the need for additional guidance to enhance their understanding and proficiency in using MySejahtera. This is also highlighted in the previous literatures [24]. They emphasized the importance of demonstrations and demonstrations to facilitate their learning process. Interestingly, a subset of participants focused primarily on the check-in function and had limited knowledge or awareness of other features within the app. They acknowledged that there were multiple functions in MySejahtera but preferred to concentrate on the check-in feature due to its significance. This suggests that some elderly users prioritize specific functions that they find essential or that they frequently utilize, while other features may be overlooked or less understood.

I need two or three tries to get the idea of using mysejahtera. Before I can use MySejahtera, someone must teach me how to use it. For better understanding, a demonstration is required.

Audit trail (R2, 31/3/2022, 4.30 pm)

Learning to use MySejahtera takes time because my son usually settles up MySejahtera for me. I used to click check-in, but it took me a long time to figure out where to click the function.

Audit trail (R20, 17/6/2022, 6.00 pm)

It seems that in one day, I learned to use MySejahtera. I just followed the instructions. But I only know the Check-in features.

Audit trail (R21, 30/5/2022, 3.08 pm)

3.2.4. Security concerns

There are mixed sentiments among elderly users regarding the security of their personal information in the MySejahtera application. While some participants expressed trust in the security measures and believed that their data was secure, others expressed doubts and discomfort about the safety of their personal information. Those who felt secure emphasized their confidence in the app's security and trusted that their personal information was protected. They believed that their data was stored securely and that the sharing of information was trustworthy. Participants cited their trust in the ministry and their belief that personal information was not obtained through the app but rather from other sources, such as banks as highlighted in below transcription. On the contrary, participants who expressed mistrust raised concerns about the security of their personal information in MySejahtera, this issue is also highlighted in [25] study. They expressed discomfort and lack of confidence in the app's security measures. Some participants highlighted the perceived vulnerability of their personal information and questioned the effectiveness of data protection in the Malaysian system. They expressed skepticism and unease about their personal data being shared and the potential risks associated with it. Additionally, participants reported instances of receiving calls from unknown numbers, which they attributed to the MySejahtera app and considered potential privacy breaches. This further intensified their fears and raised concerns about the safety and protection of their personal information. Some participants expressed the need for alternative methods to prevent the exposure of personal information.

I am not comfortable that my personal information has been saved in Mysejahtera. I am not confident about the security in Mysejahtera. Everyone is free to enter as they like.

Audit trail (R1, 31/3/2022, 3.05 pm)

My data is not very secure in Mysejahtera since I occasionally receive calls from numbers I don't recognize. I worry about who is calling and where the caller obtained my phone number. I want to answer the phone, but I'm terrified, especially with today's technology.

Audit trail (R8, 1/4/2022, 5.00 pm)

I am confident that my personal information in MySejahtera is secure. As long as my personal information is stored in MySejahtera, I believe it is secure. If the scammer calls, they usually get our personal information from the banks, not MySejahtera.

Audit trail (R15, 14/6/2022, 2.37 pm)

I believe my data is secured in the apps. I think we have to leave it to the ministry to take care of all this because we have shared all our data with them. They have to take care of our privacy securely. They should not share it with others.

Audit Trail (R21, 30/5/2022, 3.24 pm)

3.2.5. Emotions reactions when using the apps

Some participants expressed positive emotions, such as excitement and satisfaction, highlighting the convenience and helpfulness of the app's features. They appreciated the ease of checking COVID-19 cases, using the hotspot function for safety information, and the simplicity of the check-in process. These positive emotions were attributed to the app's user-friendly design and the perceived benefits it offered.

I am pleased to use this app. Mysejahtera makes it easy for me. When I use the hotspot function, I can find out if it is safe or not near where I'm going. This is so helpful. Also, the phone makes it easy for me to check-in. If I want to go to the store, I don't want to have to write it down in a book.

Audit trail (R3, 31/3/2022, 4.30 pm)

I have a feeling of excitement about using MySejahtera. I'm really looking forward to using it.

Audit trail (R4, 31/3/2022, 4.30 pm)

However, alongside the positive emotions, several participants expressed negative emotions, including frustration, boredom, and annoyance, which were associated with challenges and dissatisfaction in using the MySejahtera application. Participants cited factors such as the complexity of the app, inconvenience for the elderly, and difficulty in adapting to updates and changes in the user interface (UI). Some participants particularly highlighted the negative impact of the latest UI update, which disrupted their familiarity with the app and made it more challenging to find certain functions, such as the check-in feature. The changing positions of buttons, descriptions, and symbols were mentioned as sources of confusion and annoyance, especially for the elderly who preferred a more consistent and familiar interface. These negative emotions were linked to the participants' perception that the app's usability was compromised, resulting in frustration and difficulties in performing desired actions. The challenges faced by participants in navigating the app's interface, especially after updates, underscored the importance of considering the specific needs and preferences of elderly users in designing mobile health applications.

My feeling is that Mysejahtera is making me frustrated, especially with the latest update.

Audit trail (R13, 8/6/2022, 3.00 pm)

I have the feeling that using mysejahtera is a burden and a pressure on me.

Audit trail (R6, 31/3/2022, 6.00 pm)

3.3. Strategies to help elderly in using digital health interventions applications

Strategies to help elderly individuals in using digital health interventions applications aim to address the specific challenges they may face and enhance their user experience. To help elderly individuals effectively use digital health intervention applications, the proposed strategies as depicted in Table 2 should be considered.

The implementation of these strategies can have a profound impact on empowering elderly individuals to effectively utilize digital health intervention applications, thereby allowing them to experience the various benefits these applications offer for their overall well-being. By designing user-friendly interfaces, simplifying the user journey, providing clear instructions and guidance, incorporating descriptive symbols and tooltips, and offering language options, the accessibility and usability of these applications can be significantly enhanced. This, in turn, enables elderly users to navigate the applications with greater ease, engage with the desired features, and reap the advantages of the health interventions provided. Through the

effective implementation of these strategies, digital health intervention applications can serve as valuable tools in promoting the well-being and health outcomes of elderly individuals.

Table 2. Demographic information of participants

Strategies	Explanation
Provide user-friendly interfaces	Ensure that the applications have intuitive and user-friendly interfaces. Keep the design simple, with clear instructions and large, readable text. Use familiar icons and minimize the number of steps required to complete tasks.
Simplify the setup process	Assist elderly individuals with the initial setup of the applications. Offer step-by-step guidance on downloading and installing the app, creating an account, and adjusting settings. Consider providing written or video tutorials to make the process easier to understand.
Offer training and support	Conduct training sessions or workshops to familiarize elderly with the applications. Cover basic functions, such as navigating the app, setting up reminders, and accessing information. Provide ongoing technical support through phone hotlines, email, or in-person assistance if possible.
Use visual aids and guides	Create visual aids, such as printed or digital guides, that explain how to use specific features of the application. Include screenshots and step-by-step instructions to help seniors follow along easily. Consider providing a help section within the app itself.
Foster digital literacy	Promote digital literacy among the elderly by offering classes or workshops that cover basic computer skills, internet usage, and mobile device navigation. This can help build confidence and familiarity with technology in general, making it easier to adapt to specific applications.
Consider accessibility features	Ensure that the applications have accessibility features to accommodate the needs of elderly users. Include options for adjusting text size, color contrast, and font style. Provide audio instructions or voice command capabilities for those with visual impairments.
Encourage regular usage	Motivate elderly to use the applications consistently by emphasizing the benefits they can gain, such as improved health outcomes, increased independence, and social connectivity. Remind them to set goals, track progress, and celebrate achievements.
Seek feedback and iterate	Regularly solicit feedback from elderly users to understand their experience with the applications. Use this feedback to improve the usability, functionality, and accessibility of the apps. Consider conducting user testing sessions to identify areas for improvement.
Ensure privacy and security	Address any concerns elderly may have regarding the privacy and security of their personal information. Clearly communicate the privacy measures implemented within the applications, such as encryption and data protection. Provide guidance on safe browsing habits and avoiding potential scams.

4. CONCLUSION

In conclusion, the findings highlight several issues faced by elderly users in utilizing the MySejahtera application. These issues encompass the simplicity of the app, efficiency of the application user interface, app's learnability, security concerns, and emotional reactions when using the app. This study highlights the importance of considering the structural elements and language options when designing mobile applications for elderly users. By ensuring readability, clarity, and language accessibility, developers can enhance the user experience of such applications for elderly individuals. The study reveals variations in the time required by elderly users to learn how to use the MySejahtera application. These findings emphasize the need for user-friendly designs, clear instructions, and additional support to facilitate the learning and usage experience for elderly individuals using mobile health applications. There were reflect divergent perspectives among elderly users regarding the security of their personal information in the MySejahtera application. While some participants expressed trust and confidence, others displayed skepticism and discomfort. The concerns raised highlight the importance of addressing user apprehensions and ensuring robust security measures to enhance trust and user confidence in the app's handling of personal information. The interview data revealed a variety of emotional experiences among elderly users of the MySejahtera application. While some participants expressed positive emotions stemming from the app's convenience and user-friendly features, others experienced negative emotions due to challenges and frustrations associated with its complexity and changes in the UI. These findings highlight the significance of designing mobile health applications that prioritize user-centered design principles, including consistent and intuitive interfaces, clear instructions, and accessibility features tailored to the needs of elderly users. Additionally, understanding and addressing the emotional reactions of elderly users, both positive and negative, can help in creating a more satisfactory user experience. By addressing these issues, digital health intervention applications can better cater to the needs of elderly individuals, ultimately improving their overall well-being.

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