

Enriching User Experience among Senior Citizens in the Digital Era: A Design-Thinking Approach to Constructing a Prototype of a Mobile Application

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ABSTRACT

The elderly contributes a large and growing population that may benefit from online banking. Current mobile apps for bank transactions ignore elder users' expectations and skills, resulting in poor app uptake and hindering their access to online banking in a digitalizing environment. We researched the behaviours of elderly people to design a bank-transaction app prototype. Seven older persons (55 to 60+) participated in a five-phase design-thinking process. Phase I (empathy and definition) semi-structured interviews revealed significant elements for phase II concept formulation (ideation). In step III (prototyping and testing), the top concept was produced as a smartphone app prototype and pilot-tested with interviews. Our participants seek language-learning tools that stimulate face-to-face social connection, an active lifestyle, and several language-learning objectives. Our novel solution improves user experience and adds functionality on a single platform. In the digital age, older people can provide crucial insight into app-based innovations meant to improve their user experience and social life. The created notion can be used to adjust current programmes for elder users.

Keywords: Elder people, Online banking, Design Thinking, Empathy, Define, Testing, Prototype

1. Introduction

Rapidly aging populations are accompanied by an increase in age-related physical and cognitive health problems, such as neurodegenerative disorders including dementia, Parkinson's, and Alzheimer's. Changes in social relationships and socioeconomic status may damage older person's ability to participate in society, increasing the risk of social isolation, loneliness, and depression, which decrease cognitive functioning and may contribute to early mortality. In 2020, more than 7% of the population of Malaysia is 65 years of age or older, making it an aging society. By 2044 and 2056, when 14% and 20% of the population are 65 or older, respectively, civilization will be aging and superaged.

The average age of bank customers is growing older. The expanding elder population represents an opportunity for online banking. In terms of monthly wages, those aged 50 to 54 and 55 to 59 are the two highest earners. In recent years, the widespread use of tablets and smartphones has led to an overwhelming number of independent banking apps. Over 55s are twice as interested in online banking. Mobile banking is online banking using a mobile device; it's location independent

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[5]. However, current online banking apps don't fully exploit mobile technology for user-centered instruction. User-centred design or UCD blends end-users wants, goals, beliefs, and talents into the product's concept and shape. We learned of limited UCD-developed software that improves the user experience for elderly people. Thus, design thinking (DT), is a type of UCD to create a prototype app for seniors with online banking accounts. DT offers an organic, bottom-up method of creative problem-solving for economic and social innovation, focusing on people's needs. Our goal was to better understand the requirements and expectations of older persons to enable technology providers to improve app-based online banking for older customers. The following objectives of this study are identified:

- I. To understand the insights of senior citizens while using online banking.
- II. To ideate ways to enrich the user experience.
- III. To develop and test the prototype.

2. Literature Review

2.1 Online banking

The population of the world, especially the urban population, is expected to continue to almost double by 2050. This increase also affects economic, social, and cultural interaction activities as well as the impact on the environment and humanity, including aspects of housing infrastructure, services, education, and others. To accomplish the Sustainable Development Goals, which involve the political, social, and economic roles of every community in the world, the United Nations has introduced the New Urbanization Agenda 2030. The agenda aims to overcome all challenges that stand in the way of achieving the goals. 17 goals make up the Sustainable Development Goals (SDGs), also known as the Sustainable Development Objectives. The SDGs address a variety of social and economic development challenges, including social justice, urbanization, the environment, gender equality, water and sanitation, hunger, health, and education. Mobile and online banking services can help the SDG empowerment agenda as follows:

- i. SDG 8 - Decent Work and Economic Growth
- ii. SDG 9 - Industry, Innovation, and Infrastructure
- iii. SDG 11 - Sustainable Cities and Communities
- iv. SDG 13 - Climate Action

In the era of digitization, major financial services organizations are increasingly forming partnerships with start-ups to meet consumer demand for quick innovation and keep up with the expanding market dynamics. Banks and fintech could increasingly be joining forces to combine their strengths in alliances to make up for these limitations and to take advantage of synergies. A new stage in the development of the decentralized method for app creation has been made possible by blockchain technology. Due to the daily generation of large amounts of data as a result of the digitalization of records, every firm must manage security concerns effectively while also achieving considerable cost savings. Several industries could be transformed by blockchain, and procedures could become more democratic, safe, transparent, and effective.

Technology has revolutionized the world of banking to make it easier than ever. Online banking means we can get things done without going to the bank or talking to a banker. Banks have embraced mobile applications to a different extent. Overall, we can pay bills and check accounts while at home, waiting for a car, or stuck in traffic. By removing paper checks, invoices, and statements, users of online banking can increase financial control while reducing their impact on the environment, saving millions of trees each year, and avoiding billions of tons of greenhouse gas emissions. However, financial institutions can still attract online clients by highlighting the

advantages of paperless banking for the environment. However, serving senior citizens through online banking remains an issue among banks. Thus, user-centered design or design thinking is considered an effective method to solve this problem.

Design thinking is an 'abductive' reasoning method that relies on a qualitatively distinct mode [7]. According to Seidel [10], the theory of design thinking implies three aspects. For example, prototyping, brainstorming, and identification of desires. These concepts are completed in non-linear, iterative loops, and concepts for these components are generated based on insights before being prototyped and put to the test with users. Organizations that implement design thinking tend to go beyond aesthetics, and they have a lot of experience mixing products, services, information, and spaces. Besides, the solutions that are produced when organizations adopt design thinking are more useful and creative [6]. Goldschmidt and Porter [2] emphasized that a person with design thinking skills can solve general and complex problems. The problems include many fields such as illustration, technology, management, and spaces. Therefore, design thinking could provide more benefits to individuals and organizations such as designers, engineers, users, and start-up companies.

3. Methodology

We used a five-step design thinking model conducted in three phases. 1) Needfinding, 2) Brainstorming, and 3) Prototyping. In phase I, we interviewed older adults to understand their mindset, needs, wishes, and requirements. The collected data was analyzed and synthesized into a human-centered problem statement (step 2, define) that guided phase II brainstorming. During phase III, the best concept was implemented as a smartphone app prototype (step 4, prototype) and tested with a subgroup of interviewees in individual evaluation sessions. A semi-structured 'problem' interview was used to determine older adults' profiles and needs for a language-learning app.

Each interviewer summarised the interview data carefully. Information was extracted, categorized, and reconstructed as concise insights. The team used affinity clustering to aggregate findings into related topics, establish trends, and suggest design opportunities. To better understand our target users' objectives and product goals, we created a goal-directed persona. Next, we created a clickable app simulation that mirrored our final product. The prototype evaluations involved user-app interaction. Each researcher analyzed the recordings and notes from the interaction.

4. Results

First, we go through empathizing with the customer, then we define the problem, and next, we ideate the solution based on the problem that we have. And finally, we did the trial and test. The design thinking process began with empathy, which is initiated through a project research canvas and stakeholder mapping and is considered assumptions upon the design thinking process.

4.1 Project Research Canvas and Stakeholder Mapping

In this project research canvas, sponsors are identified among the Bank Finance Department, Bank CEO, or Board of Directors. It is expected that the sponsors will enjoy the quality of the product, and the product shall improve the company image/branding. However, currently, senior citizens face difficulty to use the existing online banking. Thus, it is expected that the product shall benefit senior citizens through an improved security system and a more senior-friendly user experience.

The project research canvas is then preceded by the development of stakeholder mapping. We categorized them into two groups of senior citizens. The first group consists of people who are

comfortable with the online application, whereas the second group is the opposite. Next step, we developed a set of open-ended questions for both groups. This survey asks about their banking experiences. We managed to interview five elder people from both categories. As a result, most of them are not interested to use online banking. They chose to carry out their banking in the conventional manner, which required them to physically present themselves at the bank. Thus, we opted to concentrate on senior citizens who are familiar with the online banking application after this procedure. Products that similarly perform online banking are dependent on the device being used to access them, these mobile banking apps appear to operate differently.

4.2 End users' categories

With the idea of the design thinking approach, now we come to the discussion of end users' categories. We do consider several aspects to have the end user. At first, during the discussion, we do take several considerations to proceed with the user categories. Especially, when we realize in the current digitalize banking sector, the least experience of these changes comes from senior citizen categories. Old people with the old way are still the center issue throughout this process in the realization of new products coming from senior citizen categories. Moreover, the categories itself is divided into two groups since it is huge between these two. This is because, there is senior citizen which still interested to use if there are chances to convince them, and the other group comes from conventional who are not keen on any changes at all. Our design thinking leads us to go with user categories who are having career-wise backgrounds. At the same time want to join in using banking applications if a convenient banking application is available to cater to them.

4.3 End user persona

The end user persona is a senior citizen that opts for the changes and technology but at the same time still wishes to maintain security as number one. Based on the above, the persona is working as a manager whose age is 59. The lifestyle as a government servant and having 2 children while working in a professional field, do give us some brief idea that the persona needs a simple yet compact interface to cater to her busy lifestyle. Based on the discussion with the persona, the same issue repeated which is they usually will pass the 'task' to handle any banking application to their child. This is because for them, any interface is quite heavy to be absorbed and understand and they are scared to press any key since they think it will deduct the account straight away. Due to that, the persona needs an application that will change her experience in using banking applications. Plus, at the same time can help her to save a lot of time, and enjoy technology during making various transactions, while keeping security as a crucial part of any part of it.

4.4 Empathy map

Then we move to the empathy map whereby this map is developed based on a persona that has been set as the center of developing more ideas. It is divided into four which are Say, Thinks, Does, and Feels; where each of them is giving us a view of how and what the application should have to cater to the exact persona's needs.

Says: - Persona did mention that she wants to have and experiences the transition from an existing application to a new version of the application which will give them a new perspective. The existing application is giving her a feeling of anxiety every time she wants to use and ends up, she will give up keeping on trying. This will have resulted in her not using the application anymore.

Does: - In the early stage, the application will be explored by the children so her feel secure to use it. All the new experiences will be taught by her children first before she hands on the application by herself.

Thinks: - She does expect the application is easy to use and have a simple interface so that she can save a lot of time on doing the transaction. Persona told us that previously, whenever she used a banking application, she will end up spending a lot of time exploring the application since she feels hesitant to press any button. Due to that, she has a bad experience with banking applications and feels that it is unsafe to do money transactions over there.

Feels: - Persona realizes that it is unsafe to bring money in the handbag to walk into a bank to make a physical transaction using cash nowadays. However, she did not convince enough to use a banking application too if it is complicated. Due to that, the persona clearly stated that she wishes to have an application that can make her feel secure to use and manage her money with a high level of the security system.

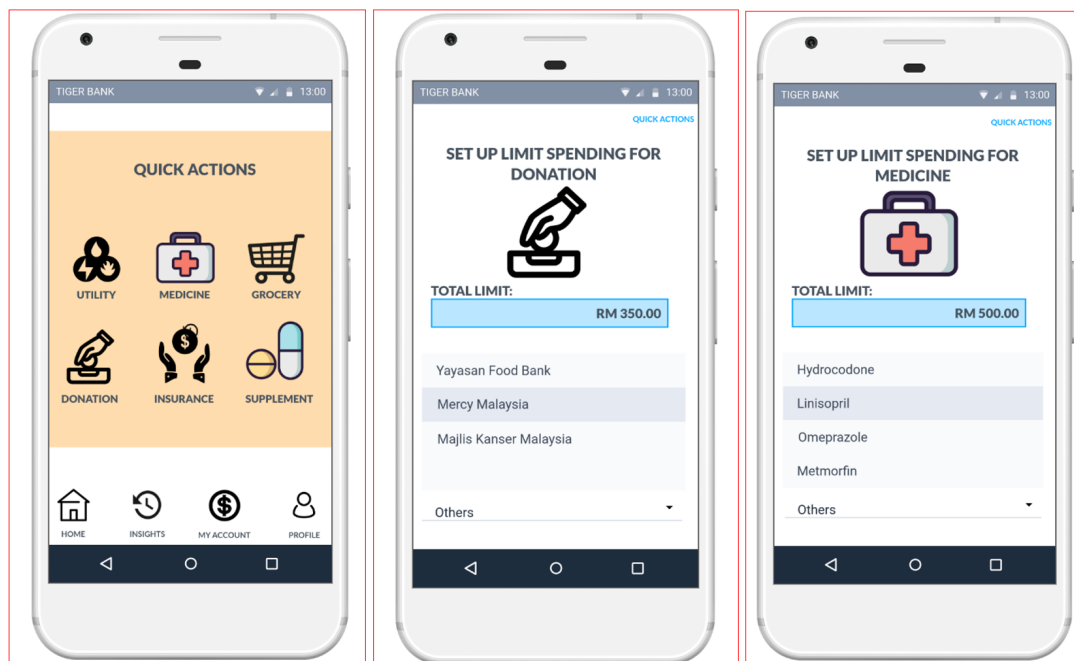


Fig. 1. Some of the Apps features

Brainstorming the idea is not easy since we do have so much information during extracting information from our persona. However, after considering many options based on prioritization, we came out with this grid to have some insight for us to produce what kind of application we want at the end to fulfill our personal needs. Four prioritizations have been our focus which is to create a friendly interface for the seniors, to have an attractive design, to enhance security, and provide self-service opportunities. The apps are shown in Figure 1.

Most of the feedback is on the functionality, as a participant stated:

“After clicking on the Customer Care Hotline page, there’s no hotspot that I can click to leave the page”.

(Participant A)

“On the My Accounts page, is this app set up for one Bank account or multiple Bank accounts? If for multiple Bank accounts, then the user can select their account number before being prompted to the details of their bank account. The RM100,000.00 under My Accounts, is this the current balance? Under Transactions how to differentiate between debit and credit transactions?”

(Participant B)

“The basic concept in graphics is not to mix 2D and 3D images. For example, the medical icon is 2D while the icon for supplements is 3D”.

(Participant C)

“Too many processes. Senior citizens will feel complicated. For example, the most obvious and should be simplified is the login and password system. The next display is also quite confusing which is related to the security display. The user must choose one.”

(Participant D)

“On the Security page, if the user clicked on done, the user will be directed to the Optional Security Set Up page. The user may be confused since the security set-up is already being done first upon entering the app.”

(Participant E)

5. Conclusion and Implications

This online bank app offers value to customers to solve problems, satisfy user needs and provide added value. Tiger Bank Apps' value proposition to users consists of innovative and new product and service aspects. We do not deny that there are also similar to what is already on the market but with the addition of other properties or characteristics. Tiger Bank Apps creates innovative digital services and solutions with user behaviour in mind. Digital banking service providers that deliver the best user experience and can address client issues will remain relevant.

The rapid development of digital banking serves as motivation for the Tiger Bank apps, which aims to further improve the user experience. Our goal is to use digital technologies worldwide to offer customers financial services that are simple to access. We offer new products and services in the online banking market in Malaysia that involve a specific market for senior citizens. A value proposition based on design is also important. An attractive and more prominent design will be more successful in the market. We offer attractive product designs that suit our target market, which is senior citizens. This aspect of customization is based on the needs of individual customers or specific customer segments.

In line with the needs of senior citizens, we offer services that are not offered by the current competitors. For example, we offer medicine, grocery, insurance, donation, supplement, and utility application services. This app has a simple and user-friendly interface that allows customers to select a home screen before login in. Suitable for senior citizens, we offer high-security application elements by providing special devices to customers and they only need to thumbprint each time they want to make a transaction. Market potential seen in determining the audience factor involves factors such

as demographics, location, behavior, and devices. When we can determine the target audience, the most important factors that need to be considered are segments such as:

i. Demographic characteristics

Demographics identify potential customers based on criteria such as age. We have identified the age factor as a market segment because the percentage of Malaysians aged below 14 years decreased to 24 percent in 2020 as compared to 27.6 percent in 2010. There is an increase in the country's potential employment because the 20 percent of the working-age population (15 to 64 years) increased to 69.4 percent in 2020 from 67.3 percent in 2010. The percentage of the population aged 65 years and over also increased to 6.8 percent in 2020 as compared to 5 percent in 2010. This information is based on age structure in Malaysia 2020 by key findings population and housing census of Malaysia 2020. Based on this analysis, shows that there is a good market potential for senior citizens.

ii. Geographical division

Geographic segmentation aims to group users according to where they live. We target urban residents who are more exposed to technology in addition to having a high population.

iii. Interests and behavioral patterns

Behavioural segmentation is about users' attitudes toward our mobile apps and how they use them. We offer a friendly mobile banking app for senior citizens.

iv. Their device

A must-know piece of information about the target market for mobile apps. Are they iOS or Android users, or do they use smartphones or tablets? In this aspect, we have offered the same device to all our users so that it is simple and standard.

Most people using online banking only think of it as one of the main benefits is convenience. But using the latest bank technology also helps the environment. Here is a short list of 5 ways we keep the world greener when using our products through electronic banking.

- i. Electronic Statements
- II. Embrace Mobile Banking
- III. Use a Digital Wallet
- IV. Send Personal Electronic Money Transfers
- V. Sign Up For e-Bills
- VI. Easy-to-use Communications

Banks must offer customers familiar and comfortable ways to contact customer support when they need it as more consumers switch to mobile banking services rather than physically visiting a branch.

It isn't for Tiger Bank Apps because each user will receive specific instructions to make using the Tiger Bank app simpler for senior persons. While some users adore the app and the ease it offers, others seem to experience glitches and latency issues regularly. All three apps could need some more functionality, despite having some excellent ones now. The best apps, according to user feedback, are based on three factors. They regularly respond to app store reviews and take note of user comments. A system that is simple for elderly users to use is most crucial, along with a biometric login feature and an e-wallet integrated within the app. Banks must think carefully about

how they might design their digital transformation efforts to target and engage seniors if they want to close this sizable gap in mobile banking usage. With the tagline “Changing Your Banking Experience”, Tiger bank has developed a mobile and online banking application system specifically for senior citizens. Several important factors have been given focus during the development phase of the system.

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