

José Rizal University

**SYNAPSE: A MEMORY SUPPORT MOBILE
APPLICATION WITH WEARABLE TECHNOLOGY
INTEGRATION FOR SENIOR CITIZENS WITH
MILD COGNITIVE IMPAIRMENT**

A Project Study Submitted
to the Faculty of the College of Computer Studies and Engineering

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ABSTRACT

The development of dementia-related diseases remains the most serious threat to the health and well-being of the elderly population despite significant developments in health sciences throughout the years. The primary intent of this study is to develop a mobile application with wearable technology integration named Synapse for the Office of the Senior Citizens Affairs in Mandaluyong City to facilitate the virtual relationship between seniors with Mild Cognitive Impairment (MCI) and their carer in order to prevent the onset of early dementia. Research has demonstrated that technology-based interventions can reduce the progression of early dementia in high-income countries for populations with MCI. However, these interventions lack features that cater to people with MCI in low-income countries such as the Philippines, where the researchers focused their study. An Agile-Scrum approach was used in this study, utilizing data from primary and secondary sources and ISO 25010 was used to evaluate the system's quality and specification.

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Chapter 1

INTRODUCTION

Background of the Study

The aging of the world's population is projected to soar up to two billion by 2050 (Palmes, Trajera, Ching, 2021). Thus, rapid advances in technology-based interventions were developed to assist seniors with Mild Cognitive Impairment (MCI) (Ge et al., 2018). However, the majority of primary studies and technological interventions like mobile apps that assist seniors are from High-income Countries (HIC). This causes the gap to widen further. In the next 50 years, the prevalence of MCI would increase about 140% among developing countries and 51% for developed countries. Consequently, that makes an alarming case in the Philippines to raise awareness regarding the magnitude of the problem in allocating MCI care and prevention (Dominguez et al., 2021; Eshkoor et al., 2015;). The given certainty information substantiates to assist senior population with technology-based interventions.

The Mild Cognitive Impairment (MCI) described by Eshkoor et al. (2015) is an intermediate phase of dementia, characterized by deterioration of attention, memory, and cognitive abilities. It is a cognitive decline due to aging and often begins at 60 and above. As prior mentioned, the population group of seniors with MCI and dementia in the Philippines is increasing. Subsequently, demands in health concerns, challenges, and health care costs for senior citizens continue to change dramatically (Jaiswal et al., 2021; Palmes et al., 2021).

There is a burden of health care cost services for senior citizens in the Philippines. A recent study shows that the poverty line in the Philippines is around 11.90%, which means that one in every ten families is having difficulty surviving. It is evident that technology-based intervention would be a low-cost solution and can be done without the aid of healthcare professionals (Bonnechère & Sahakian, 2020). Likewise, with utilization of technology will help senior citizens to lead lives successfully in their best time of their life.

In the Philippines, the approximate figure of seniors aged 60 and above will double from 9.5 million in 2020 and jump to 19.7 million by 2040. In a recent study conducted in Marikina Memory and Aging Project (MMAP), the researchers found out that senior citizens were identified to have approximately 23.2% with MCI among Filipino senior men and women; this implies a further increased risk for developing dementia (Dominguez et al., 2021).

The demographic group of senior with MCI can still manage most daily tasks independently. Nevertheless, these are not enough; there is a repetitive pattern of forgetfulness and confusion in their everyday lives. Thus, this becomes a burden for family members, especially for the carers who step in to provide support.

As of now, it is evident that most new technology developments focus on younger people, which makes seniors opt not to utilize products that have nothing to offer them. Therefore, it is imperative to find a way to increase the welfare of senior citizens in the country. An intervention strategy, such as a mobile application for MCI, aims to assist

them in overcoming cognitive problems so they can lead a better Quality of Life (QoL) on a day-to-day basis (Portenhauser et al., 2021).

Stereotypes exist among senior citizens with rejecting technology. However, Conci et al. (2009), cited by Klimova (2017), argue that seniors are willing to “adopt and accept” new technologies if they meet their expectations and needs. Likewise, this helps seniors understand how they can be happier and live a more fulfilling lifestyle; technology has a tremendous potential to impact seniors' QoL positively.

Individuals with MCI would appreciate devices that help them in memory guidance. In particular, memory support that reminds them of actions needed at particular times: exercise, medication, appointments, and games to help them enhance their cognitive function. By having daily goals, this will help them be less confused or agitated (Schaham et al., 2020).

In research conducted by Schaham et al. (2020), the utilization of touchscreen devices to practice and solve puzzle-games apps can stimulate various cognitive components. The intervention of puzzle-games aims to enhance cognitive functions and prevention of cognitive deterioration of senior citizens with MCI. Likewise, cognitive training improves cognitive functions. Therefore, to delay the progression of the disease, games can be incorporated to increase the engagement of senior citizens and improve their cognitive abilities (Groznik & Sadikov (2019).

There are multiple devices built to help seniors with cognitive impairment. However, most seniors (70%) currently prefer to utilize smartphones. Due to the baby boomers' generation, who are presently approaching the retirement age, this number will

increase in the future (Klimova et al., 2017). In addition, another primary device intervention that can support active aging is wearable technology integration, which can be used to elevate seniors' health-related experience in fitness. It includes self-monitoring of heart rate, step count, and condition status (Bhayana et al., 2020).

To reinforce the findings, a study conducted by Ge et al. (2018) stated that technology-based support is a promising intervention that will improve cognitive function, contribute to the QoL of senior citizens with MCI, and reduce their cognitive impairments. In a separate study, the findings corroborated by Bonnechère & Sahakian (2020) that new technologies are vital and need to be harnessed to enhance worldwide health care and reduce the impact of cognitive impairment.

With these facts given by Bonnechère & Sahakian (2020) and Ge et al. (2018), the proponents concluded that one of the best organizations to apply their study is the Office for Senior Citizens Affairs Mandaluyong (OSCA). This organization gives great importance to its carers and seniors by utilizing technology-based intervention, a mobile application with wearable technology integration, and treats the latter as an asset to its organization.

This realization leads the proponents to focus more on the study of memory support for senior citizens with Mild Cognitive Impairment.

Conceptual Framework

This section provides the outline process wherein it shows the flow of the Synapse mobile application.

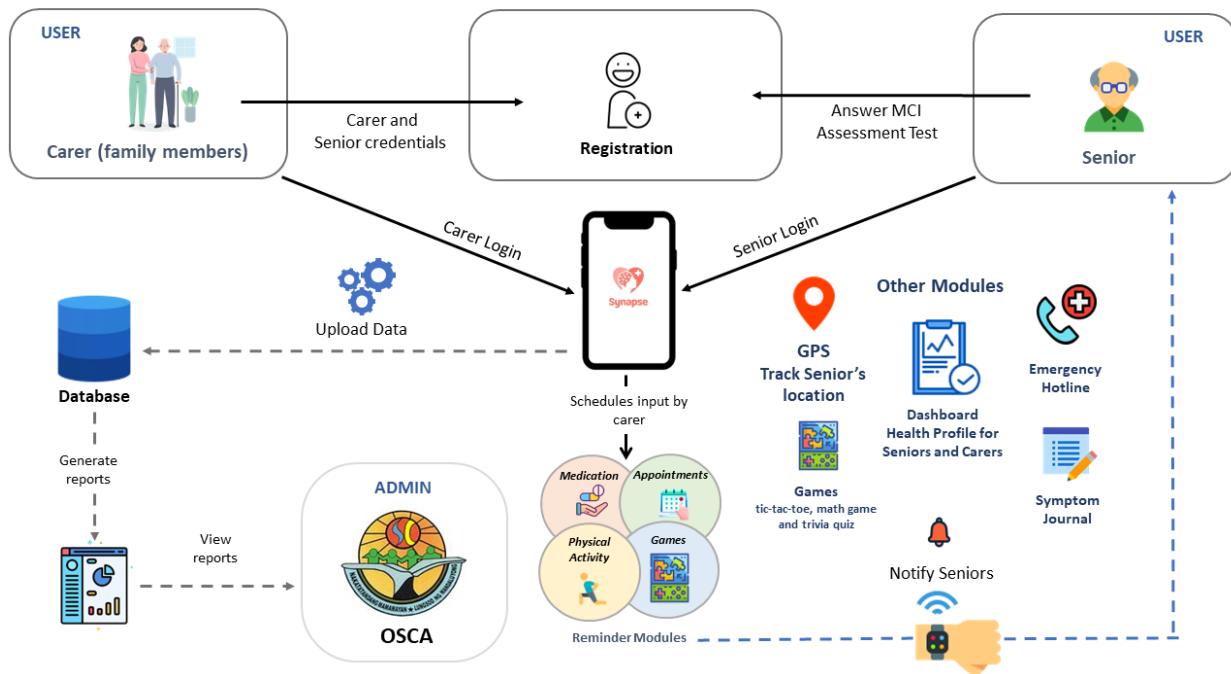


Figure 1.1 Synapse Mobile Application Process

According to Schaham et al. (2020) and Roest et al. (2017), individuals with MCI maintain awareness despite having cognitive decline, which allows them to have compensatory strategies and metacognitive for their impairments. Thus, it will be ideal for providing seniors with cognitive intervention. Seniors would appreciate devices that have memory support capability that would be reminding them of actions necessary at particular times, such as keeping appointments, taking medication, physical activity, and games to stimulate cognitive functions. With this, the proponents came up with a conceptual framework that shows the Synapse mobile Application flow. This mobile application will help seniors have a better QoL on a day-to-day basis.

The proponents have prepared a visual diagram that illustrates what to expect in mobile application flow with wearable technology integration. In this framework, the proponents have depicted the app flow to visualize how the process on the client-side works. The application has two user clients: the carer and the senior citizen. Both have different services provided and user procedures, and seniors can access the application through wearable and mobile devices, wherein carers can solely access it through mobile devices. The carer is the first type of client, and this client can schedule input needed for the geriatric care of senior citizens. All categories in the reminder modules.

These reminder modules consist of medication reminders, appointments schedule, physical activity, and games. The idea is the carer will send a reminder to the seniors to take their medications on time. They can also check if the seniors have already taken medicine or if they missed the medicine intake. Aside from that, they can also monitor the medicine inventory of the senior, and they can check how much is left and which medicine is already out of stock. Next is the medical appointments schedule, which is a configurable automated message notification; this is designed to help the carer by eliminating the burden of manually reminding the seniors about their upcoming medical checkups.

The physical activity module takes care of the carers by sending a reminder to seniors to exercise and take care of their health. Lastly, the game notification module reminds them how often the seniors will play games that are designed to improve their cognitive function, and this will all be received by the senior citizens via their wearable technology. However, wearables were not the only device that the senior citizens could use because they could also use this application with their mobile technology to access

other modules such as dashboard health profile, symptom journal, games, emergency hotline and GPS.

The wearable application is only available to senior citizens, as mentioned prior. Aside from all of that, other modules which are only available for the senior user are symptoms journal which allows clients to input the symptoms regarding whatever illnesses they have, GPS module contains a GPS locator that the carer can use to locate senior's location if senior is in a situation where they are lost in a particular place.

The game module contains games that can be used to stimulate their cognitive function. The emergency hotline module contains emergency telephone numbers that allow senior users to call emergency services for assistance. Lastly, the health profile dashboard has data analytics visualization to help clients monitor their daily health. Moreover, the admin dashboard where OSCA can view data visualization about senior citizens generated from the database.

Statement of Objectives

The study aims to develop an efficient mobile application with wearable technology integration to help provide memory support for senior citizens with MCI. This study aspires to enhance the Quality of Life of all senior members in OSCA.

The following are the objectives of this study:

1. Provide notification reminders that remind senior citizens of actions needed at particular times, specifically medication, appointments, physical activity, and game reminders.

2. Provide games to stimulate cognitive abilities, specifically tic-tac-toe, math quiz, and trivia quiz.
2. Assess and evaluate if seniors have Mild Cognitive Impairment, which seniors will answer the MCI assessment test during account registration.
4. Provide dashboard and report generation for the following:
 - Dashboard of OSCA for data visualization.
 - Report generation of health profile that senior citizens and carers can view.
5. Integrate the wearable technology with the mobile application to monitor senior citizens, specifically the following:
 - Health tracking – heart rate and step count.
 - Reminders – received notification reminders through push notifications.
 - GPS - to track seniors' location.
6. To test the mobile application and wearable technology integration quality according to ISO/IEC 25010:2011.

Significance of the Study

This research study on “Synapse: A Memory Support Mobile Application with Wearable Technology Integration for Senior Citizen with Mild Cognitive Impairment” presents its significance as follows:

Office for Senior Citizens Affairs Mandaluyong (OSCA) - the study would serve as an effective strategy for enhancing the condition of senior citizens who suffer from Mild Cognitive Impairment. This study aims to provide an application that can be used to

change how health can be promoted among older individuals. The application will include acquiring health information, encouraging healthy lifestyles, and promoting medication compliance. In this way, the quality of life will improve for older individuals.

Senior Citizens - the mobile application will assist older individuals through a game training application that enables older adults to stimulate their cognitive capabilities in a safe and fun way that may moderately enhance their cognitive function, resulting in positive effects on memory. As part of the study, wearable technology will be integrated to aid in self-management by providing reminders, promoting physical activity, and assisting older adults to make necessary changes to their routines or behaviors.

Carers (families) - the application enables the carers or family members to access the health profiles of older patients to monitor their daily needs and better assist them. Furthermore, wearable technology will allow for continuous monitoring of senior citizens, making it easier for carers to manage their health conditions.

Developers - this study will help the developers to create a mobile application for monitoring, assisting, and improving the Quality of Life (QoL) of older adults. It also aims to provide evidence that older adults can effectively use technology, despite age-related stereotypes about older adults dealing with technology. This type of technological intervention can contribute to the well-being of older individuals.

Future Developers - It may be possible to use the study's outcome as a basis for additional research regarding memory support applications for older adults and provide possible solutions to the problem addressed.

Scope and Limitations

Scope

The proponents will develop a mobile application with wearable technology integration targeting only seniors with MCI in OSCA. During the interviews for data gathering in OSCA, the proponents perceived that most of the participants have carers. Therefore, this research is designed only for senior citizens with the assistance of carers.

The primary artifact of this research proposal is the mobile application that contains modules that would remind seniors of actions needed at particular times. Whereas the wearable technology integration is solely for monitoring seniors' physical activities and for receiving notification reminders sent by the mobile application through push notification.

Limitations

This research study does not extend to seniors' overall memory support and prevention of cognitive decline such as Alzheimer's disease and dementia. However, the basics of the proposed mobile application are to stimulate the cognitive functions of seniors to slow down the progression of early dementia or also known as MCI is covered.

A. Wearable Integration

The wearable device is only available in one operating system, which is Android smartwatches and does not support cross-platform technology. Moreover, the wearable device will not be implemented from scratch. Instead, the developers will utilize what is already available in the market.

The API version that the wearable is available on is API 25 and above. Thus, the developers made a decision to come to terms where the API for both smartphones and wearables meet by using API 25.

B. Mobile Application

The mobile application is only available in one operating system, which is Android and does not support cross-platform technology. It will be out of the study's scope, thus leaving future researchers to implement if ever they will continue this area of research.

The mobile application is strictly designed to be paired with wearable technology – android watch. When paired with wearable technology, the application can store health data and be tracked over time and can also be viewed using both wearable and mobile phones. Thus, it offers helpful benefits for both carer and senior users.

The GPS tracker feature of the application will automatically let the carer user locate the senior's location. The senior also can automatically send a notification through their wearable device to the carer to locate them immediately with an optional message.

The mobile application will contain three puzzle-based games which the developers affirm best for the cognitive stimulation of seniors with MCI, specifically tic-tac-toe, math game, and trivia quiz.

During the interview data gathering, it is perceived that seniors prefer to utilize their smartphone devices. On this premise, the admin access for the dashboard data visualization will be a mobile-based application since the admins are seniors. Moreover,

the office currently does not own any computer for administration work purposes, thus justifying the mobile-based app for administration access.

The API version and the minimum SDK for mobile applications that the developers will use is API 25: Android 7.1.1 (Nougat) which will approximately run on 85.6% of android devices. This is the specific API that the developers will utilize because the Google Maps Geolocation API will only work on android API 23 and above.

Definition of Terms

To aid in the understanding of the research, the following terms are conceptually and operationally defined:

Carers - individuals that are in direct partnership with their loved ones. It could be a family members or paid staff who step in to provide support.

Cognitive Function - refers to multiple mental abilities, including remembering, thinking, reasoning, learning, problem-solving, attention, and decision making.

Dementia – refers to cognitive impairment characterized by the loss of ability to think, recall, and reason to a degree that interferes with everyday life and activities.

High-income country (HIC) - it is used interchangeably with a developed country and first world country.

Mild Cognitive Impairment (MCI) - is characterized by a decline in attention, memory, and cognitive abilities, and that seen in those with dementia.

Quality of Life (QoL) - an individual's or group's standard of comfort, health, and happiness.

Seniors - individuals that are aged 60 or above and who are retired and live on a pension.

Technology-based Intervention - it is an intervention of advances in technology that make modern living easier, which involve the delivery via mobile, wearable, web-based applications, or computers.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

The demographic group of seniors worldwide is increasing, thus the healthcare cost. Senior citizens face challenges such as loneliness, social relationships, physical but primarily cognitive impairments. Senior citizens need intervention to retain an active and independent lifestyle. In addition, to sustaining physical and mental performance and, most importantly, preventing mental disorders. Mobile applications in managing seniors' challenges may serve as a low-threshold approach and be cost-effective to support them (Portenhauser et al., 2021).

In a separate study, Stewart, 2014 cited by Riboni et al. 2020, demographic change will need new solutions and strategies for effective support for seniors with psychological well-being. The technology made to meet seniors' needs is specifically labeled Geotechnology, and the Gerontechnology will improve treatment quality and accessibility while promoting good QoL for seniors.

Evidence for existing literature suggests that technology-based intervention targeting seniors' well-being can enhance cognitive functions through memory support, reaction time, and attention. The technology for cognitive training, such as games and mobile applications has been extensively studied in the past, and researchers conclude that it has the potential for efficient treatment in improving cognitive function for senior with MCI (Schaham et al., 2020).

Common Characteristics of Senior Citizens with Mild Cognitive Impairment

MCI is a slight deterioration in a person's memory or thinking. Essentially the things that make human higher thinking such as language, remembering, and way of calculating are degenerating. However, this does not affect their capability to live independently and perform tasks. Individuals with MCI, or people close to them may notice some changes in their behavior on how they think and remember things.

Table 1.1

Below are the common signs or symptoms of Senior Citizens with MCI

No.	Common Signs or Symptoms
1	Forgetting about appointments or social events
2	Misplacing household items, such as car keys, clothing, or other objects
3	Difficulty finding the right words compared with peers of the same age
4	Movement difficulties
5	Changes in the sense of smell

Medical News Today (2022). [Table] Retrieved from <https://www.medicalnewstoday.com/articles/mild-cognitive-impairment-mci>

In addition, according to the Alzheimer's Association, other symptoms of MCI can include:

- the inability to form certain sounds
- problems completing tasks
- issues with visual perception
- and trouble remembering events, instructions, or conversations

In a separate study, conducted by Griffiths et al. 2020, researchers gathered data about that prevalence of MCI in diverse geographical regions which included Asia, Europe, USA, and Australia. The researchers found out that the estimation of prevalence among seniors with MCI was 5.0 – 36.7%. The prevalence increases with age and not utilizing technology-based intervention for cognitive functions were increased the likelihood of MCI significantly. The figure below is the percentage of common cognitive impairments among senior citizens with MCI.

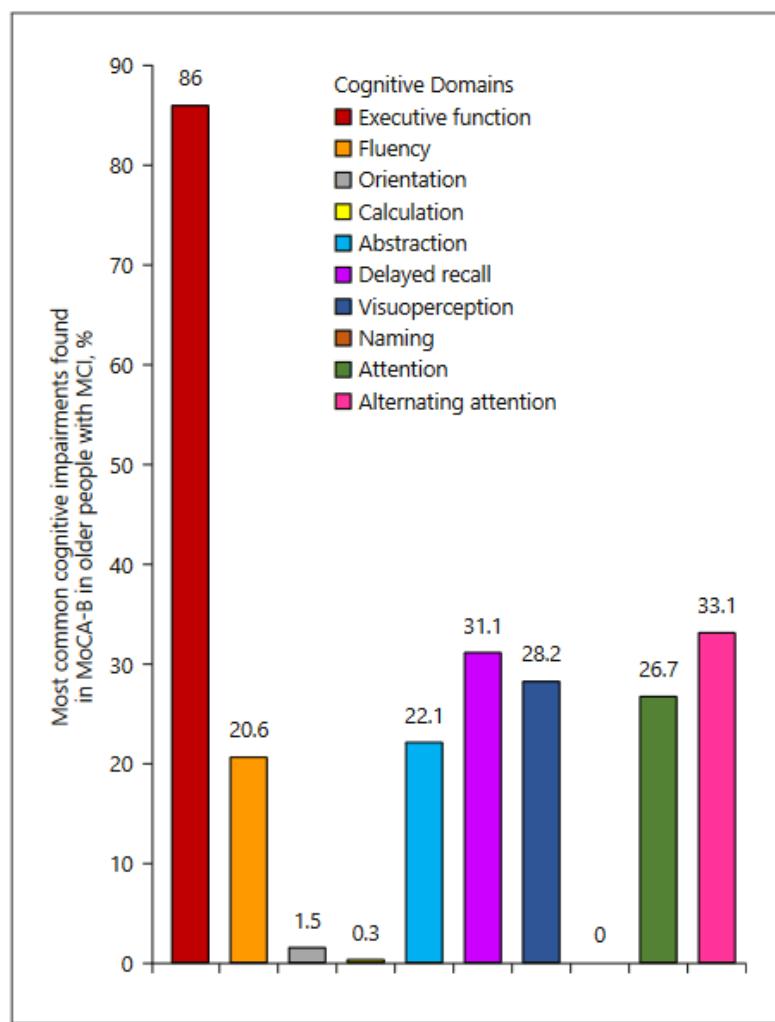


Figure 2.1 Percentage of most common cognitive impairments found among seniors with MCI

A Quick Glance at the Prevalence of Seniors with MCI

Global Scale

A study conducted by Rajan et al. (2021) stated that Alzheimer's Disease (AD) and Mild Cognitive Impairment (MCI) are more prevalent in the elderly. The study concluded that by the end of 2020 in the United States, around 6.07 million adults had clinical AD. By 2025, this number will further increase to around 7.16 million, and by 2060 a staggering 128% to 13.85 million. In light of this study, we can better understand the deficiencies in national policies in this area, in turn, framing new policies to reduce clinical AD incidence among at-risk populations will be easier. Worldwide, the number of people with dementia exceeds 50 million, and it is projected that this number will be around 152 million by 2050 (Patterson, 2018). MCI is something that appears early on in the onset of AD that generally affects older individuals.

The two main risk factors that contribute to the progress of MCI are advancing age and lack of education. For this reason, developing countries must target their most vulnerable populations by reducing and controlling the development of dementia among older populations who show signs of mental decline and disabilities and/or have a higher risk of suffering from MCI (Liu et al., 2018).

Local Scale

The prevalence of dementia is expected to rise the fastest in low- and middle-income countries (LMIC) by 2050 as they struggle with competing priorities and limited

resources. (ADI, 2020). Over the next 50 years, the Philippines' older population is forecast to increase from 9.5 million to 23.8 million. (Help Age Network, 2022).

Table 2.1

Key statistics on the Philippine's population of senior citizens

	2019	2015
Population aged 60 and above (total)	9,433,000	23,863,000
Population aged 60 and above (% of total population)	8.6	16.5
Older women aged 60+ (% of total population)	4.83	9.4
Life expectancy (males)	67.08	71.88
Life expectancy (females)	75.31	79.5
Old-Age Dependency Ratio (Age 65+ / Age 15-64)	8.6	17.7
Rural older people (% of total population)	6.48	
Urban older people (% of total population)	6.54	
Older persons living alone aged 60 and above (% of total population aged 60+)	5.4	

Note. (2022). *Ageing population in the Philippines*. [Table] Retrieved from <https://ageingasia.org/ageing-population-philippines/>

Unfortunately, it is not yet clear how prevalent dementia is in the Philippines, and relevant data is still lacking. Therefore, determining the causes of dementia is essential, and epidemiological studies can serve to bring the attention of the public to the problem, and guide government policy about dementia prevention, which is particularly crucial for healthcare settings with limited resources. (Dominguez et al, 2021).

Implementation of Technology-based Intervention to Improve QoL of Senior Citizens

Developing concern about the quality of life (QoL) has arisen when the population ages and the concept of human aging have begun to gain attention from researchers and

alike. (Aggarwal et al., 2020). The QoL of citizens is becoming an important social policy objective, as happiness and contentment are seen as just as important as social inclusion and social justice. (Pangbourne et al., 2021).

A growing number of older adults are learning, using, and staying up to date with the latest information technologies, such as the internet, due to the ease of accessibility to various kinds of technology devices such as personal computers, smartphones, and tablets (Aggarwal et al., 2020). New technologies can be integrated into psychological initiatives for the elderly. As technology advances, the issues associated with an aging population might be a solution to combat the adverse effects of aging. Introducing new technologies to senior care could be a possible way to counteract the negative effects of the aging population. (Vailati Riboni et al., 2020).

The Necessity of Technology-based Intervention for Senior Citizens with MCI

In the search for new and effective treatments for dementia-related diseases, there is another way to help people living with this condition: technology. Experts believe that technology intervention early in this stage represents our greatest hope that can make breakthroughs in slowing down the development of more deadly cognitive diseases such as Alzheimer's and dementia.

According to Dr. Hadjistavropoulou, one of the most challenging truths to accept is that there are no major cures for dementia-related diseases that come from the health sciences. There has been very little progress, but there are no breakthroughs. However, the good news is that technology can help fill that gap; early intervention can

have a huge potential in every element of dementia: detection, prevention, treatment, and care.

The worldwide population has changed dramatically over the years due to growing life expectancy. Although a healthy population is correlated with long life expectancy, it is also concurrent with age-related diseases like dementia and Alzheimer's (Chávez et al., 2019). To reduce the risks of individuals having these more devastating mental diseases, the detection of early signs can play an essential role in initial prevention, proper treatments, and intervention. Researchers have found that individuals with MCI have a greater risk of developing dementia-related diseases early on in life, with 10% - 15% of progression per year. MCI is an early stage of neurological loss and other cognitive ability. It is a stage between the cognitive decline of normal process aging and more serious cognitive deterioration of dementia. According to the American Academy of Neurology, MCI is prevalent in older adults ages 65 to 85 years old, but the cognitive decline starts at the age of 45.

Geriatric individuals with this mental condition experience mild problems in their cognitive functions such as memory and thinking. However, these individuals are aware of their impairments, allowing them to acquire metacognitive and compensatory strategies, making this an ideal stage for a cognitive intervention (Schaham et al. 2020). As of the moment, there is no standard treatment for this mental impairment, but there are things a person can do that may help their cognitive improvement. It is hoped that with the right technology, it can slow the progression of MCI to more serious neurological disorders and possibly stabilize cognitive level overtime.

Digital technology has a promise and uses in caring for people with MCI. A wide array of technology can help prevent dementia altogether, detect it as early as possible, and put the right interventions in place. Detection and early intervention can help individuals with MCI not to deteriorate their cognitive function so quickly.

Using digital technology for cognitive training has a great potential to be an efficient treatment for geriatric individuals with this kind of mental condition. Many professionals in the healthcare industry have recognized the benefits of technology in caring for people with cognitive disabilities (Chávez et al., 2019). These technological advances are developing exponentially alongside an aging population around the globe, creating opportunities for technology-based intervention to help and assist older adults with MCI in their everyday activities.

According to studies, geriatric individuals with MCI have lapses in their everyday tasks, including medication reminders, place recognition, event identification, and the list goes on, because of cognitive decline. Thus, technology-based intervention is necessary at this point. The appropriate treatments and preventive interventions will enhance cognitive performance and retard or prevent progressive deficits (Eshkoor et al., 2015).

Digital technologies such as mobile e-health trackers, wearable technologies, social robots, self-driving cars with GPS, assistive technology, and monitoring devices have been proven to aid people with this condition. Also, certain computer programs have massive potential for mental stimulation, improving memory, and other cognitive abilities. Such include video games, virtual reality, and augmented reality. In addition, some mobile

applications offer mental health interventions in providing medical monitoring, self-management, skills enhancement, and especially memory improvement.

The latest scientific evidence suggests that digital technology use has a significant health impact on a person's cognitive functioning. Functional imaging scans show that internet naive older adults show significant increases in brain neural activity during simulated internet usage (Schaham et al., 2020).

The need for the treatment of MCI has not changed, but the way we can treat this condition has changed. Technology has a potentially positive impact on cognitive conditions, and no discernible limit to the number of technologies that are either being developed, or have been developed, or will be developed. The impact is going to be a breakthrough. The digital technologies developed for this mental condition do not make the diagnosis easy. Nevertheless, neurological conditions are more manageable with newly developed technologies than ever before.

Exemplars

The proponents gathered a collection of existing academic studies of mobile applications and systems in relation to this research. This helps the proponents articulate a summary of the study's essential features and salient aspects relevant to our research project. These previous related studies will show how our research extends and helps to address gaps in the field.

A. Sahayak Application



Figure 3.1 Note. A screenshot. Bhayana et al, (2020), Sahayak UI for home screen [Image].
<https://dl.acm.org/doi/abs/10.1145/3429290.3429300>

Bhayana et al. (2020) in India, created design layout of the application with integration of wearable technology. (a) is the Home screen, (b) is the medium-fidelity layout, and (c) the high-fidelity layout. The researchers created UI elements with a consistent interface throughout the application. The researchers decided that a particular color scheme, typeface, and type scaling would be appropriate, making it easier to access for all senior citizens. The blueprint designs have a good contrast of the text, space between characters, and optimum size, to suit the senior's needs. Moreover, the chosen color scheme gives the user a sense of comfort, warmth, and joy with their images, indicating that the seniors are just a tap away.

B. Puzzle-based Apps for Senior Citizens with Mild Cognitive Impairment

Table 3.1

Examples of puzzle-based applications for cognitive training

Name of app, developer	Description and aim	Main cognitive components trained	Difficulty level
Buttons and Scissors KyWorks Software	To cut off all the buttons from a scrap of denim, by selecting two or more buttons of the same color each time. Buttons can be selected only on the same horizontal, vertical, or diagonal line.	Problem solving reasoning Working memory Visual perception	Medium-Hard
			
Flow Free Big Duck Games LLC	To connect matching colors with pipe, by pairing all colors, and cover the entire board. Pipes will break if they cross or overlap.	Visual perception Problem solving reasoning	Medium-Hard
			
Rush Hour Free ThinkFun	To get the red car out of the board by maneuvering all the other cars and trucks out of its way.	Planning Problem solving Working memory Shifting	Hard
			
Roll the Ball—slide puzzle BitMango	To create a path for the ball to roll to the finish line by moving blocks on the board.	Problem solving Reasoning planning	Hard
			

Table 3.2

Cont. Puzzle-based Apps

	Move the Box Pavlo Shelyazhenko	To clean a dock from boxes by moving, dropping, and swapping them. Three or more boxes of the same kind in a line disappear. Number of turns for each level is limited.	Problem solving Working memory Reasoning Processing speed	Very hard
	100 Blocks Eternus Games	To drag and drop random blocks into 10×10 board. Blocks are cleared by making a line of full blocks either horizontally or vertically. This puzzle game ends when there is no more space to put another block on the board.	Visual perception Inhibition Planning	Easy
	Puzzle Retreat The Voxel Agents	To slide all the blocks to fill all the holes, by paying attention to the correct order to slide the blocks, and to certain rules.	Working memory Reasoning Planning	Medium-hard
	Memorama Clement Marty	To discover pairs of two pictures. Each discovered pair will disappear, otherwise, are again covered and remittances in their original location on the screen.	Visual memory Inhibition	Medium

and Health, a Novel Cognitive Intervention for People with Mild Cognitive Impairment. [Table] Retrieved from <https://www.liebertpub.com/doi/abs/10.1089/g4h.2019.0157>

The study of Schaham et al. (2020) in Israel, aims to provide cognitive training utilizing technology for potential effective treatment methods for seniors with Mild Cognitive Impairment (MCI). The evidence shows that a repetitive practice has the potential to improve, or at least maintain, cognitive functioning in various domains. In addition, utilizing different tasks and games to simultaneously practice various cognitive components and learning a new skill such as operating a smartphone is an essential key to successful cognitive aging.

C. Digital Avatar Software Framework

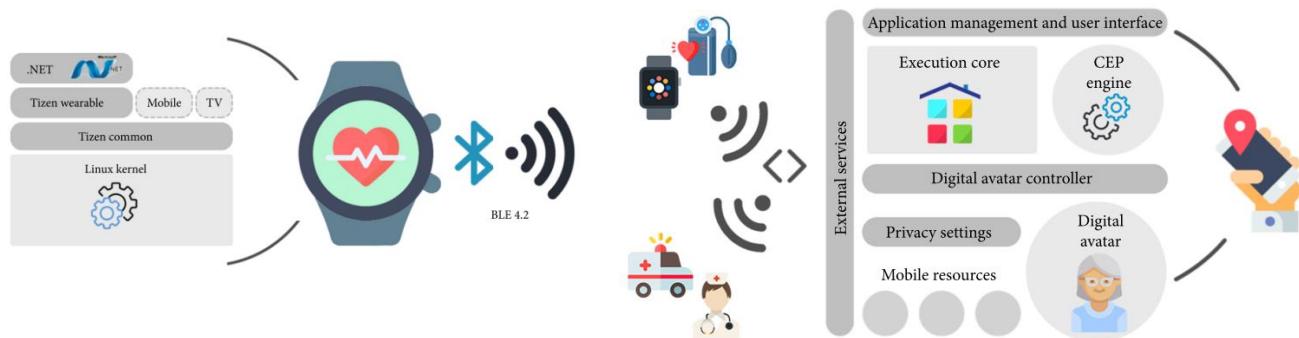


Figure 4.1 Note. A screenshot. Bertoa et al. (2020). Digital Avatar Software Framework [Image]. <https://www.hindawi.com/journals/wcmc/2020/8891002>

The study of Bertoa et al. (2020) in Spain, presents Digital Avatars, a software framework that helps senior citizens to improve their life style, and individuals who requires assistance through technology. This study takes advantage on smartphone's capabilities to gather information about seniors who own them. In addition, by integrating wearable technology, will help to monitor quality of life of senior citizens, by analyzing

their patterns of activity, reminding them medication schedules, and detecting risky situations that can send alerts to carers and relatives.

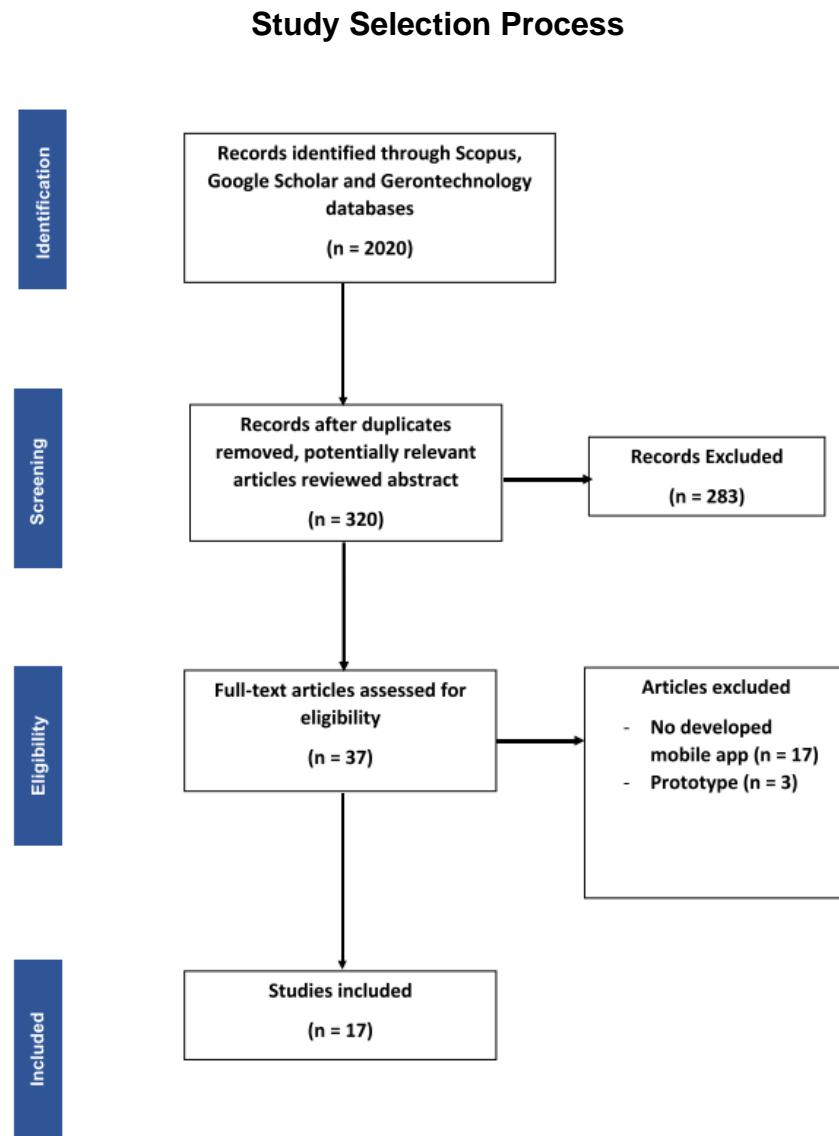


Figure 5.1 Study Selection Process

The proponents utilized this diagram to keep track of the number of articles found, how many were narrowed down, and the types of studies. During the search process, the proponents used the terms “Older adults”, “Senior citizens”, “Memory support app”, “Mild

cognitive impairment”, and “MCI app”. On this premise, the proponents were able to encompass everything they were searching about memory support apps for seniors with MCI. This study yielded the proponents an initial of 2020 articles through the databases. After removing duplicates, the proponents screened the articles through titles and abstracts and came up with 320.

Moreover, the proponents skimmed through these 320 articles and excluded an additional 283 articles. The full-text articles assessed for eligibility is 37, and then the articles excluded for no developed mobile app is 17, and for prototype only is 3, this leaving the proponents with final 17 primary articles.

Matrix for mobile apps and systems related to this study

Table 4.1

The characteristics of included studies (n =17)

Study	Authors	Year	Related Systems, Apps or Technologies		OS	Platform	Tested	Available	Wearable Technology	Users	Location
			Name	Description							
1	Bhayana et al.	2020	Sahayak	Not determined	Tablet	Yes	No	Yes	Older Adults	India	
2	Givon Schaham et al.	2020	TECH	Not determined	Tablet	Yes	No	No	Older Adults	Israel	
3	Tabak et al.	2020	ActivityCoach	Android	Mobile	Yes	Yes	No	Older Adults	Netherlands	
4	Chávez et al.	2019	Alzheed	Not determined	Mobile	No	No	No	Older Adults & Carers	Mexico	
5	Sykes et al.	2022	Therapy Tracker	Android & ios	Mobile	Yes	No	No	Older Adults	Switzerland	
6	Bisson et al.	2021	StepMATE	ios	Mobile	Yes	Yes	Yes	Middle-Aged and Older Adults	United States	
7	Bastos et al.	2021	SmartWalk	Android	Mobile	Yes	Not determined	No	Older Adults	Switzerland	
8	Quintana et al.	2019	InfoSAGE app	Android & ios	Mobile	Yes	No	No	Family-based medication management	America	
9	Zhong et al.	2019	Mobile Information Systems	Android	Mobile	Yes	No	Yes	Younger age & Older adults	China	
10	Leone et al.	2018	InTouch App	ios	Tablet	Yes	No	No	Older Adults	United Kingdom	
11	Wilding et al.	2021	Verily Connect	Not determined	Mobile	No	No	No	Older Adults	Switzerland	
12	Bautista-Mier et al.	2021	GeatriApp	Android	Tablet / Mobile	Yes	Yes	No	Older Adults & Health professionals	Columbia	
13	Ureña et al.	2020	m-SFT	Android	Mobile	Yes	Yes	Yes	Older Adults	Spain	
14	Bertoa et al.	2020	Digital Avatars	Android	Mobile	No	No	Yes	Older Adults	Spain	
15	Struzek et al.	2019	Everyday PersuasiveApp	Android	Tablet	No	No	Yes	Older Adults	Germany	
16	Francesco Vailati Riboni	2020	Mindful Age and Technology	Android	Tablet / Mobile	No	No	No	Older Adults	Italy	
17	Palumboa et al.	2020	PreventIT mobile health	Android	Mobile	Yes	Yes	Yes	Older Adults	Italy	

The 17 studies selected were all published in journals over the preceding five years (2018 – 2022). Most of the studies were conducted in High-income Countries (HICs). Two studies were in the United States, Italy, Spain and Switzerland, and each in Columbia, Germany, China, Netherlands, India, Israel, Mexico and the United Kingdom, respectively.

Table 4.1 shows that 12 out of 17 locations (70%) were from HICs. 11 out of 17 (64.70 %) use Android as their smartphones' operating system. For wearable technology, 7 out of 17 (41.17%) integrate wearable for their studies. 14 out of 17 (82.35 %) for the platform were mobile, and 16 out of 17 (94.11%) users were older adults.

Matrix for related literatures and studies reviewed by the researchers

Table 5.1

The characteristics of included studies (n = 9)

Study	Authors	Year	Purpose	Focus	Number of participants	Results	Location
1	Palmes et al.	2021	Predicting the quality of life among senior citizens in the Philippines	Senior citizens and family members	392	More attention should be placed on these domains so as to improve the overall QOL of senior citizens.	Philippines
2	Dominguez et al.	2020	Assessed incidence of MCI and dementia in the Philippines	Senior citizens	748	Based on this incidence, the project estimated of 220,632 new cases in 2030, 295,066 in 2040, and 378,461 in 2050.	Philippines
3	Eshkoor et al.	2015	Proper management for older people with MCI	Senior citizens	Not determined	This review sheds light on the fundamental issue of developing MCI, although it seems relatively simple. It is necessary to investigate more on risk factors.	Malaysia
4	Jaiswal et al.	2021	Determining the prevalence of dementia in Barangay Bangkal, City	Senior citizens	266	Advancing age increases the risk for cognitive decline while higher income and education level prevent or delays the onset of dementia.	Philippines
5	Portenhauser et al.	2021	Systematic review of mobile apps for older adults	Senior citizens	Not determined	In total, 83 of 1217 identified mobile apps were included in the analysis. Generally, the mobile apps for older adults were of moderate quality (mean 3.22 [SD 0.68]).	Germany
6	Klimova et al.	2018	Determining if mobile apps with training tools for seniors can be effective	Senior citizens	120	Several factors such as training of the elderly, design of the smartphone, level of difficulty of cognitive training, or security functions, must be carefully considered	Russia
7	Groznik et al.	2021	Gamification in cognitive assessment training for MCI	Senior citizens	1,227	The important result, however, is that some people tended to abandon the game in the run when no assistance was offered.	Slovenia
8	Griffiths et al.	2020	Cognitive characteristics of seniors with MCI	Senior citizens	482	The prevalence of MCI in older Thai people in a rural area is high compared with that in other countries.	Thailand
9	Riboni et al.	2020	Technology interventions for older adults	Senior citizens and carers	150	Considering the increasing rate of chronic disease and related issues within the senior population, the need for alternative or improved care and welfare solutions is crucial.	Italy

Synthesis

The existing literature shows that in the rapid growth of the aging population, especially in low-middle income countries, including the Philippines, there is a need to provide a solution for seniors with MCI. Thus, technology intervention would be a low-cost solution for seniors struggling with cognitive decline and to live their lives with confidence, dignity and independence.

The utilization of technology-based intervention would be the best support for seniors that will improve cognitive function and contribute to the QoL of seniors on their day-to-day basis. Advance technology helps seniors suffering from memory loss to reconnect to the world. It provides reassurance to families, and it offers support to carers.

Chapter 3

METHODOLOGY

This chapter is consisted of the research design, sources of data, instrumentation and data collection, ethical considerations, statistical treatment, development tools, and tools for data analysis. They are elaborated as follows.

Research Design

This study will utilize an iterative development through the agile approach by following a set of values and principles equipped with the basis to guide the application development process called scrum methodology.

The proponents will use scrum for the iterative application development process as it focuses on delivering high-value features within short delivery cycles, improving satisfaction, and delivering a high-quality product. Scrum is an agile framework, and it is a team-oriented type of agile methodology that stipulates a specific role and establishes a short cycle iteration called sprints. It is a project management methodology that the developers of this project will use. Moreover, developers will break down the phases of the project into smaller pieces that can be completed by a cross-functional team within a prescribed time period (**see table 6.1 – 6.2**).

The Scrum approach is appropriate for this study as these addresses complex adaptive problems productively and creatively and gives value to the OSCA throughout the development of this study.

Table 6.1 and Table 6.2 is a Gantt chart that helps the developers visualize planned events throughout the development of this project over time. This chart provides milestones and timing of this project's activities. It is useful for planning, coordinating and identifying specific tasks in this project. Moreover, it can also show dependencies amongst activities and can show the developers the current schedule of those particular project tasks or features of the application.

Table 6.1

Gantt Chart: Project Timeline

Project Task/Feature	JUNE				JULY				AUGUST		
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3
Mock UI Design											
Register											
Login											
GPS Tracker											
Symptom Journal											
Testing											
Release											
Bug Fixes											
Fitness Module											
Emergency Hotline Dashboard											
Health Dashboard											
Testing											
Release											
Bug Fixes											
Admin Health Dashboard											
Wearable Notification Module											
Testing											
Release											
Bug Fixes											
Puzzle-Based Games											
Testing											
Release											
Bug Fixes											
Final Release											

Table 6.2

Cont. Project Timeline

Project Task/Feature	SEPTEMBER					OCTOBER			
	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Mock UI Design									
Register									
Login									
GPS Tracker									
Symptom Journal									
Testing									
Release									
Bug Fixes									
Fitness Module									
Emergency Hotline Dashboard									
Health Dashboard									
Testing									
Release									
Bug Fixes									
Admin Health Dashboard									
Wearable Notification Module									
Testing									
Release									
Bug Fixes									
Puzzle-Based Games									
Testing									
Release									
Bug Fixes									
Final Release									

The three main phases of Scrum life cycle

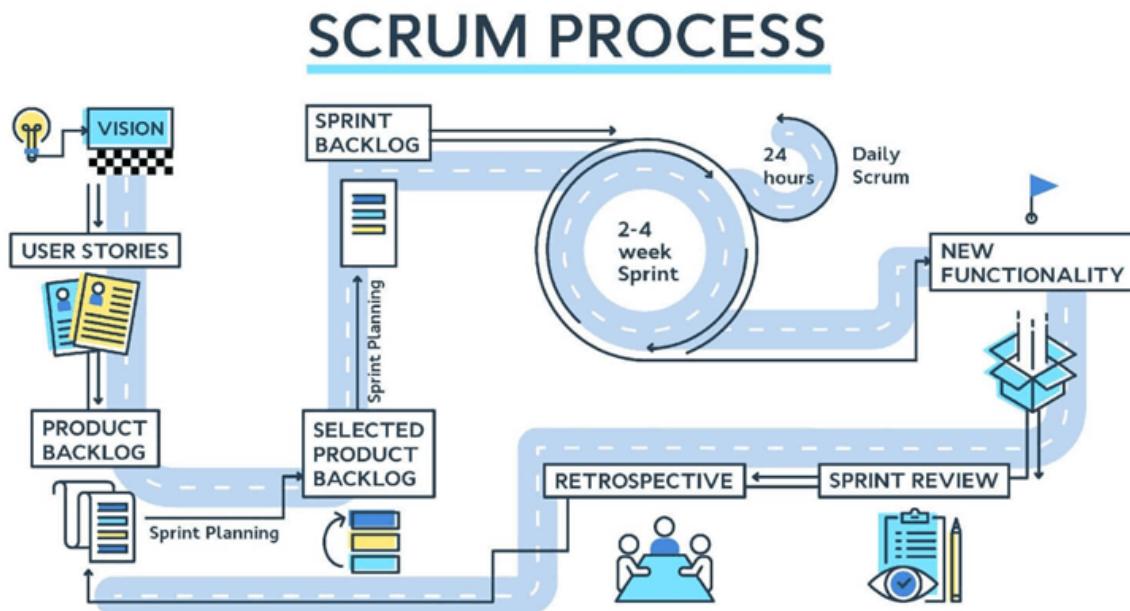


Figure 6.1 Scrum Process [Image] Retrieved https://www.freepik.com/free-vector/scrum-infographic_8806106.htm?query=scrumfrom

Planning Phase

The initial phase of the Scrum life cycle consists of planning and task estimation. The proponents will create a project backlog based on the outline of all the project features that will be provided to the organization. Then, schedule estimation for the initial project will be done, giving a highest priority to the items that should be delivered first. Prioritizing the project backlog with feasible schedule estimation will deliver the best results. Assigning sprints to the project backlog can take up to two to four weeks depending on the backlog priority.

At the initial project process, take into consideration the task that has a high backlog priority with clear and concise requirements. Then during the sprint planning, the proponents will have a discussion about the project backlog and time estimation for each product backlog items. Most of the work from this phase is in the sprint backlog, and it is already decided including how to work on each task. In addition, how to make changes if necessary, refine the tasks, and create an analysis, to solve issues that emerge in the process.

Sprint Phase

Sprint phase is a short, time-boxed period given to completely finish a set amount of tasks for a project. It is a continuous development and the most iterations of the scrum process that consists of numerous amounts of planned work. This phase's duration lasts for only one to two weeks. The sets a feasible schedule target for planned work in Sprint Backlog. After planning, the proponents should complete the work at the specified timeframe and give necessary review at the end of each session.

During the development process, tasks may bump into some issues or problems. These are sometimes unpredictable such as proponents' wellness, natural disasters, emerging bugs, technical problems, and complexity of the tasks, which can delay, drastically affecting the duration of the sprint. In addition, daily scheduled meetings are also included in this phase, an essential part of the product development. In here proponents can exchange important information, decide which path to take along the development, discuss problems and seek solutions, all of which can positively affect the project development.

Release Phase

Deployable software packages that are the result of multiple development iterations in scrum methodology are known as releases. Releases can be done before the end of each iteration to be able to change the beta release version. Project modules may be merged in this phase and tests in accordance with the ISO 9126 which inspects the quality model of the product.

Sources of Data

Primary Sources

The proponents coordinated with the respected senior presidents of OSCA in which each president managed a particular population group of senior citizens in Mandaluyong, respectively. It provides the proponents with the knowledge to know, gather, interpret, or describe information about the present condition of the senior with MCI in relation to this study. Moreover, the seniors' carers were also interviewed, as this will also provide information about the current situation and challenges of senior citizens on a day-to-day basis. The identified factors provide a solid ground for identifying the importance of technological-based intervention for senior citizens with MCI.

Secondary Sources

The internet was also utilized to search and review various internet articles, reports, reviews of related technologies, and literature that helped the proponents

determine the implementation and impact of a technology-based intervention to assist senior citizens with MCI.

Ethical Considerations

The proponents applied some ethical principles to this study. The proponents ensure the confidentiality and anonymity of all the personal information of participants.

Statistical Treatment

The proponents will utilize statistical treatment to test and evaluate quality model of the system. It is a useful technique for measuring, evaluating the product quality of the system, in which it provides the summary of overall functional performance. The weighted mean will use for alpha and beta testing for the mobile application and wearable integration through the use of ISO/IEC 25010:2011 system and software quality model.

$$\text{Weighted Mean Formula: } \underline{x} = \frac{\sum x}{N}$$

Where \underline{x} = mean, \sum = sum of observations, x = observations, and N = total number of observations.

Instrumentation and Data Collection

Interview

Table 7.1

Overview of the interview

Interview Number	Age	Brgy	Duration of Interview
1	64	Addition Hills	8 minutes
2	61	Barangka Drive	22 minutes
3	63	Daang Bakal	10 minutes
4	64	Namayan	12 minutes
5	66	Highway Hills	18 minutes
6	62	San Jose	32 minutes

Note: please see the Appendix for interview transcript.

The research instrument used in the data collection process is the qualitative approach, particularly an unstructured interview, also known as an in-depth interview. The proponents prepared a set of interview questions to ask the participants, eliminating the strict interview process but leaning towards a more casual conversation with an underlying subject and objective.

An unstructured interview is the most suitable data collection process for obtaining data from the focus group, the older adults in OSCA. This data collection process is used because the proponents acknowledge that it is essential to gain trust and build rapport with the participants due to their current character brought by their old age, which becomes a massive challenge in the entire data collection process. Also, by using this, there is a high probability that the participants will give a truthful answer to the inquiry.

Interviews were held through an online platform — Zoom. The proponents and participants interact and answer inquiries orally. The interview questions aim to establish a problem within the seniors that are members of OSCA in Mandaluyong and find a solution to the established problem. Data was collected by video and audio recordings so it could be transcribed for analysis. Then, data were further analyzed using data processing methods and digital tools to extract the potential source of information and draw conclusions.

Development Tools

Java - is a programming language that is open source and proven technology for building cross-platform mobile applications. Java is another JVM based language that is simple to write and concise. It combines object-oriented and functional programming features. This programming language is mainly designed and developed for Android applications.

Firebase - is a NoSQL and document-oriented database designed to handle tough database workloads. It allows data to store easily, sync and query for mobile applications.

Android Studio - is an integrated development environment mainly for Android Operating System (OS). It is explicitly designed to develop android products such as mobile phones and wearables with android OS. It supports structured coding, allowing the developers to divide the project into smaller units that can be independently built, tested, and debugged. This IDE is ideal for its ability to accelerate the development process while not losing any quality.

Figma - is an interface design software, and it gives the developers all the tools needed for designing a project's interface. Figma allows live collaboration to make the development and communication easy. It works on any computer, whether Mac, Linux or Windows.

Tools for Data Analysis

Data Flow Diagram - a visual representation to illustrate the flow of data through a system or process. It also includes data inputs and outputs.

Context Level Diagram – it shows a system in relation to other external systems. It does not show details within the system, and it is the simplest form of DFD.

Conceptual Framework – is a diagram representing the relationship of variables. It is used to make conceptual distinctions and organize ideas.

Entity Relationship Diagram - the entity-relationship model is a diagram that depicts the relationships and connections among entities within the database.

Database - the proponents will use Cloud Firestore, a NoSQL document designed to store and sync app data easily and at scale.

Chapter 4

DISCUSSION OF FINDINGS

This chapter contains a detailed presentation of the module used that answered the statement of the objective of the study. It also presented the results gathered using the ISO 25010 that was distributed to the administrator, carers, and seniors of the Office for Senior Citizen Affairs Mandaluyong (OSCA). The following modules were developed to address the six (6) statements of objectives.

The researcher designed the mobile application to be visually appealing to the users. It is also easy to use and navigate so that the users will not be confused when using the mobile application. The figures below show the onboarding and log-in screen of the application.

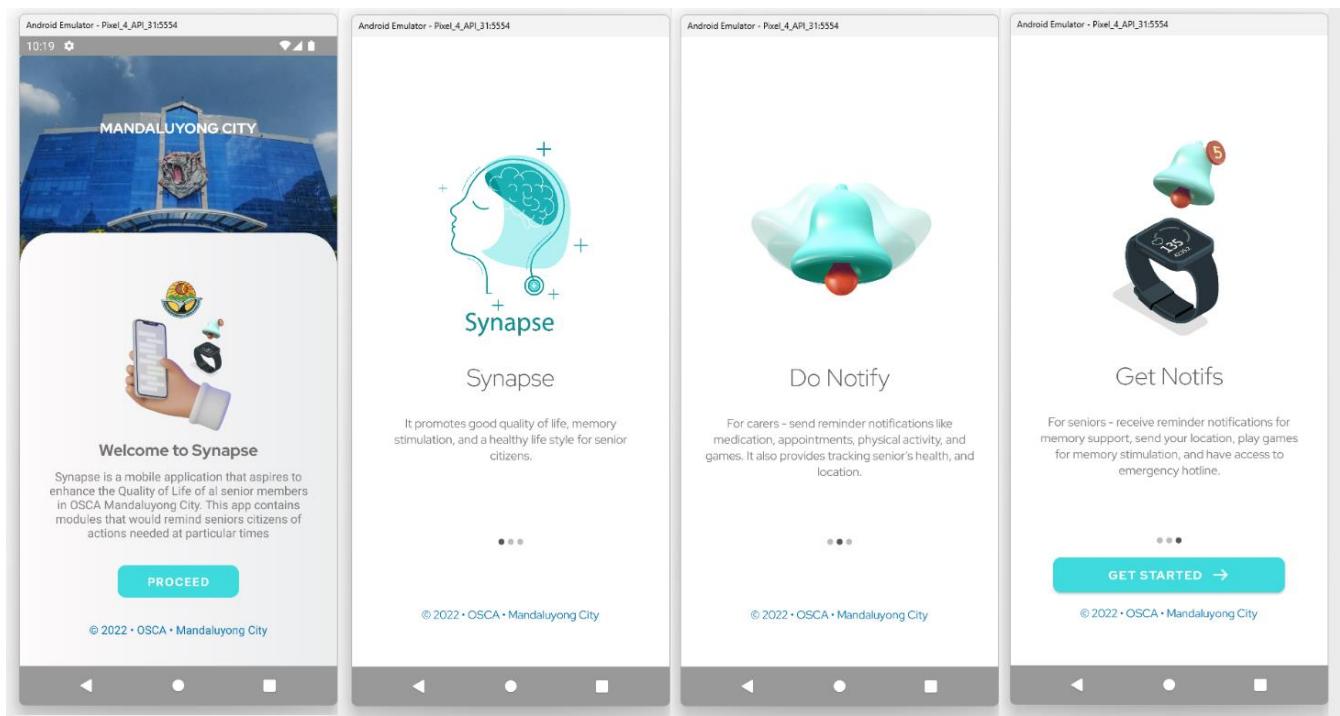


Figure 7.1 Onboarding screen

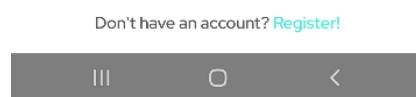
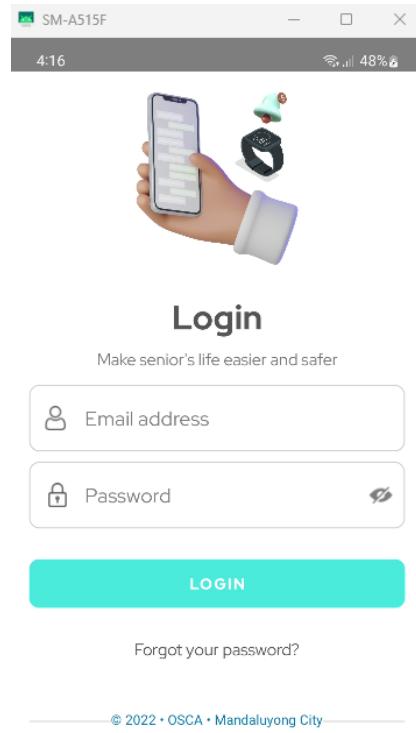


Figure 7.2 Log-in screen

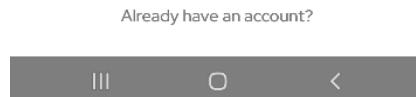
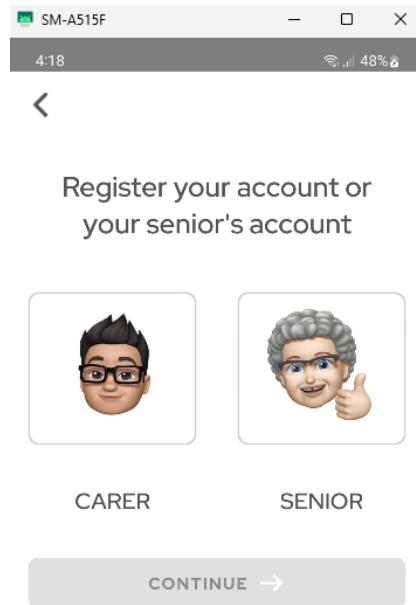


Figure 8.1 Landing page for registration

The researcher created one (1) registration for two (2) distinct types of application users: seniors and carers. Depending on which user is chosen, a registration screen will be shown like the figure below. To register, the carer must enter the personal information for each category.

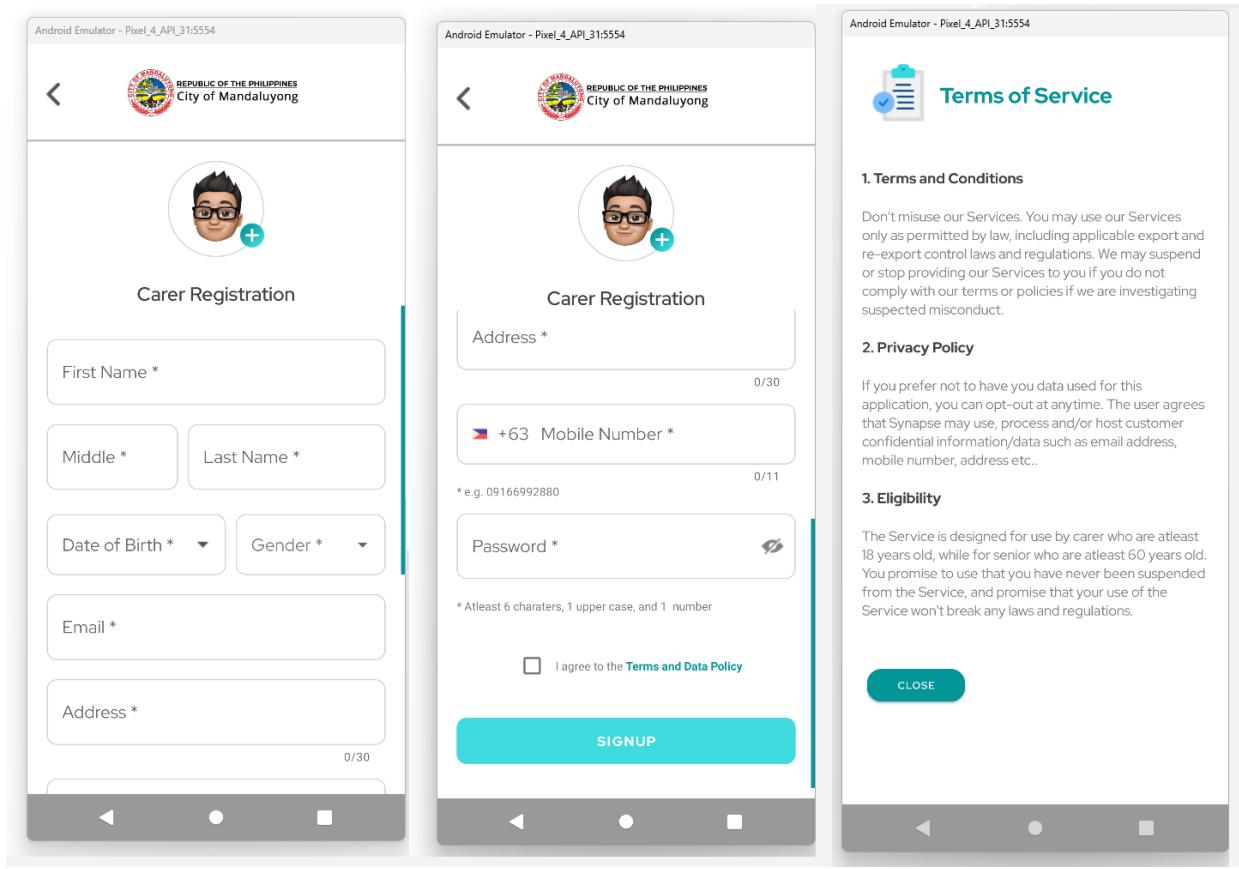


Figure 8.2 Carer Registration

The figure above shows how to register as a carer providing personal information such as Full name, Date of Birth, Gender, E-mail, Address, Mobile Number, and Password. The carer can also personalize their profile by adding a photo. To activate the application, the e-mail address and mobile number must be active to verify and receive the one-time pin (OTP) for mobile verification.

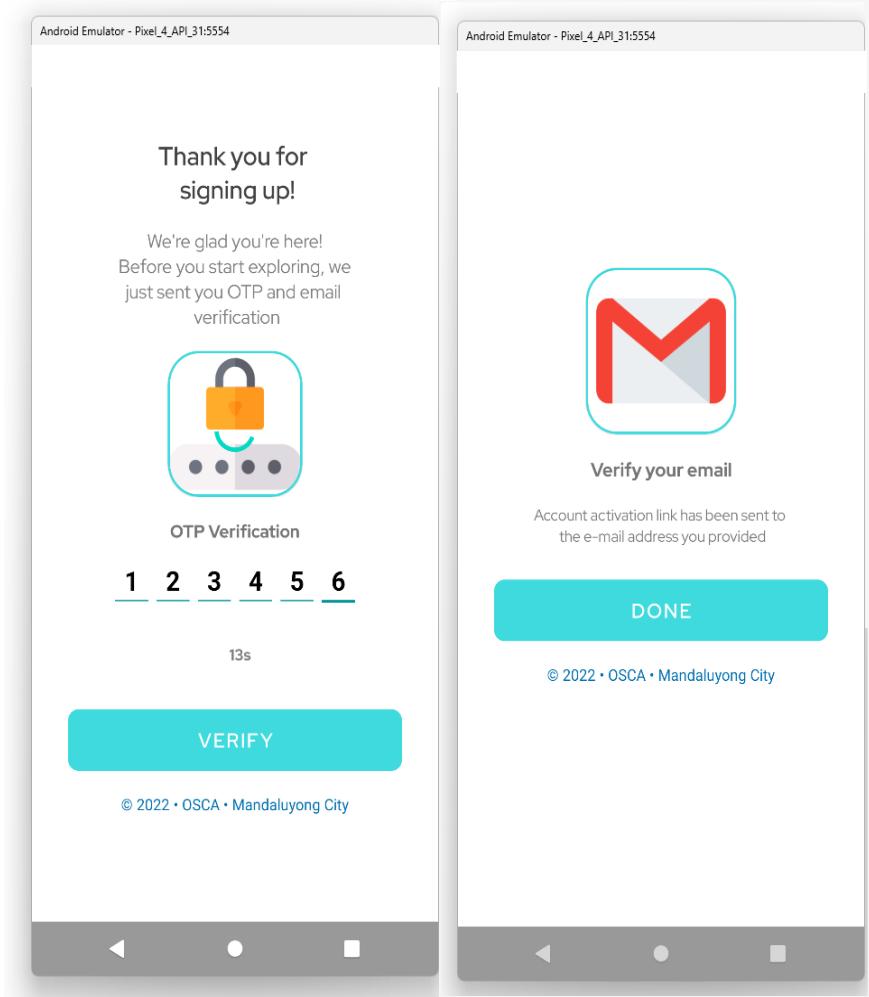


Figure 8.3 One-Time-Pin (OTP) and E-mail Verification

The figure above shows an example of an OTP and e-mail verification. The carer will receive the OTP verification code via text; it must be entered within a sixty-second-time frame limit. Otherwise, the code will be invalid, and the carer must re-send a new verification code.

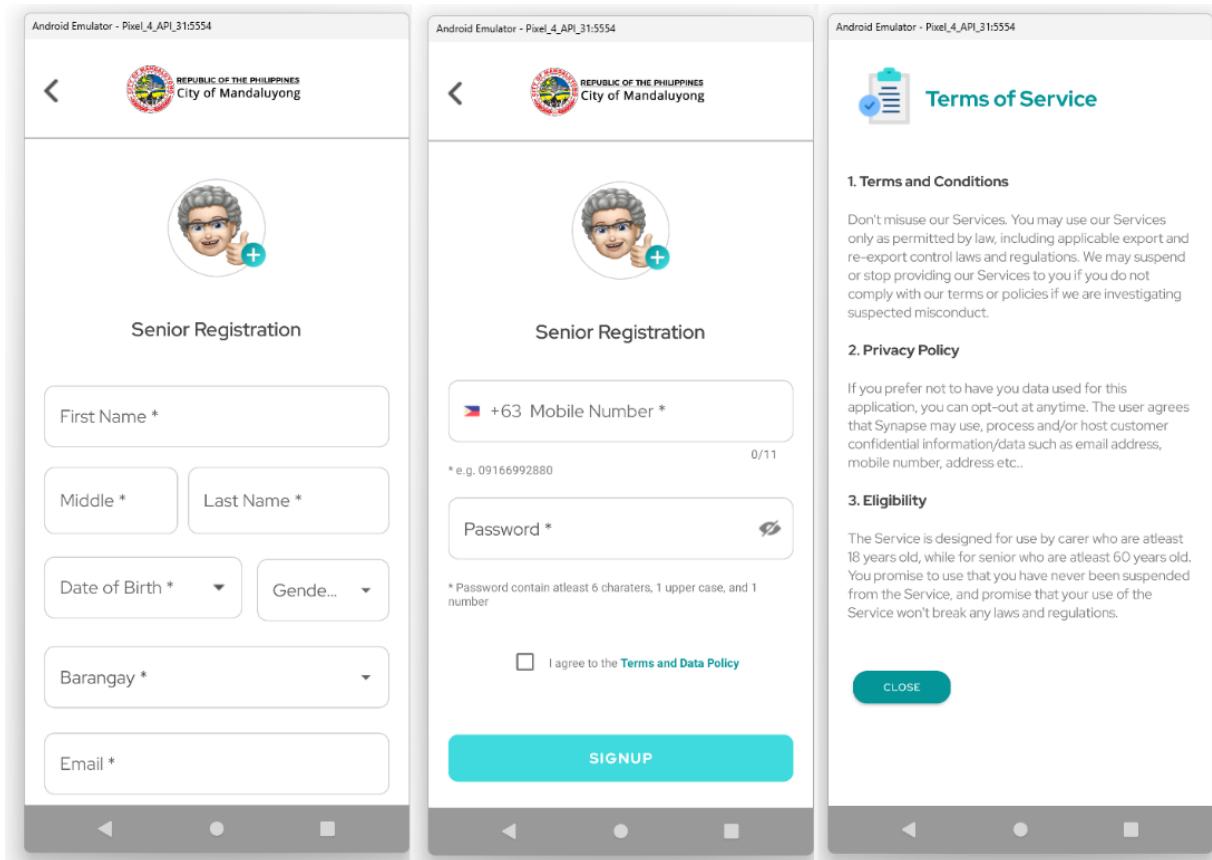


Figure 8.4 Senior Registration

The figure above shows how a carer can register one or more senior users by providing personal information such as their Full name, Date of Birth, Gender, E-mail, Address, Mobile Number, and Password. The carer can also personalize the profile of each senior by adding a photo. The e-mail address and mobile number must be active to receive the verification code to activate the application.

In relation to the study's SOO1. Provide notification reminders that remind senior citizens of actions needed at particular times, specifically medication, appointments, physical activity, and game reminders.

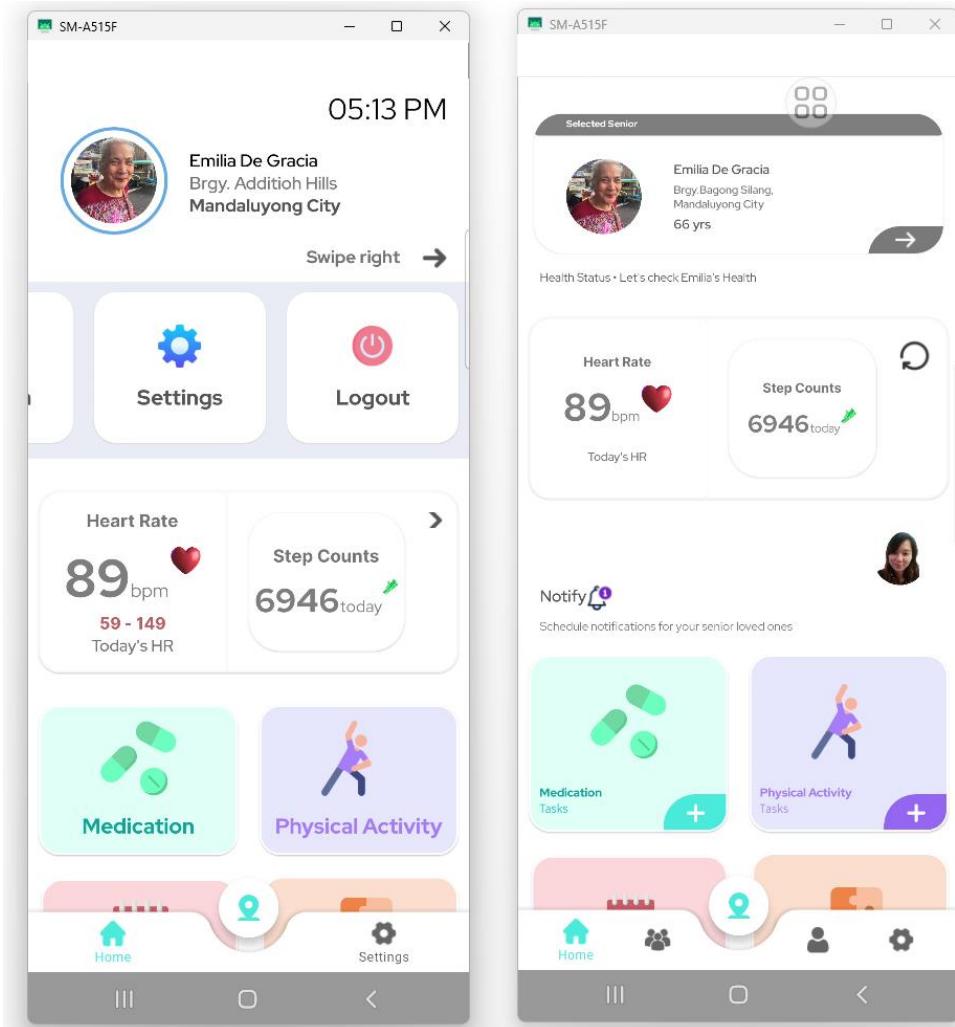


Figure 9.1 Home screen of carer user

The figure above shows the application home screen of the users. Carer users can add tasks depending on seniors' needs, such as doctor's appointments, medications, physical activities, and games. These tasks are used as notifications that they need to carry out for their seniors. It also shows the name, age, and address of their senior.

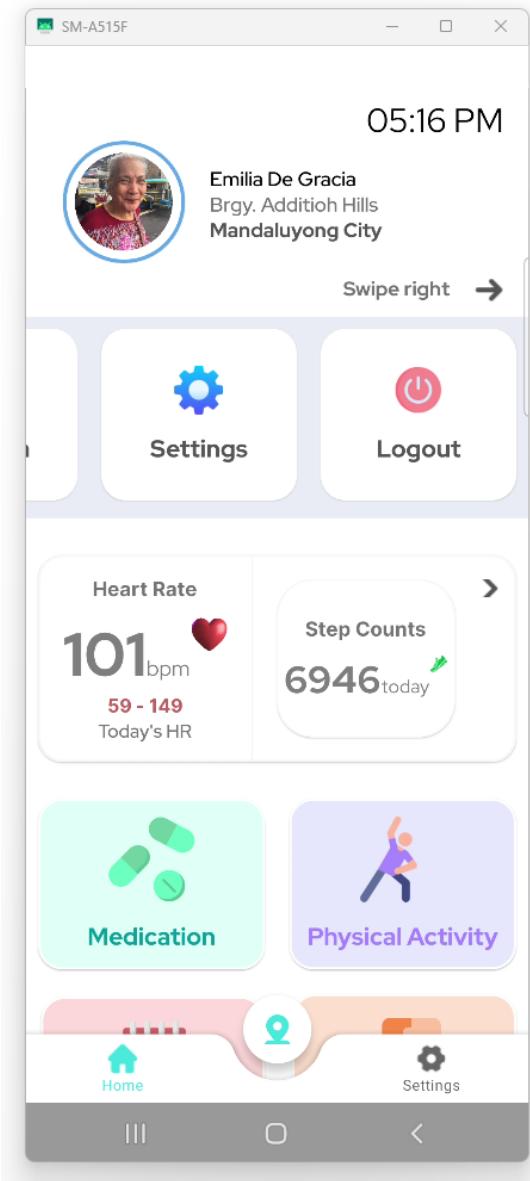


Figure 9.2 Home screen of the senior user

The senior's application home screen shares many of the same features as the carer user. However, seniors cannot add additional tasks to their medications, physical activities, and games. They can only see the tasks they must complete on that particular day set by their carers. Additionally, the location button allows seniors to check their whereabouts on a map and share it with their carer.

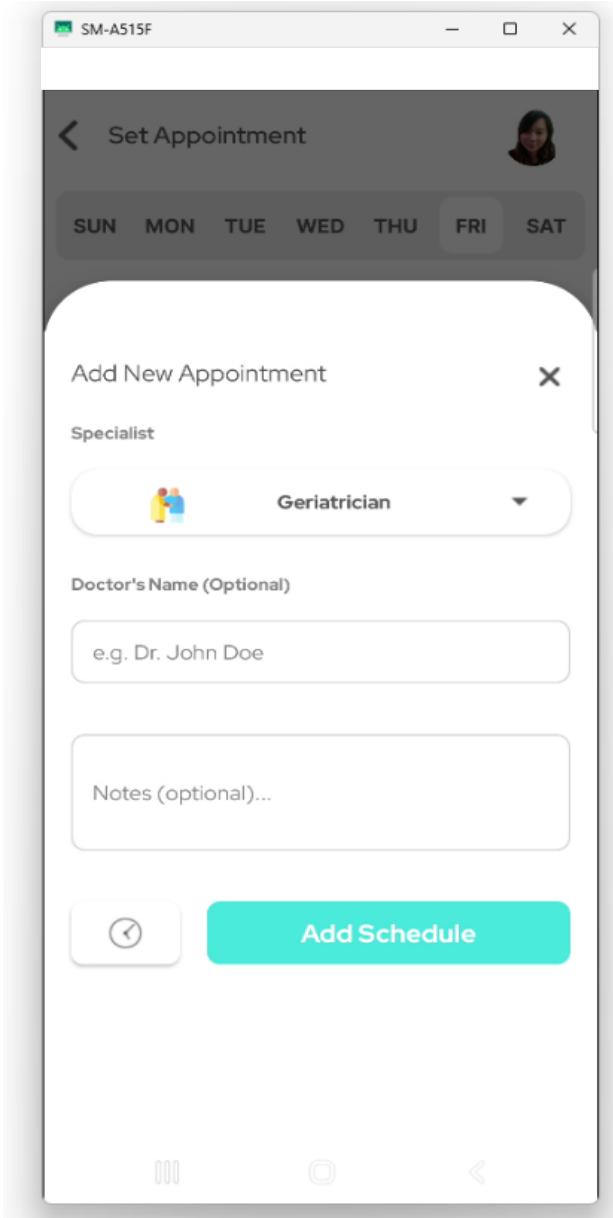


Figure 10.1 Carer Appointments Module

The carer users can add doctor's appointments as illustrated in the appointment module figures below. When elders encounter pain requiring medical attention, carer users can set an appointment and choose the kind of specialist, adding the doctor's name and notes.

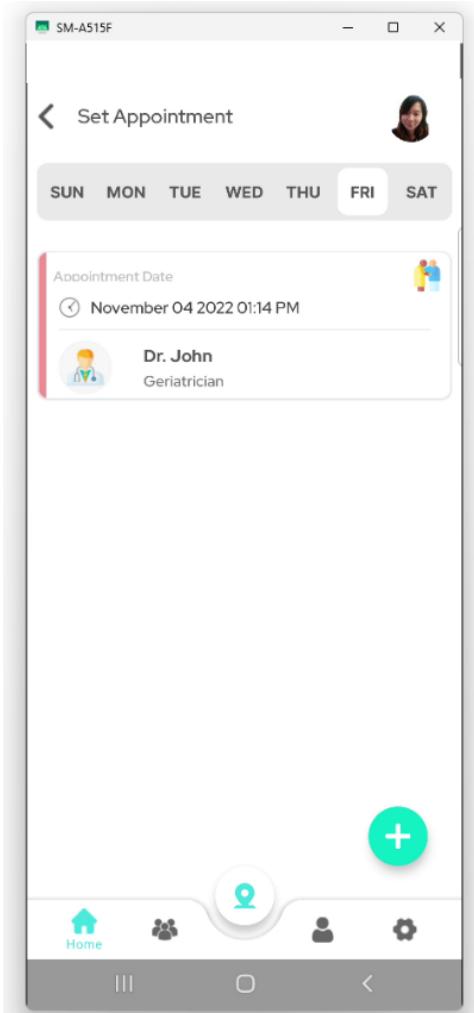


Figure 10.2 List of appointments

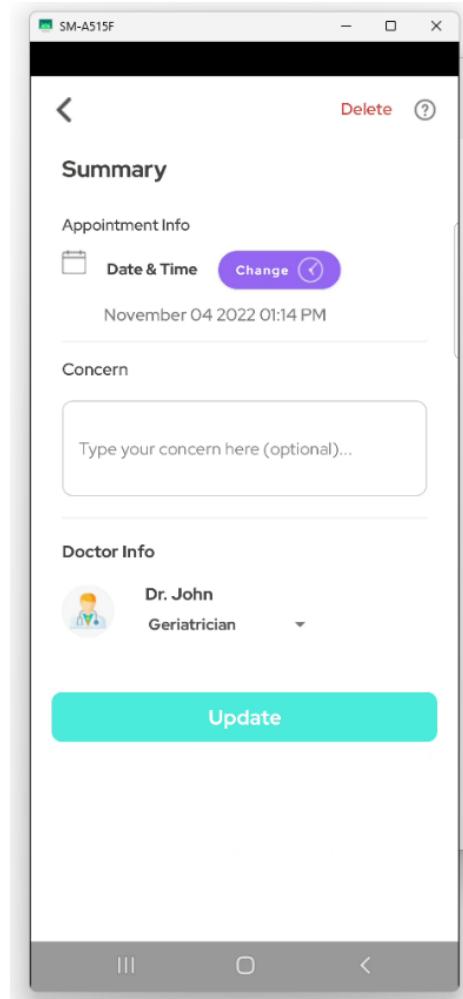


Figure 10.3 Appointments Information

In Figure 10.2 appointments are shown. Both users will be notified one day before the scheduled time. In Figure 10.3 carer users can update the summary of appointments by clicking on a particular appointment, while the senior user can only view the scheduled appointment entered by the carer.

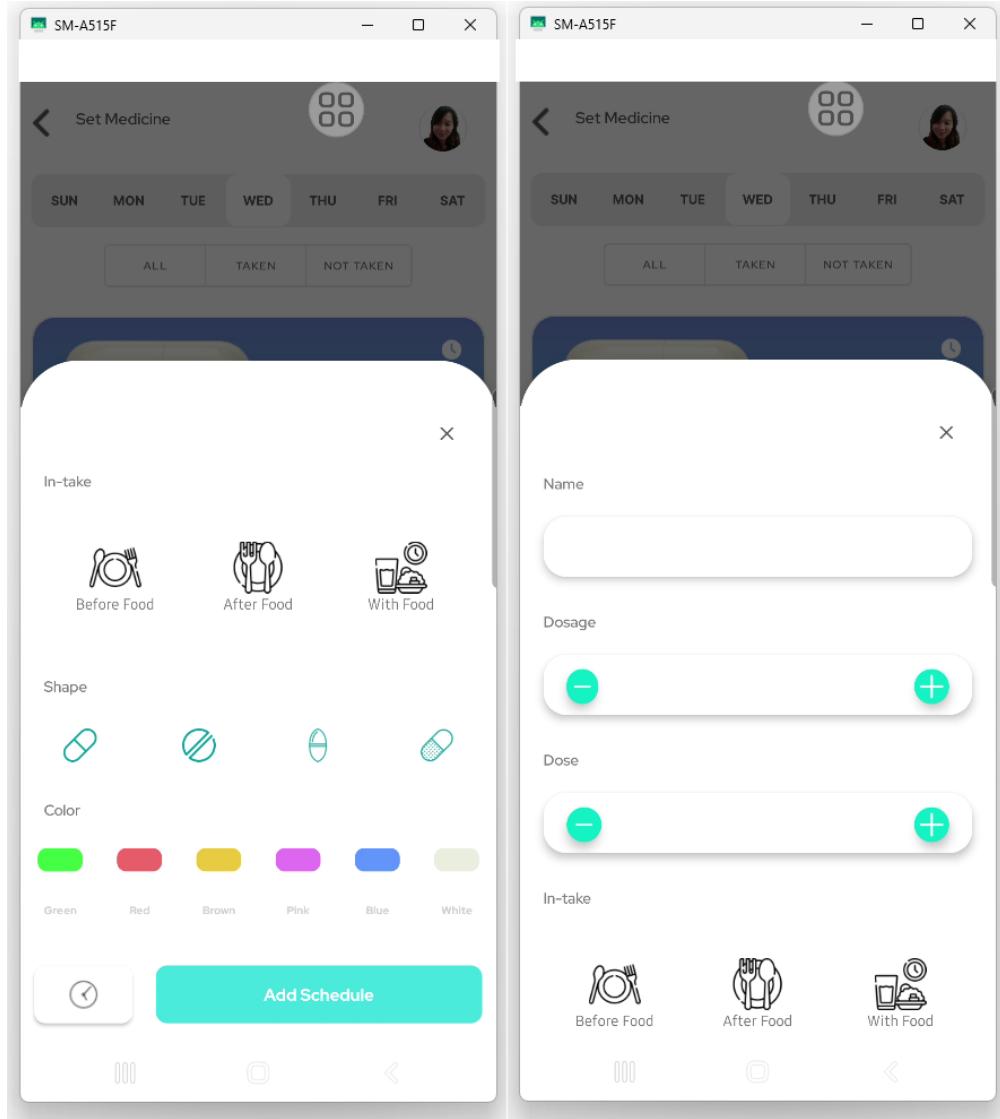


Figure 11.1 Carer Medicine Module

The figure above shows that only the carer user can add medication reminders for the senior. Figure 11.1 is for the carers to fill in; it includes the name of the medicine and the recommended daily dosage the seniors need to take. Moreover, the shape and color of the medication are visible so that seniors can quickly identify it.

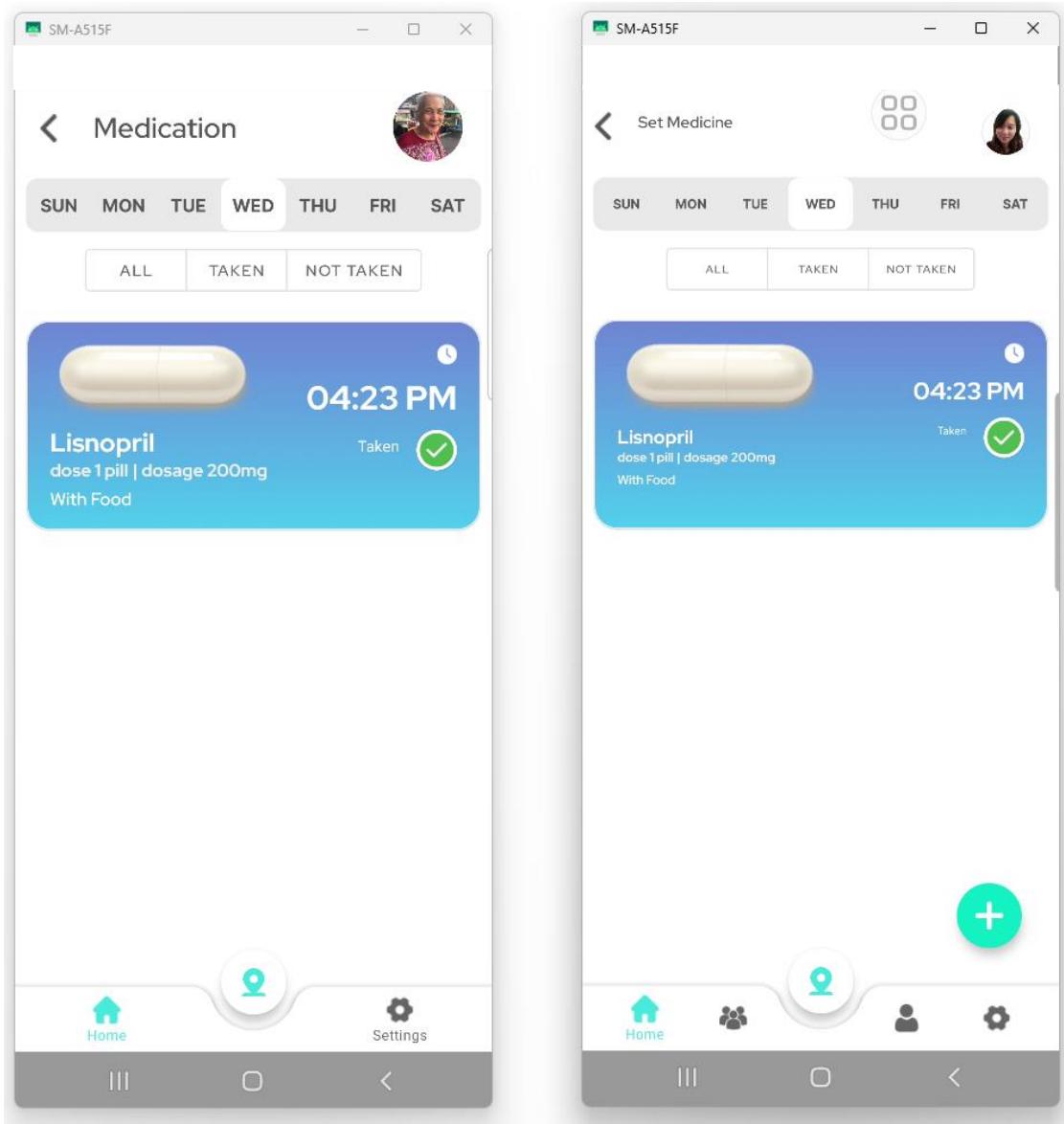


Figure 11.2 List of medicines added by the carer users

The above shows the list of medications. While Figure 11.3, carer users can update medication summary information, while senior users can only view the medication schedule entered by the carer. as shown in Figure 11.4.

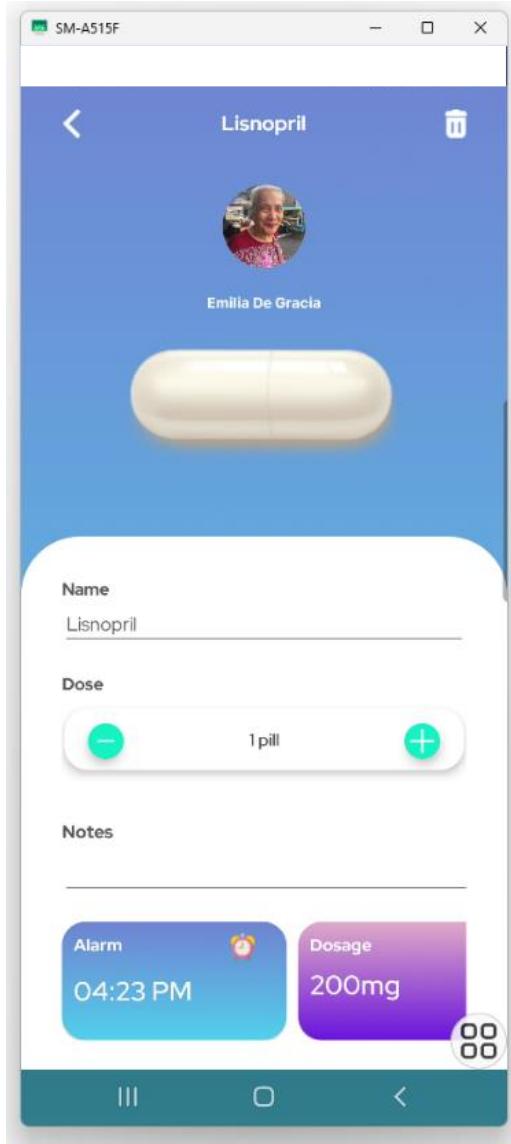


Figure 11.3 Medication Summary Information

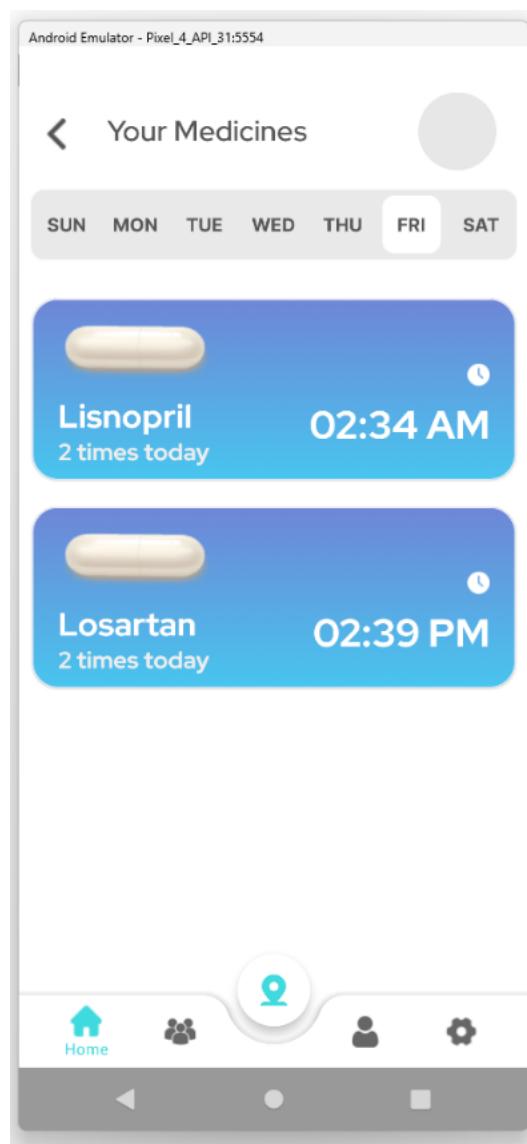


Figure 11.4 List of medications

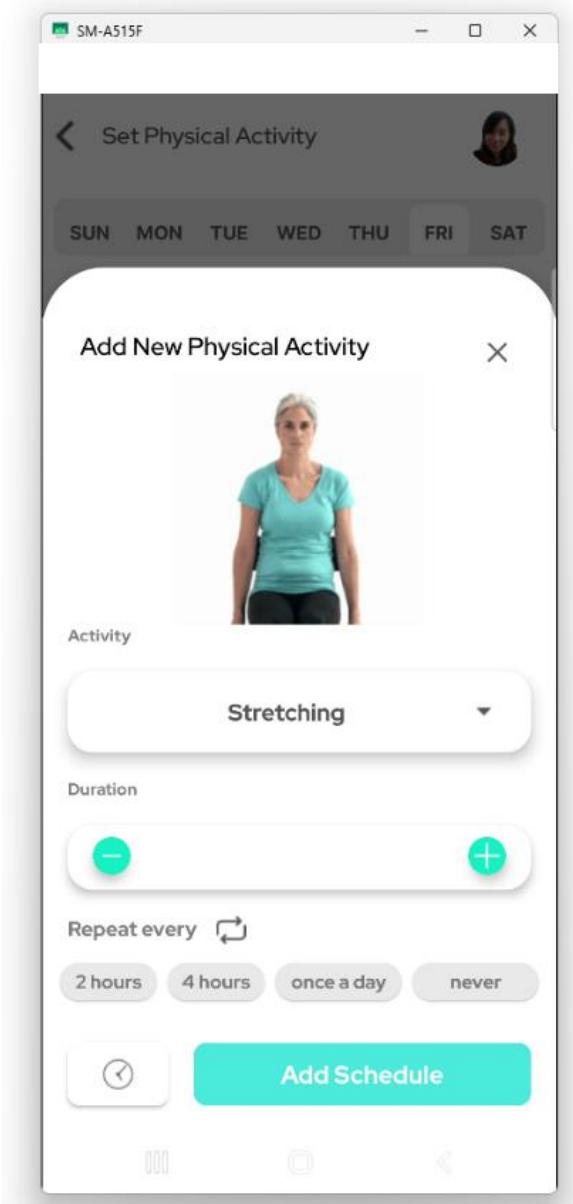


Figure 12.1 Carer Physical Module

Figure 12.1 above illustrates the type of physical activity carers are required to schedule for the seniors, as well as the duration of that particular activity. According to Figure 12.3, carer users can view and update physical activity information.

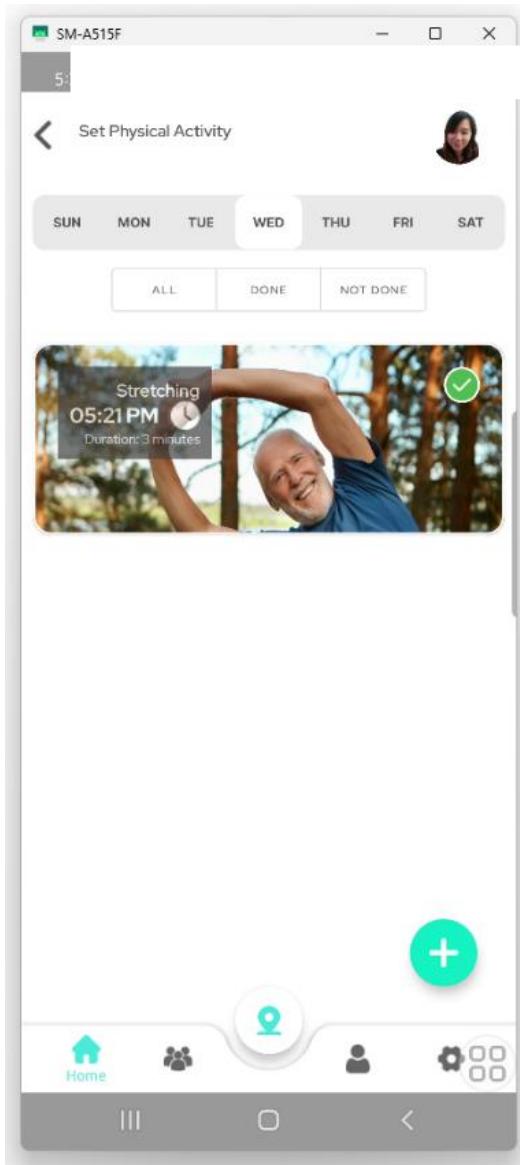


Figure 12.2 List of physical activities

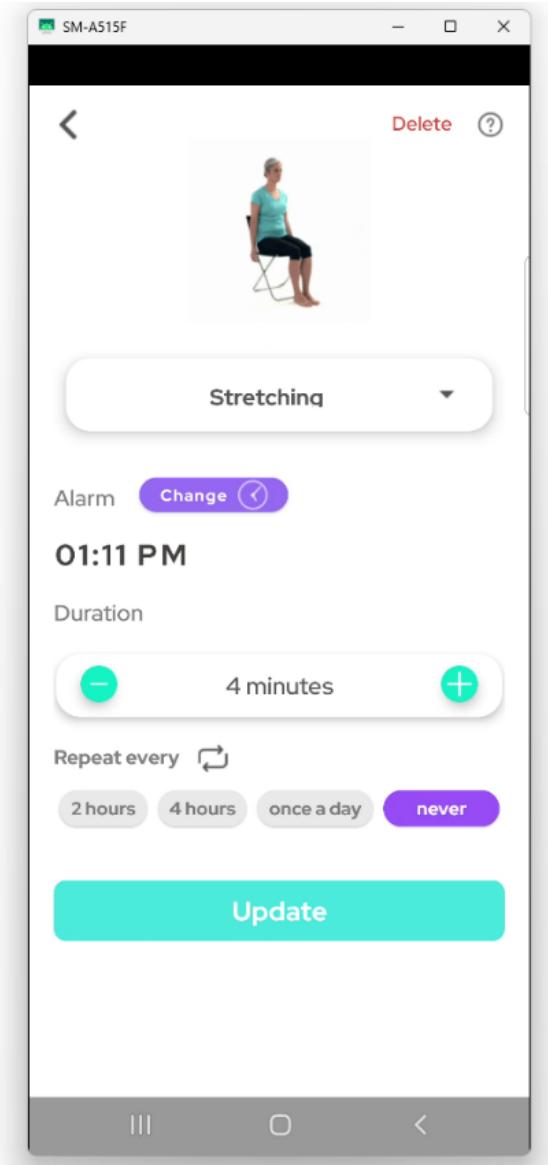


Figure 12.3 Physical Activity Summary Information

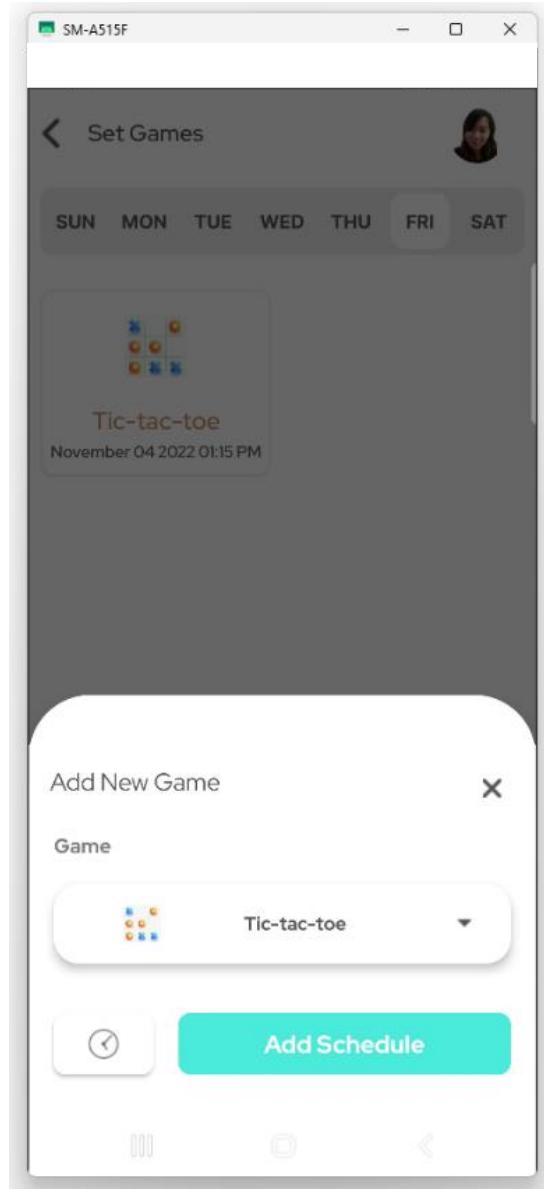


Figure 13.1 Carer Games Module

In Figure 13.1 above, the carer users are required to schedule the following games for their seniors: The games included are Tic-Tac-Toe, Math Quiz and Trivia Quiz. These games are used to support seniors' cognitive abilities. While Figure 13.3 below, carer users can view and update the game's task information.

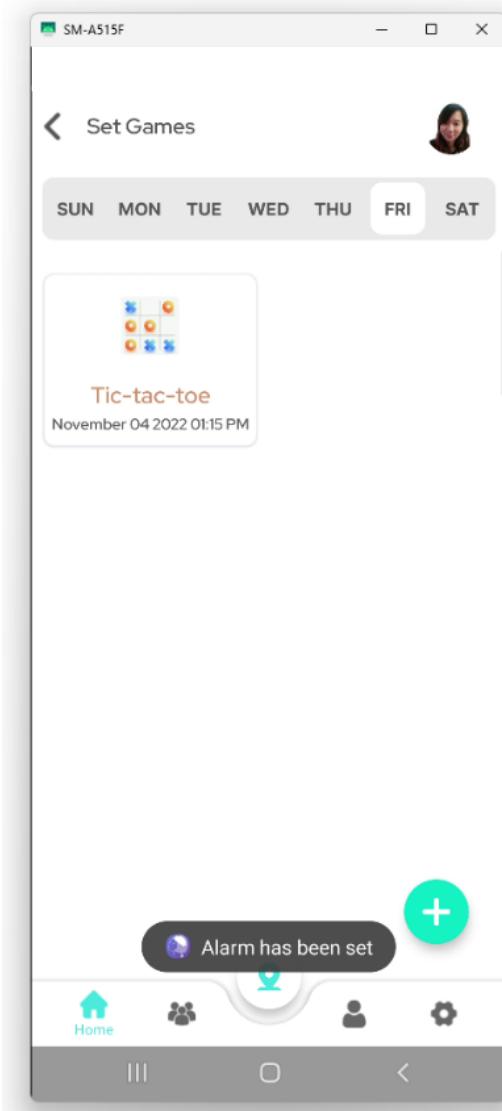


Figure 13.2 List of game

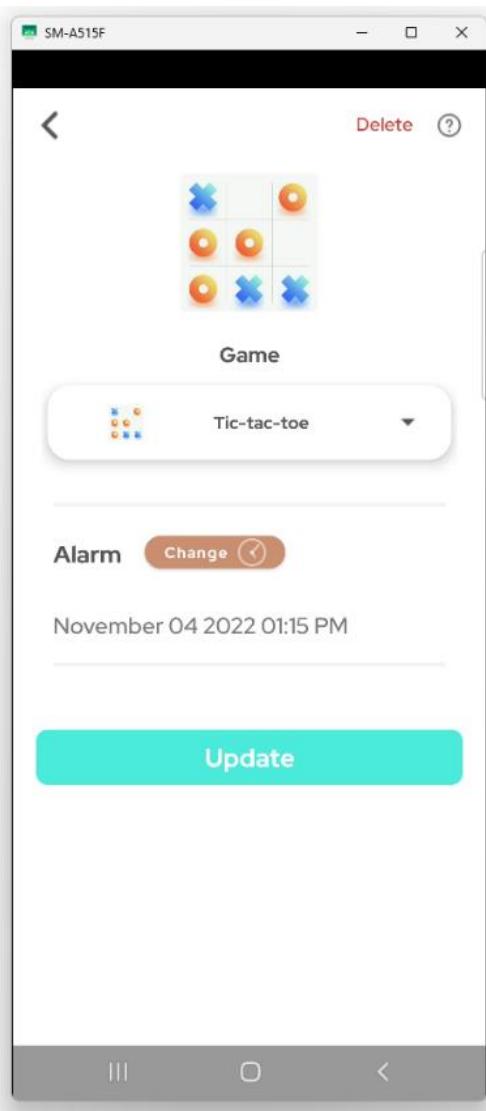


Figure 13.3 Game Information

In research conducted by Schaham et al., 2020, individuals with MCI would appreciate devices that help them in memory guidance. In particular, memory support that reminds them of actions needed at particular times: exercise, medication, appointments, and games to help them enhance their cognitive function. By having daily goals, this will help them be less confused or agitated.

In relation to study's SOO2. Provide games to stimulate cognitive abilities, specifically tic-tac-toe, math quiz, and trivia quiz.

The researchers developed games that are supported by recent studies that prove they can improve the cognitive abilities of the elderly. Games in this application are easy to use, particularly for the seniors that will be using them. As seen in Figure 13.1 above, carers schedule the games seniors will play that day. On the screen of the seniors, a notification will appear, reminding them that they will begin playing games.

The seniors will tap the game tab, and the games will appear, as seen in Figure 14.1 below. There are three (3) games that are available on the application, and these are Tic-Tac-Toe, Trivia Quiz, and Math Quiz. The seniors will then select the scheduled game inputted by the carer on the task menu.

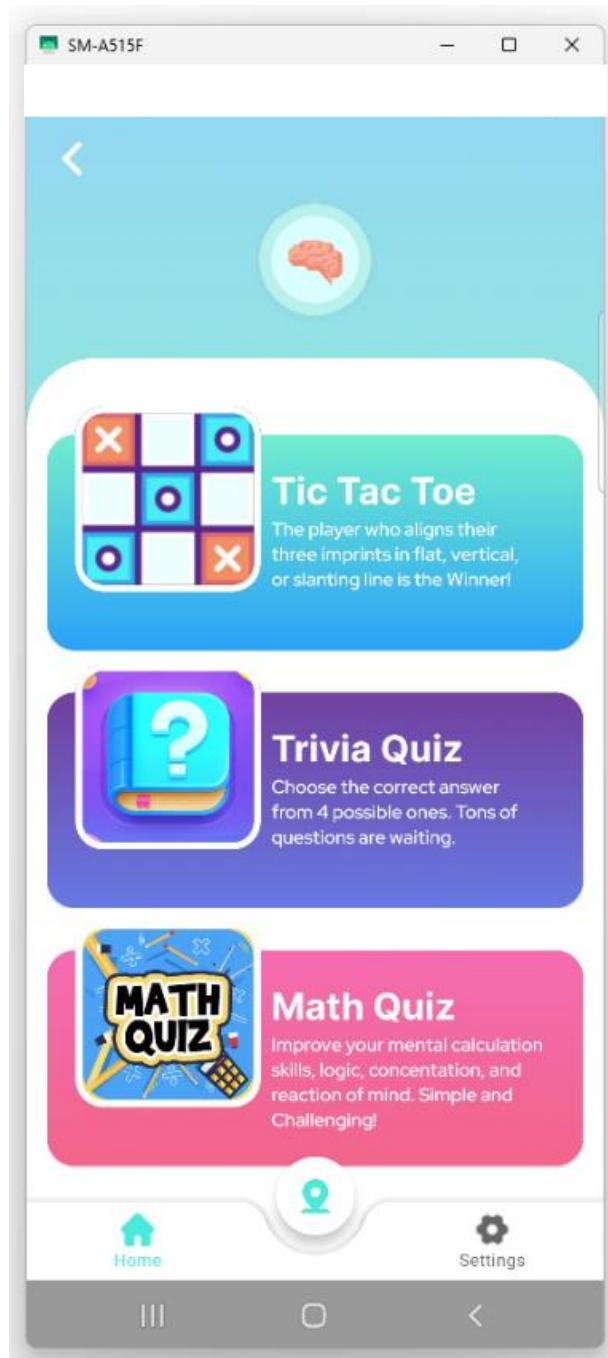


Figure 14.1 Senior's Game Module

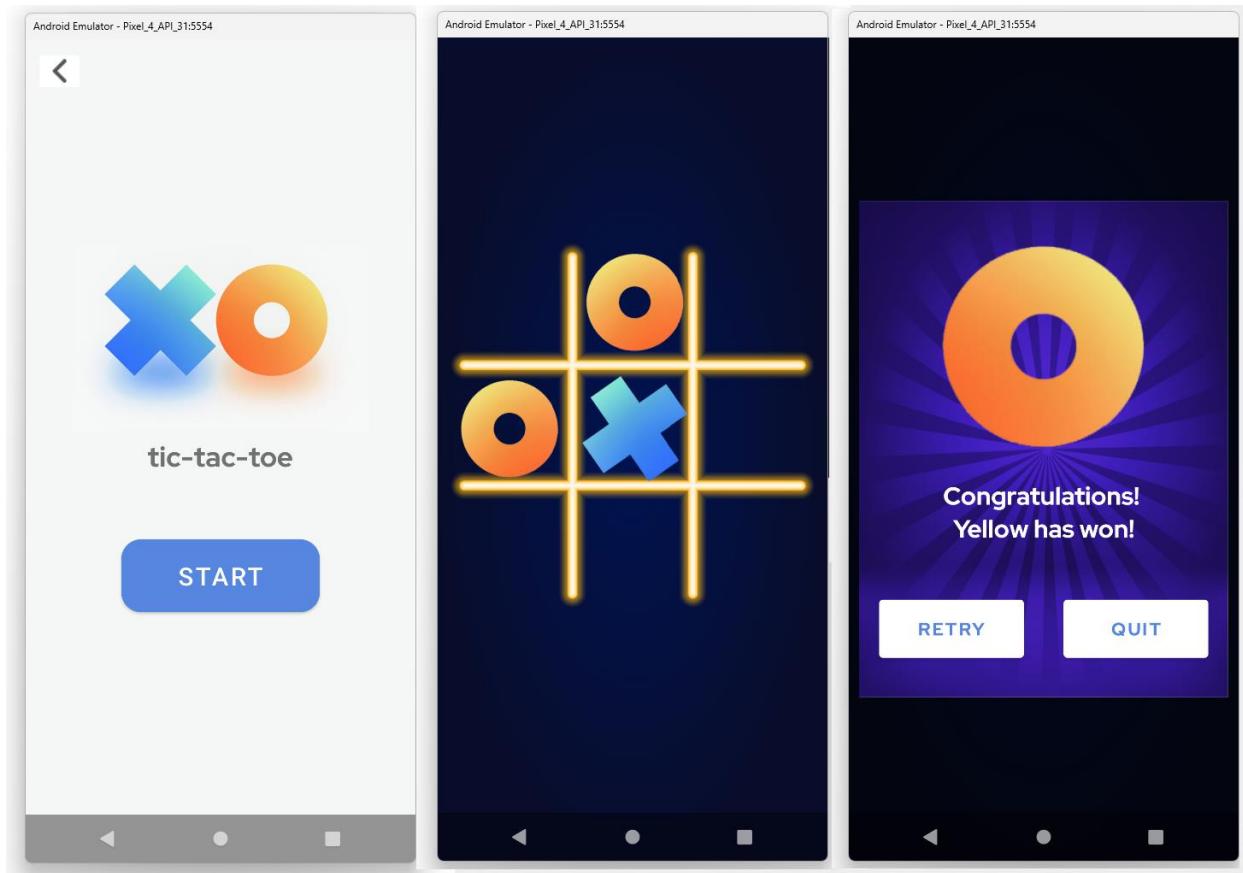


Figure 14.2 Tic-Tac-Toe

The figure 14.2 above, is the module for the Tic-Tac-Toe. The researcher developed the Tic-Tac-Toe game based on the research of J. Schmid (2022), which indicates that games such as tic-tac-toe stimulate areas of the brain that are responsible for memory as well as cognitive processes. The game can be played on a three-by-three square grid. Players will take turns putting their round tiles on the grid. The player that gets three (3) round tiles in a row will win the game. If the nine (9) squares have been filled with round tiles, the game will be over, and if the player doesn't mark the row, the game will be a tie.

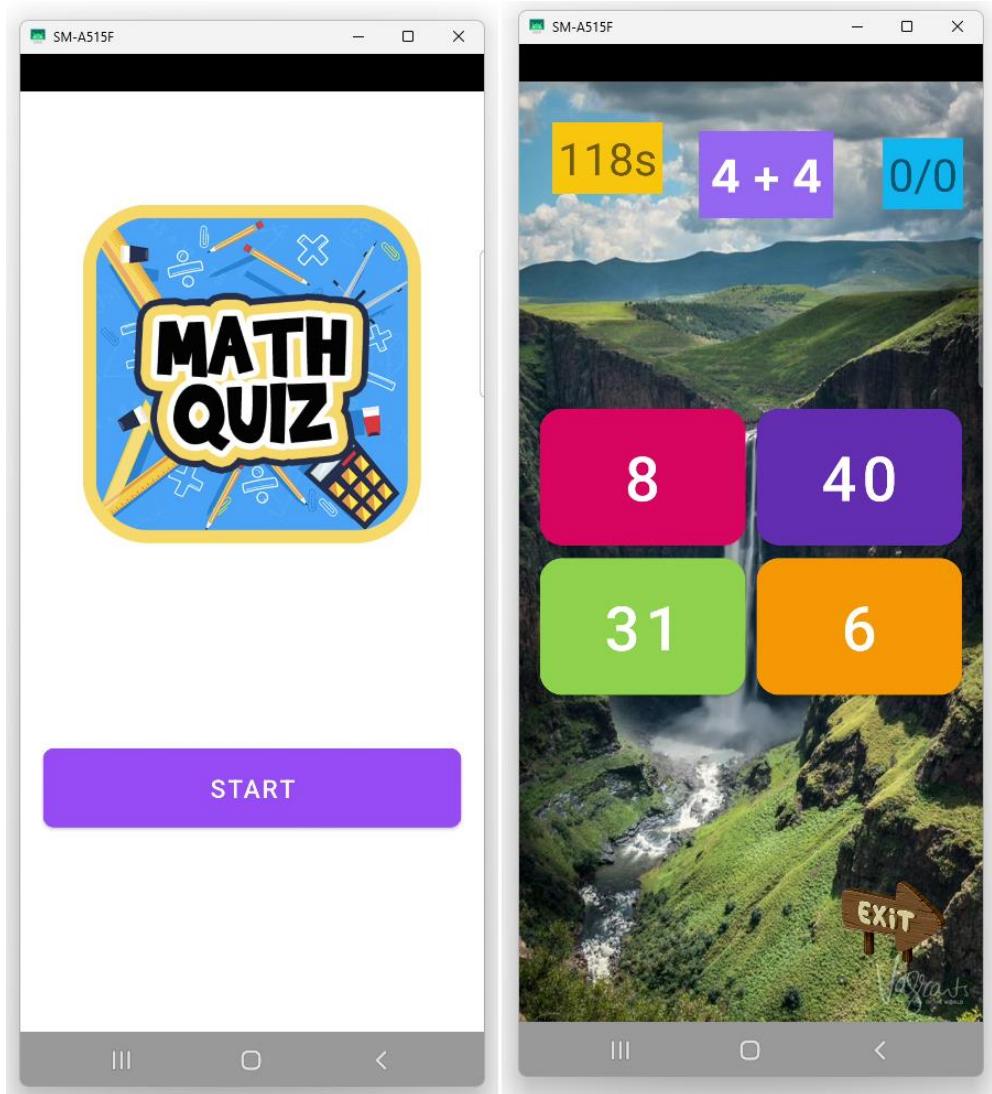


Figure 14.3 Math Quiz

Figure 14.3 above shows the Math Quiz. This game helps to prevent older people from dementia, Kasinathan et al. (2020) promoted brain activities among older adults with logic and mathematical games. The seniors will try to answer math questions to the best of their ability. These math questions are random and have timers so the seniors would know how long they take the math quiz. The seniors then tap the correct answer to proceed to the next question.

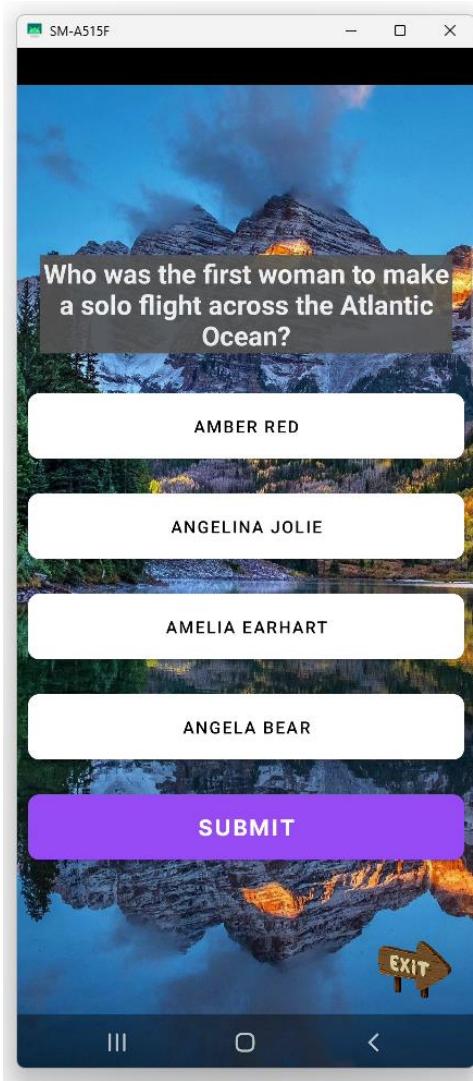


Figure 14.4 Trivia Quiz

Figure 14.4 above shows the Trivia Quiz game; despite signs of dementia, older adults can excel at trivia games. In a study published by Provision Living (2021), performing this exercise enhances cognitive skills since it exercises the frontal cortex of the brain. To play this game, the seniors will try to answer a set of questions. This set of questions is random, so the seniors cannot easily determine the answers. The seniors can tap the correct answer on the selection and click the submit button to submit the answer.

In relation to the study' SOO3. Assess and evaluate if seniors have Mild Cognitive Impairment, which seniors will answer the MCI assessment test during account registration.

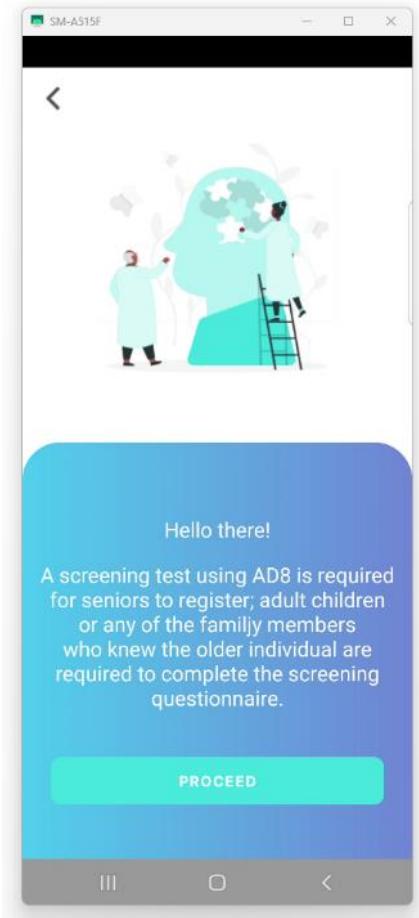


Figure 15.1 MCI Test

As shown in Figure 15.1, senior cognition is evaluated and assessed before registering for the application. The test is adapted from the study of Dominguez et al. (2021) to distinguish seniors with dementia related diseases from normal aging to mild cognitive function. A score of 0 to 1 indicates normal cognition to mild cognitive impairment and can proceed for registration, while a score of 2 or greater indicates potential dementia, which means the application is not fit for the senior.

The adaptable screening test cannot diagnose dementing disorders. Nevertheless, the test effectively detects the onset of many common dementias at an early stage of the disease.

Screen	Question	Response Options	Action
1 of 8	Problems with judgment (e.g., problems making decisions, bad financial decisions, problems with thinking)	YES - A CHANGE NO - NO CHANGE N/A - DON'T KNOW	NEXT
2 of 8	Less interest in hobbies/activities	YES - A CHANGE NO - NO CHANGE N/A - DON'T KNOW	NEXT
3 of 8	Repeats the same things over and over (questions, stories, or statements)	YES - A CHANGE NO - NO CHANGE N/A - DON'T KNOW	NEXT
4 of 8	Trouble learning how to use a tool, appliance, or gadget (e.g., VCR, computer, microwave, remote control)	YES - A CHANGE NO - NO CHANGE N/A - DON'T KNOW	NEXT
5 of 8	Forgets correct month or year	YES - A CHANGE NO - NO CHANGE N/A - DON'T KNOW	NEXT
6 of 8	Trouble handling complicated financial affairs (e.g., balancing checkbook, income taxes, paying bills)	YES - A CHANGE NO - NO CHANGE N/A - DON'T KNOW	NEXT
7 of 8	Trouble remembering appointments	YES - A CHANGE NO - NO CHANGE N/A - DON'T KNOW	NEXT
8 of 8	Daily problems with thinking and/or memory	YES - A CHANGE NO - NO CHANGE N/A - DON'T KNOW	NEXT

Figure 15.2 List of AD8 questionnaire

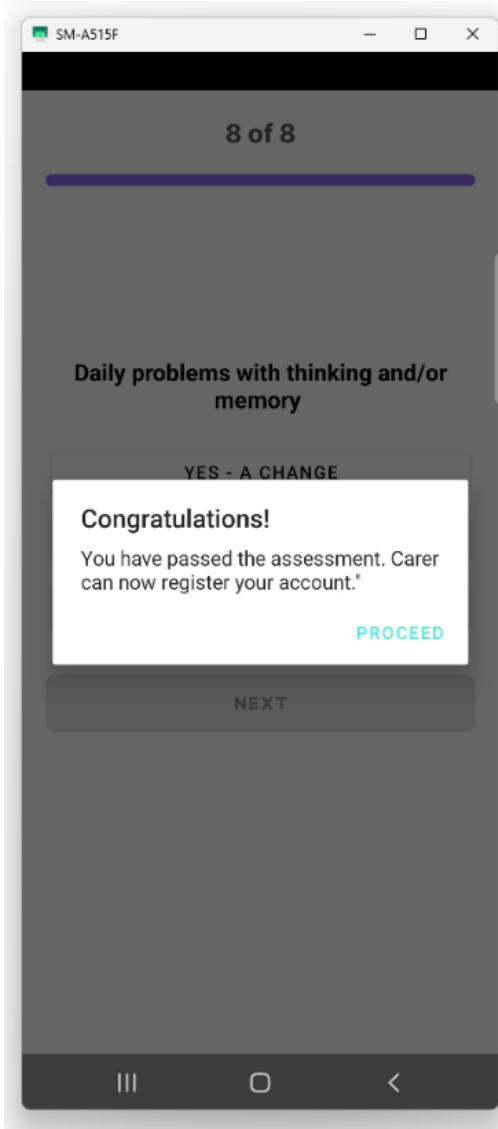


Figure 15.3 Test Confirmation if Passed

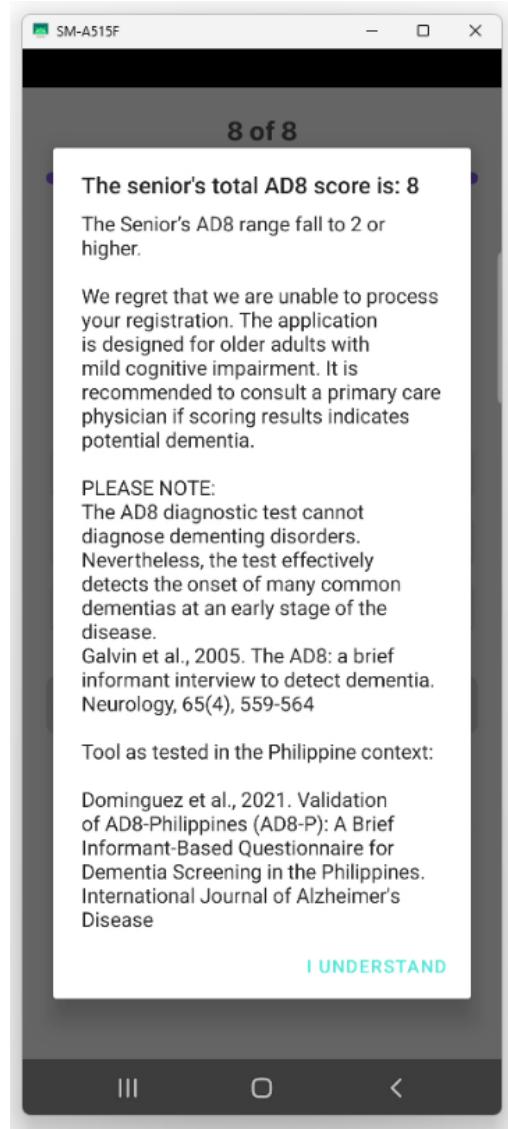


Figure 15.4 Test Confirmation if Failed

In relation to study' SOO4. To provide dashboard and report generation for the following:

- **Dashboard of OSCA for data visualization.**

Figure 16.1 below shows the login page of the OSCA administration, which requires admin identification and authentication by entering the correct combination of username and password. It also shows the loading screen while fetching all the resources needed to display data visualizations

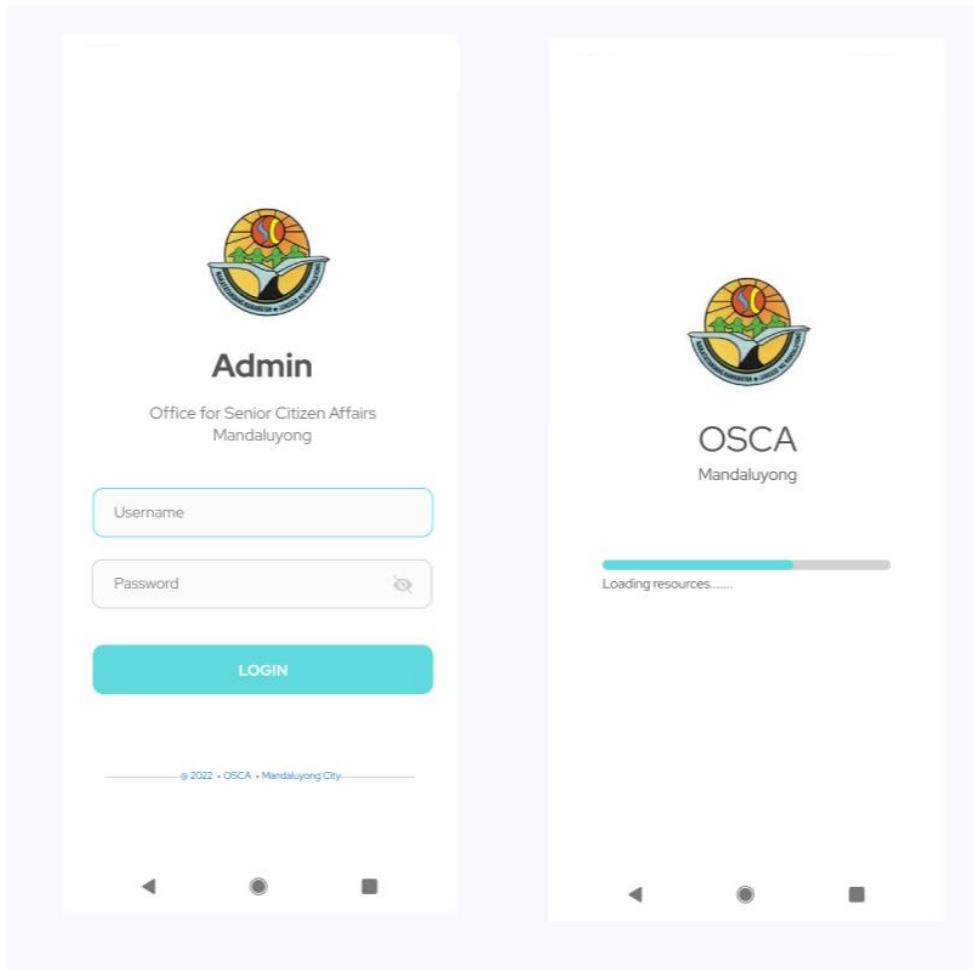


Figure 16.1 Admin Login Screen

- Report generation that admins can view.

Figure 16.2 below shows the real-time generated reports of the application. It shows the total number of application users and the barangay where the application is used as the mode of the technology-based dementia prevention app. It also displays pie charts containing a ratio of the total reminders per module and the total number of senior users per barangay.



Figure 16.2 Admin Dashboard

Figure 16.3 shows the admin dashboard settings. It gives authorization to the admin personnel to directly create, read, delete, and update information in the database using a user-friendly Graphical User Interface (GUI). The admin also has the capability to add, edit and delete barangays, add or delete senior and carer data, and lastly, add another admin user.

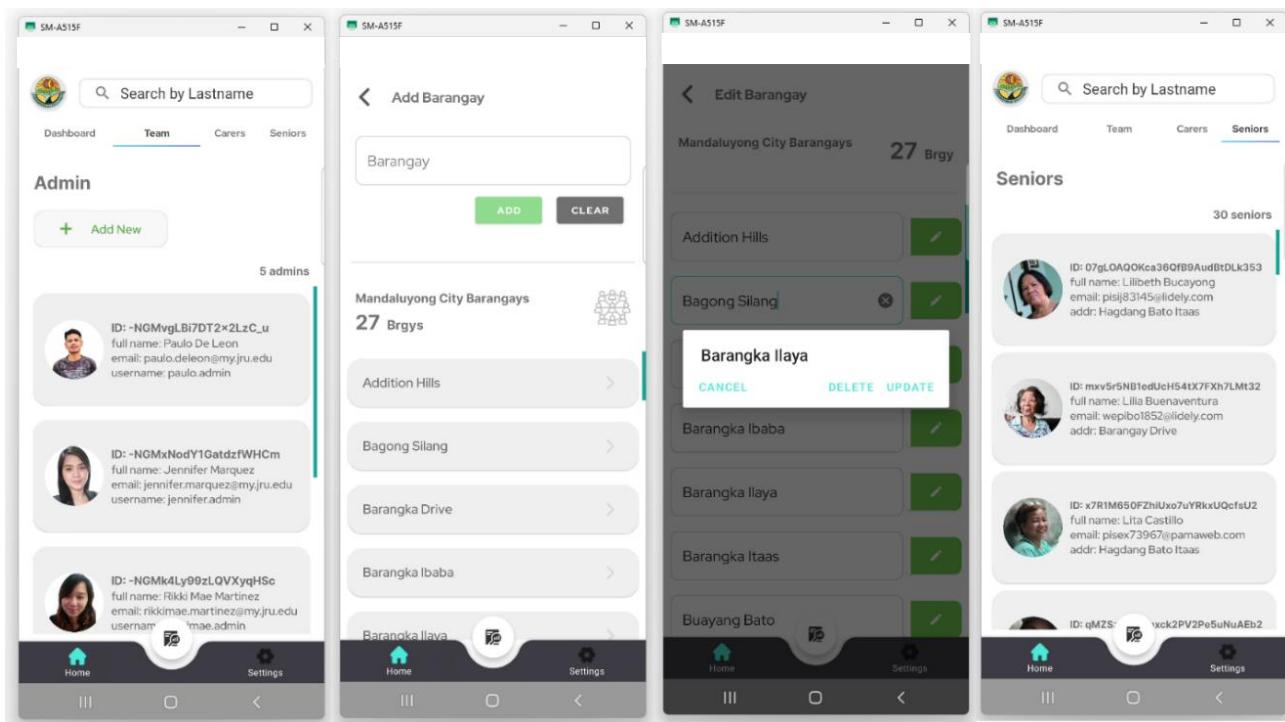


Figure 16.3 Settings

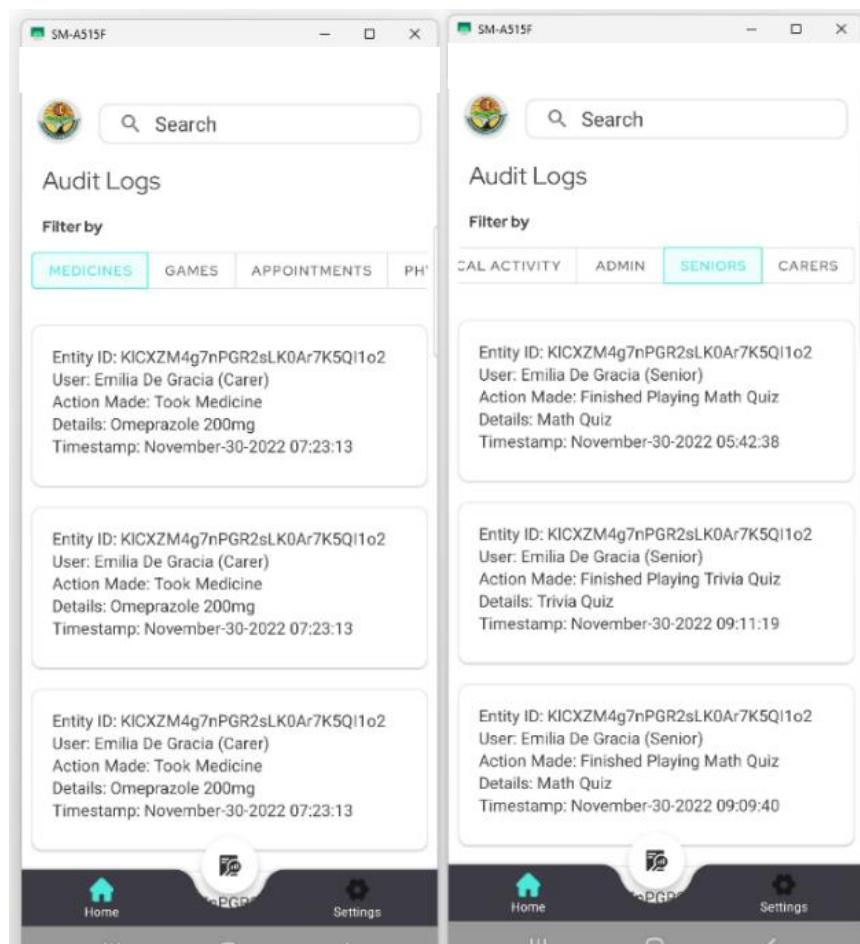


Figure 16.4 Audit Logs

In relation to study' SOO5. Integrate the wearable technology with the mobile application to monitor senior citizens, specifically the following:

- **Health tracking – heart rate and step count.**

The figures below shows the senior user's heart rate and step count. It utilizes wearable technology to count the senior user's steps easily and the heart rate they take while walking. Using a mobile phone and wearable smartwatch, it can view the heart rate and step count's status panel.

- Reminders – received notification reminders through push notifications.

The figures below show the notification reminders for various tasks the senior user needed. The notification reminder can be seen on the wearable smartwatch, the senior user, and the carer user's mobile phone using the push notification interface. To create a reminder, the carer user needs to set the task and time the senior user must accomplish.



Figure 17.1 Heart Rate and Step Count Module

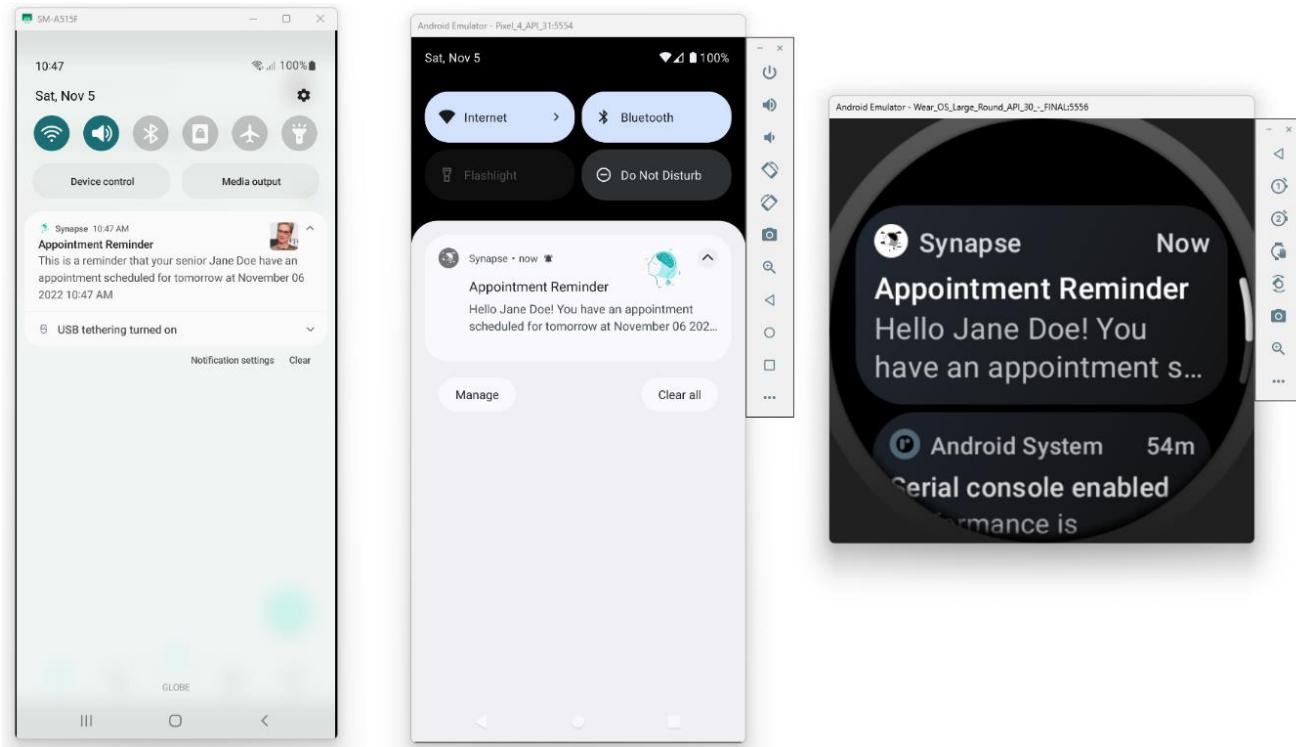


Figure 17.2 Appointments Notification

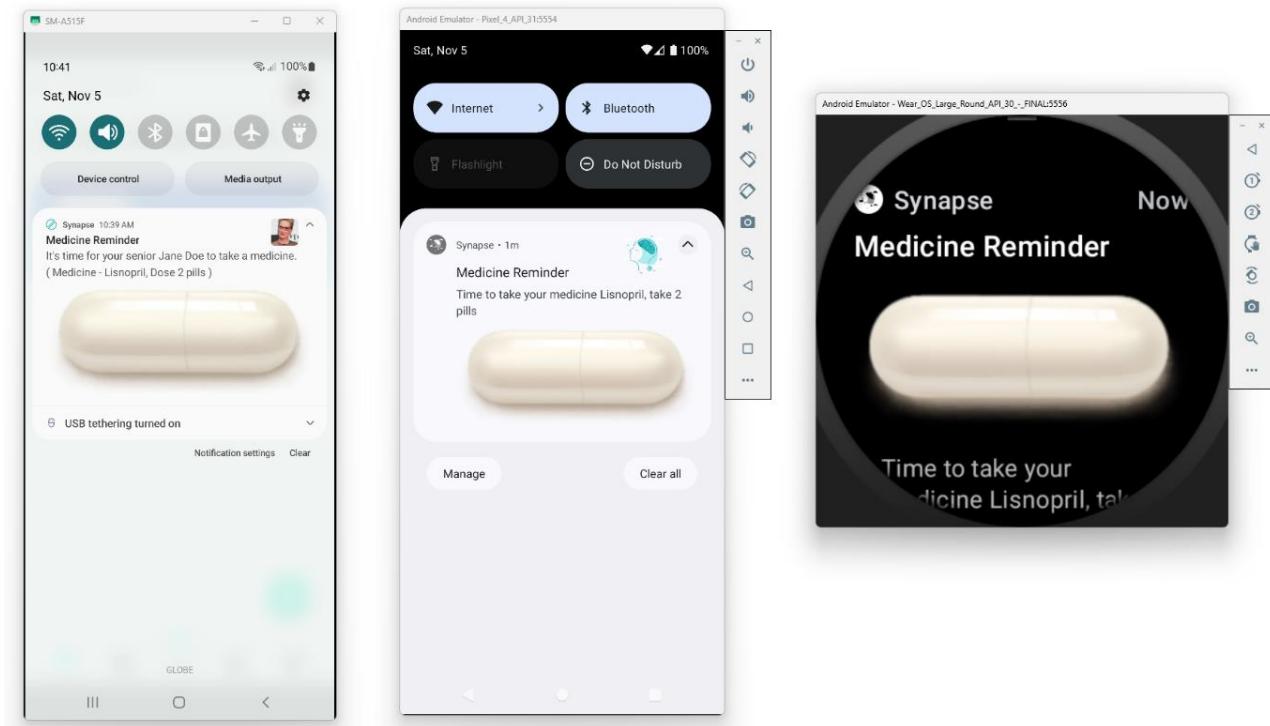


Figure 17.3 Medication Notification

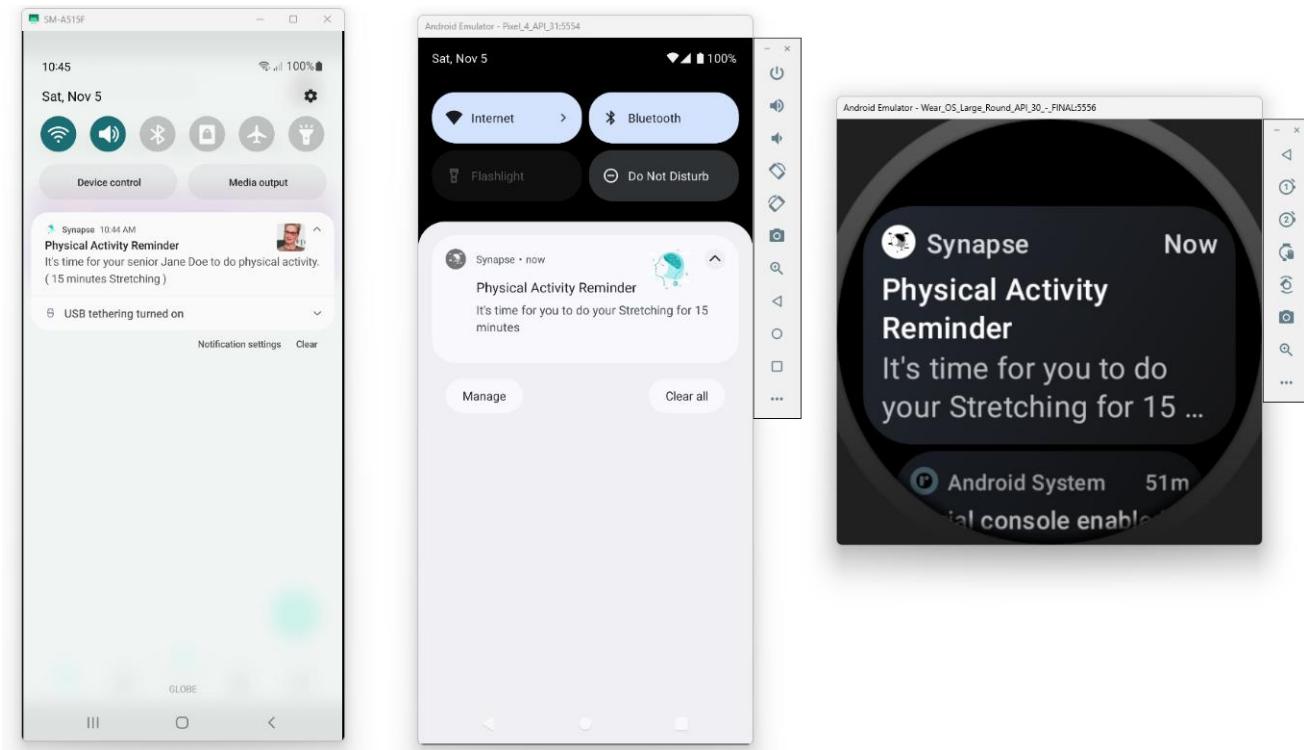


Figure 17.4 Physical Activity Notification

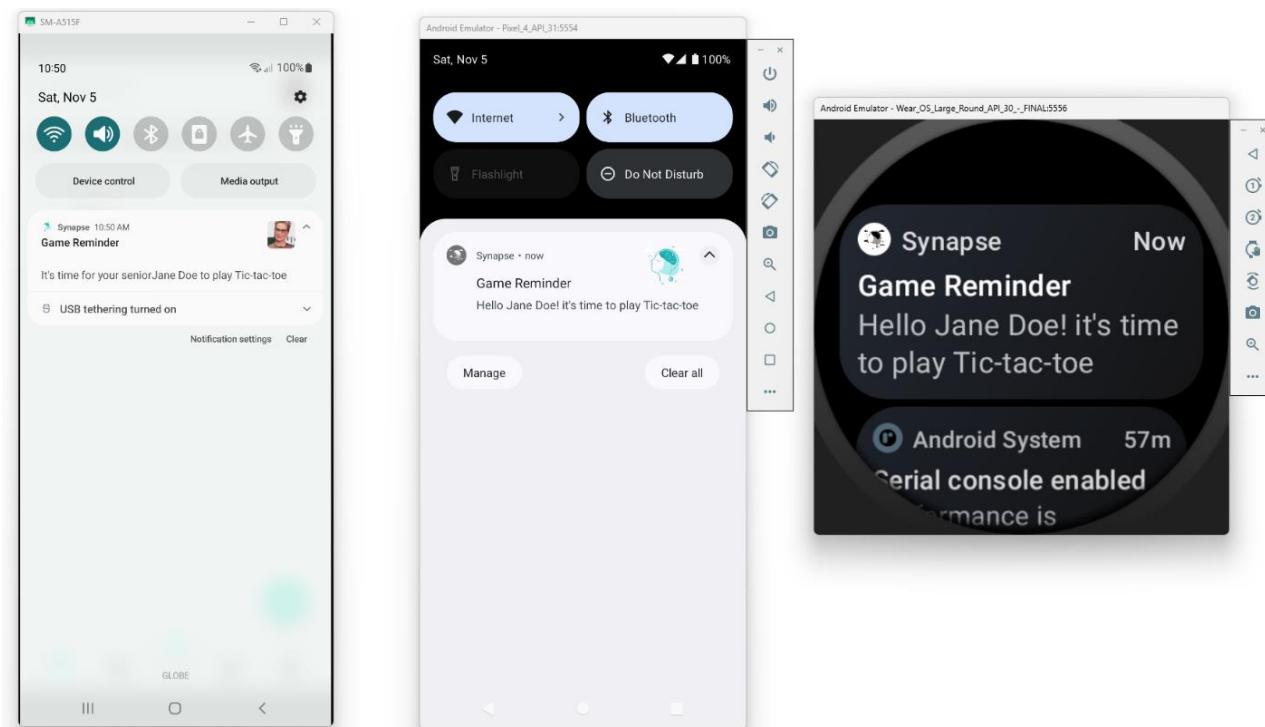


Figure 17.5 Games Activity Notification

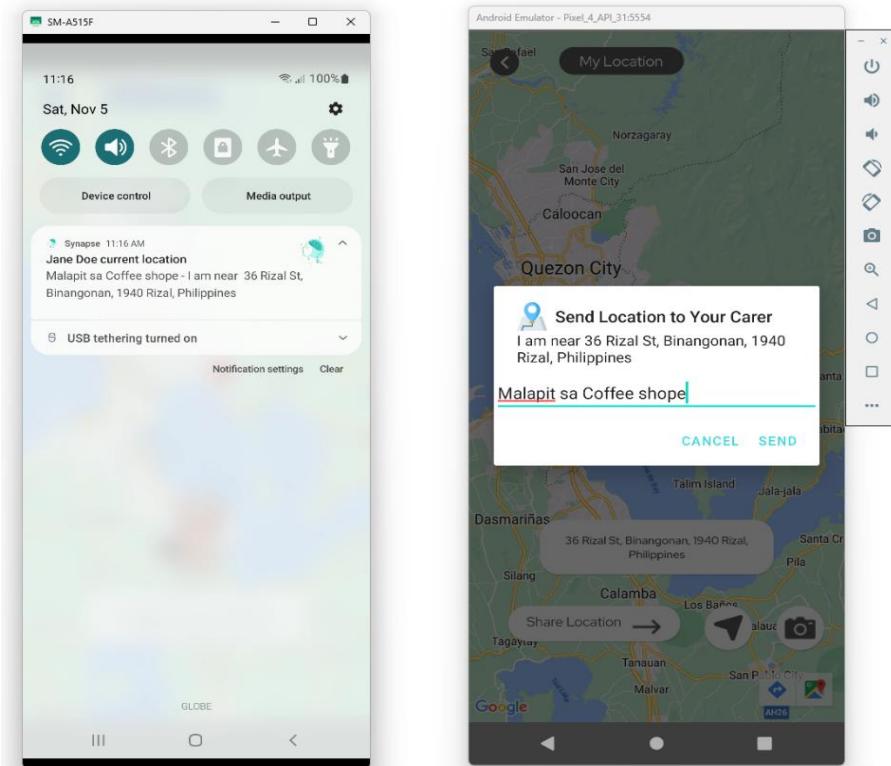


Figure 17.6 Message Site Notification

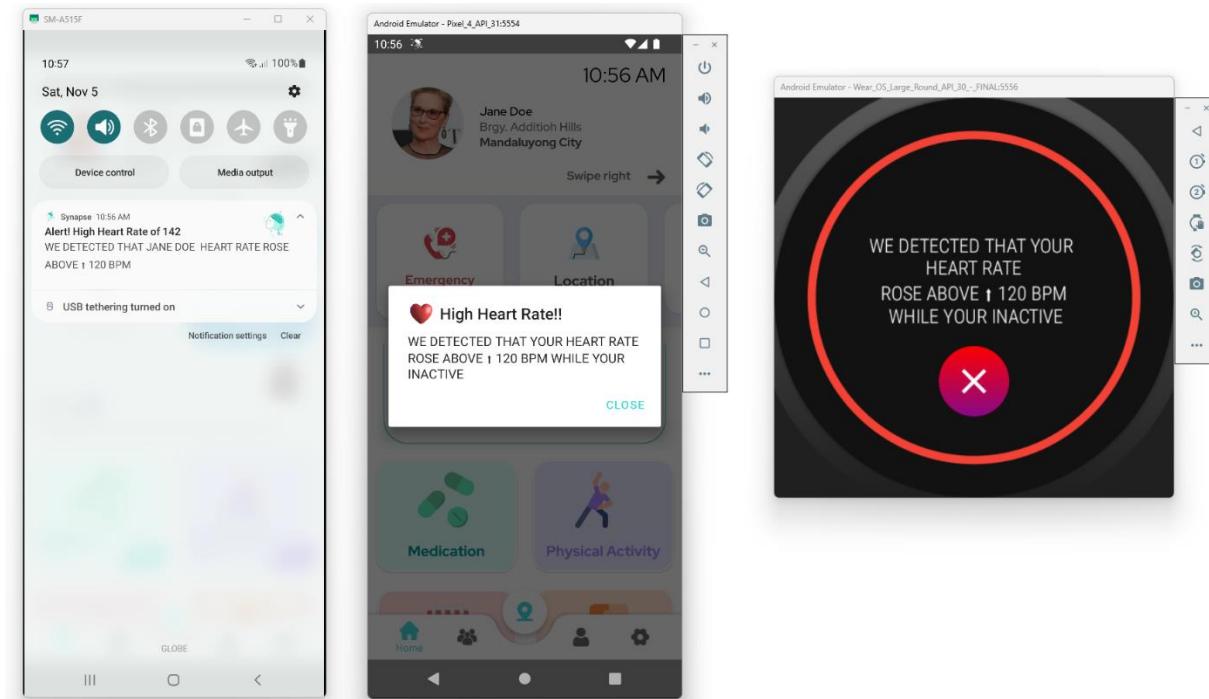


Figure 17.7 High Heart Rate Notification

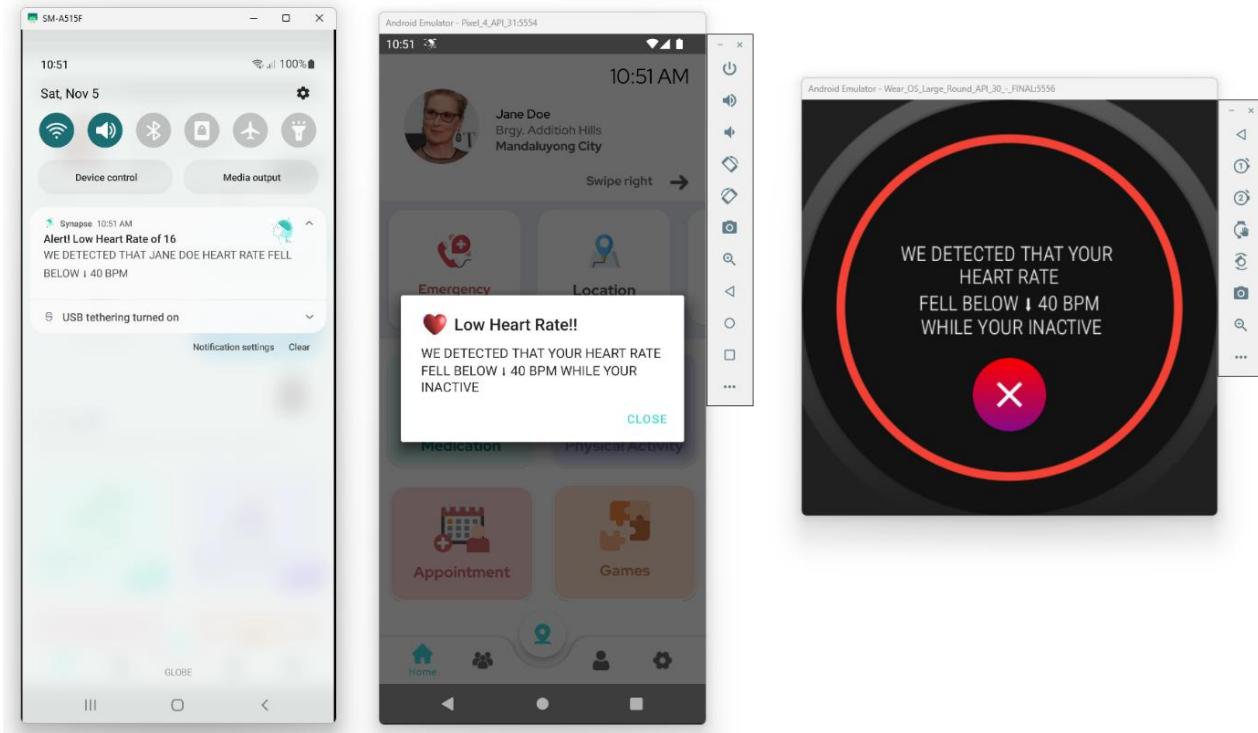


Figure 17.8 Low Heart Rate Notification

- **GPS - to track seniors' location.**

The figure below is the module for the GPS tracker. The GPS tracker utilized the mobile phone's map application to locate the senior user's whereabouts. Using the wearable connected to the mobile phone, it can send the location of the senior user to the carer user. The area can be shared via a different application that uses location notification.

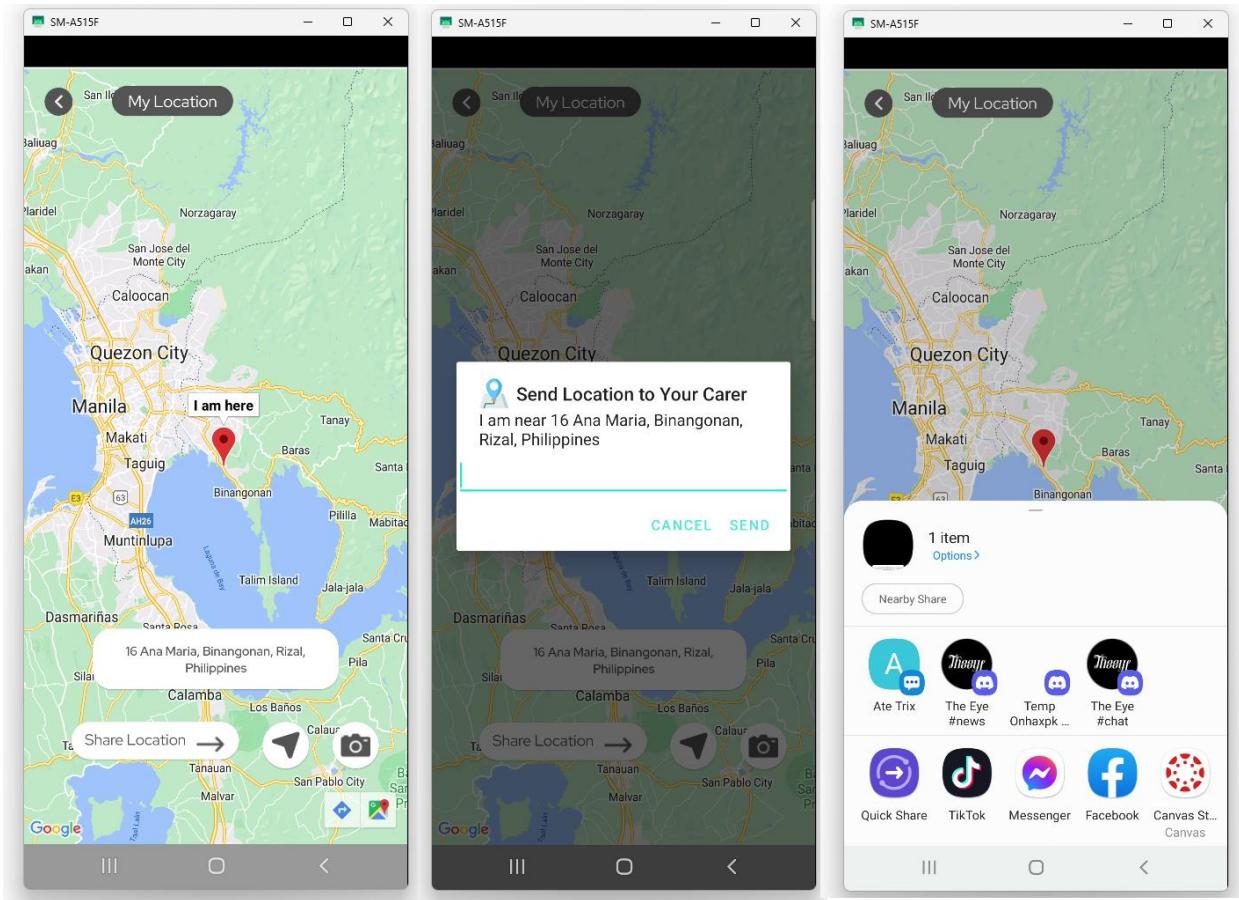


Figure 18.1 Global Positioning System (GPS) Location Module

In relation to study's SOO6. Test the mobile application and wearable technology integration quality according to ISO/IEC 25010:2011.

The developers conduct a software evaluation form from the ISO 25010:2011 to test and implement the system to respondents. The developers conduct interviews and testing from different respondents and give them a survey questionnaire to answer questions regarding the system.

ALPHA TESTING

Table 8.1 Functional Suitability

Functional Suitability	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree	Mean
The system fulfills the user goals and tasks that have been stated.	32	1			4.0
The system delivers the desired outcomes with the required level of accuracy.	30	3			3.9
The system components make it easier to complete specific tasks and goals.	30	3			3.9
Overall weighted mean					3.9

In the alpha testing, the developers conducted a test with 33 JRU students in 3rd year to help in alpha testing with guided questions from the ISO 25010:2011 and got the three highest scores of each questionnaire. Here in functionality suitability, the three questions with the highest mean are “The system fulfills the user goals and tasks that have been stated?” 32 respondents answered strongly agree, and 1 respondents answered agree, with a total mean of **4.0**. The next question is, “The system delivers the

desired outcomes with the required level of accuracy?" 30 respondents answered strongly agree, and 3 respondents answered agree with a total mean of **3.9**. The last question is, "The system components make it easier to complete specific tasks and goals?" 30 respondents answer 4 strongly agree, and 3 respondents answered agree, with a total mean of **3.9**. The total overall mean of the functionality test is **3.9**.

Table 8.2 Performance Efficiency

Performance Efficiency	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree	Mean
The system performs its functions with quicker response and processing times.	30	3			3.9
The system makes use of all available resources to carry out its tasks and fulfill requirements.	29	4			3.9
The system's concurrent user count parameter satisfies the requirements.	31	2			3.9
Overall Weighted Mean					3.9

In Performance efficiency testing, the 4 questions with the highest mean are "The system performs its functions with quicker response and processing times? 30 respondents answered strongly agree, and 3 answered agree, with a total mean of **3.9**. The next question is, "The system makes use of all available resources to carry out of its task and fulfill requirements?" 29 respondents strongly agree, 4 answered agree with a total mean of **3.9**. The next question is, "The system's concurrent user count parameter

satisfies the requirements?" 31 respondents strongly agree and 2 answered agree, with a total mean of **3.9**. The overall mean of the performance efficiency test is **3.9**.

Table 8.3 Compatibility

Compatibility	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree	Mean
The system effectively completes its necessary tasks while utilizing shared resources and an environment with other product.	32	1			4.0
The system has the ability to communicate information and utilize that information	32	1			4.0
While utilizing the same hardware or software environment, the system components can communicate with other products or other systems components, as well as carry out their necessary activities.	30	3			3.9
Overall weighted mean					4.0

In compatibility, the 3 questions with the highest mean are "The system effectively completes its necessary tasks while utilizing shared resources and an environment with other product?" 32 respondents answered strongly agree and 1 answered agree with a total mean of **4.0**. Then the next question is "The system has the ability to communicate information and utilize that information?" 32 respondents strongly agree, 1 answered agree with a total mean of **4.0**. The next question is "While utilizing the same hardware or software environment; the system components can communicate with other products or other systems components, as well as carry out their necessary activities?" 30

respondents answered strongly agree and 3 answered agree with a total mean of **3.9**.

The overall mean of the compatibility test is **4.0**.

Table 8.4 Usability

Usability	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree	Mean
Specific users can utilize the system to effectively, efficiently, and satisfactorily accomplish their goals.	30	3			3.9
The system's user interface makes for an enjoyable and fulfilling user experience.	29	4			3.9
Because the system has data pieces, managing and controlling it is simple.	30	3			3.9
Users are guarded against making mistakes by a product or system.	31	2			3.9
Overall weighted mean					3.9

In usability testing, the 4 questions with the highest mean are “Specific users can utilize the system to effectively, efficiently, and satisfactorily accomplish their goals?” 30 respondents answered strongly agree and 3 answered agree, with a total mean of **3.9**. Then the next question is, “The system’s user interface makes for an enjoyable and fulfilling user experience?” 29 respondents answered strongly agree, and 4 answered agree with a total mean of **3.9**. Then the next question is “Because the system has data pieces, managing and controlling it is simple?” 30 respondents answered strongly agree, and 3 answered agree, with a total mean of **3.9**. Then the next question is, “Are users guarded against making mistakes by a product or system?” 31 respondents answered

strongly agree, and 2 answered agree, with a total mean of **3.9**. The overall mean of the usability test is **3.9**.

Table 8.5 Reliability

Reliability	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree	Mean
The system's components are reliable when used as intended.	30	3			3.9
When needed for use, the system's components are operational and reachable.	32	1			4.0
The system's components perform the required functions under specified conditions for a predetermined period of time.	29	4			3.9
Despite the presence of hardware or software results, a system, product, or component functions as intended.	28	5			3.8
A system or product can restore the data and restore the system to the desired condition in the case of an interruption or failure.	31	2			3.9
Overall weighted mean					3.9

In the Reliability test, the 5 questions with the highest mean are, “The system’s components are reliable when used as intended?” 30 respondents answered strongly agree, and 3 answered agree, with a total mean of **3.9**. The next question is, “When needed for use, the system’s components are operational and reachable?” 32 respondents answered strongly agree and 1 answered agree, with a total mean of **4.0**. The next question is, “The system’s components perform the required functions under

specified conditions for a predetermined period of time?" 29 respondents answered strongly agree, and 4 answered agree, with a total mean of **3.9**. The next question is, "Despite the presence of hardware or software results, a system, product, or component function as intended?" 28 respondents strongly agree, and 5 answered agree, with a total mean of **3.8**. Then the next question is, "A system or product can restore the data and restore the system to the desired condition in the case of an interruption or failure?" 31 respondents strongly agree, and 2 answered agree, with a total mean of **3.9**. The overall mean for the reliability test is **3.9**.

BETA TESTING

Table 9.1 Functionality

Functionality	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree	Mean
The system fulfills the user goals and tasks that have been stated	19	5			3.8
The system delivers the desired outcomes with the required level of accuracy	20	4			3.8
The system components make it easier to complete specific tasks and goals	21	3			3.875
Overall weighted mean					3.825

For the beta testing, the developers conducted the testing with 24 respondents composed of 12 seniors and 12 carers. In the beta testing, the 3 questions with the highest mean are, "The system fulfills the user goals and tasks that have been stated?" 19 respondents strongly agree, and 5 answered agree, with a total mean of **3.8**. The next question is, "The system delivers the desired outcomes with the required level of

accuracy?" 20 respondents answered strongly agree, and 4 answered agree, with a total mean of **3.8**. The next question is, "The system components make it easier to complete specific tasks and goals?" 21 respondents answered strongly agree, and 3 answered agree, with a total mean of **3.875**. The overall mean for the functionality test is **3.825**.

Table 9.2 Security

Security	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree	Mean
The system makes sure that only people with access rights can access the data.	23	1			4.0
The system guards against unauthorized access to or alteration of data or computer programs.	23	1			4.0
The system safeguards information and data to allow users to access it to the extent necessary for their types and degrees of authorization.	22	2			3.9
Overall weighted mean					4.0

In the security test, the 3 questions with the highest mean are, "The system makes sure that only people with access rights can access the data?" 23 respondents strongly agree, and 1 answered agree, with a total mean of **4.0**. The next question is, "The system guards against unauthorized access to or alteration of data or computer programs?" 23 respondents answered strongly agree, and 1 answered agree, with a total mean of **4.0**. The next question is, "The system safeguards information and data to allow users to access it to the extent necessary for their types and degrees of authorization?" 22

respondents answered strongly agree, and 2 answered agree, with a total mean of **3.9**.

The overall mean for the security test is **4.0**.

Table 9.3 Maintainability

Maintainability	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree	Mean
The system can be changed effectively and efficiently without adding flaws or lowering the quality of the finished result.	22	2			3.9
It is possible to define the test criteria for the system and run tests to see if the requirements have been met.	20	4			3.8
For the system, test criteria can be specified, and tests can be run to see if the criteria have been met.	21	3			3.875
It is possible to evaluate the effects of a planned modification to one or more of a product's components, diagnose a product for flaws or failure causes, or pinpoint the components that need to be changed.	22	2			3.9
Overall weighted mean					3.9

For the maintainability test, the four questions with the highest mean are, “The system can be changed effectively and efficiently without adding flaws or lowering the quality of the finished result?” 22 respondents answered strongly agree, and 2 answered agree, with a total mean of **3.9**. The next question is, “It is possible to define the test criteria for the system and run tests to see if the requirements have been met?” 20 respondents answered strongly agree, and 4 answered agree, with a total mean of **3.8**. The next question is, “For the system, test criteria can be specified, and tests can be run

to see if the criteria have been met?" 21 respondents answered strongly agree, and 3 answered agree, with a total mean of **3.875**. The next question is, "It is possible to evaluate the effects of a planned modification to one or more of a product's components, diagnose a product for flaws or failure causes, or pinpoint the components that need to be changed?" 22 respondents strongly agree, and 2 answered agree, with a total mean of **3.9**. The total mean for the maintainability test is **3.9**.

Table 9.4 Portability

Portability	4 Strongly Agree	3 Agree	2 Disagree	1 Strongly Disagree	Mean
In a given setting, the system can be successfully implemented.	23	1			4.0
Online access is available for the system.	23	1			4.0
The system is capable of changing to a new environment, including new hardware and an updated operating system.	22	2			3.9
In a particular context, a product or system can be successfully installed and uninstalled.	23	1			4.0
By decreasing the time costs associated with providing instruction, a product or system can boost efficiency and production.	21	3			3.875
Overall Weighted Mean					4.0

For the portability test, the 5 questions with the highest mean are "In a given setting, can the system be successfully implemented?" 23 respondents answered strongly agree, and 1 answered agree, with a total mean of **4.0**. Then the next question "Online access is available for the system?" 23 respondents answered strongly agree,

and 1 answered agree, with a total mean of **4.0**. Then the next question, “The system is capable of changing to a new environment, including new hardware and an updated operating system?” 22 respondents answered strongly agree, and 2 answered agree, with a total mean of **3.9**. The next question is, “In a particular context, a product or system can be successfully installed and uninstalled?” 23 respondents answered strongly agree, and 1 answered agree, with a total mean of **4.0**. Then the next question is, “By decreasing the time costs associated with providing instruction, a product or system can boost efficiency and production?” 21 respondents answered strongly agree, and 3 respondents answered agree, with a total mean of **3.875**. The overall mean of the portability test is **4.0**.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents the summary of the finding from the data gathered from the previous chapter, the conclusion drawn, and the recommendation of the researcher.

Summary

The study aims to develop a memory support mobile application with wearable technology for senior citizens with mild cognitive impairment. This mobile application has two primary user clients: the carer and the senior. Both of which have different services provided. The application has reminder notifications that notify the senior user of various tasks such as medication, appointments, physical activities, and games created by the carer user for the senior user to accomplish on a particular day; these tasks are accessible through mobile devices and wearables. Furthermore, wearable technology is used to monitor the heart rate and step count of seniors, as well as GPS trackers that track their location. The application was tested using the ISO/IEC 25010:2011 for system and software engineering, an international standard for the specification, measurement, and evaluation of software and system quality.

Conclusions

The findings and reviews received by the proponents suggested that there was a critical need for a technology-based intervention to prevent the onset of early dementia. According to the results, the majority of the study's respondents supported the proponents' memory support application with wearable technology integration. The

"Usability" metrics also had the highest weighted mean score across all ISO testing standard metrics, indicating that the sample population finds the system to be well-designed, making it useful and efficient for achieving specified tasks.

Recommendations

Based on the findings and conclusions, the proponents presented the following recommendations and suggestions: Make the application support cross-platform technology to support other operating systems like iOS for better scalability, compatibility, and maintainability of the system to cater demand changes and technology evolution. Implement more puzzle-based games to sharpen the minds of older adults with MCI by preserving their logical thinking skills and mental abilities.

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APPENDICES

APPENDIX A

INTERVIEW GUIDE FOR THE OSCA ORGANIZATION AND FOR FOCUS GROUP DISCUSSION WITH THE SENIOR CITIZENS MEMBERS OF OSCA (Online)

Date: _____

Location: _____

Position: _____

Introduction Part – Interview through zoom with OSCA president

Good afternoon, ma'am/sir _____ !

We are 3rd year students from Jose Rizal University currently taking up Bachelor of Science in Information Technology. We want to ask your good office for permission to allow us to conduct research for our study entitled: "Synapse: A Memory Support Application with Wearable Technology for Senior Citizens". Rest assured that the data we gather will remain absolutely confidential, anonymous, and only be used for academic purposes.

Hi! I am Rikki Mae Martinez. My name is Jennifer Marquez. I am Marianne Rario, and I am Paulo De Leon. We believe that this good organization is with us in our enthusiasm to help the respective senior citizens and carers and finish the requirement as compliance for our subject. We would appreciate your assistance and support in this research endeavor.

By the way, is it okay for you po that this interview will be recorded?

Interview Questions:

1. Can you introduce yourself po so that we can have insights on your day-to-day job in OSCA?
 - 1.1 How long have you been working here?
 - 1.2 What are your tasks here? Sino sino po ang namumuno and bakit nyo po naisipang itayo itong organization na ito?
 - 1.3 What type of organization is the Office for Seniors Affairs Mandaluyong?
 - 1.4 How old is this organization?
2. How many senior citizens work or go here? (frequency)
3. Marami po bang madalas ng makalimot sa mga seniors dito?
 - 3.1 Malaking problem ba sa manda ang MCI or mandalas makalimot?
 - 3.2 If so, tinutulungan po ba ng organization nyo itong problemang to or more on personal solutions nalang po ang ginagawa ng bawat individual na seniors?
 - 3.3 Do those individuals with MCI have carers/caregivers to take care of them?
4. Gumagamit po ba sila ng smartphones yung mga seniors na madalas makalimot?
5. Malaki po ba ang impact ng technology sa senior citizens? (nakaka tulong bayung mga mobile application na nag reremind sa mga seniors)
6. According po sa study namin, yung boredom is malaking problema po sa mga seniors. Agree po ba kayo dito?

APPENDIX B

CONTEXT DIAGRAM

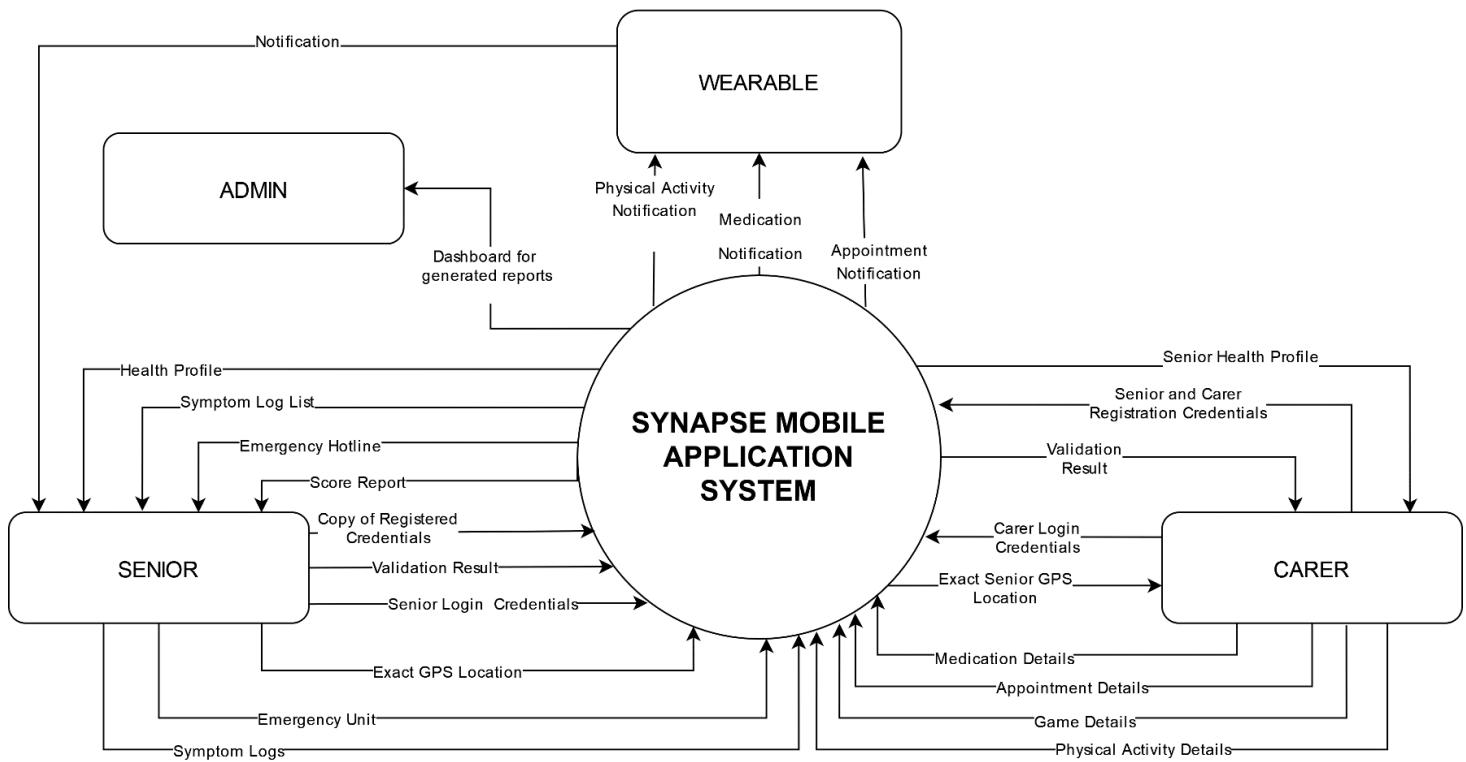


Figure 19.1 Context Diagram of the Application

APPENDIX C

Data Flow Diagram

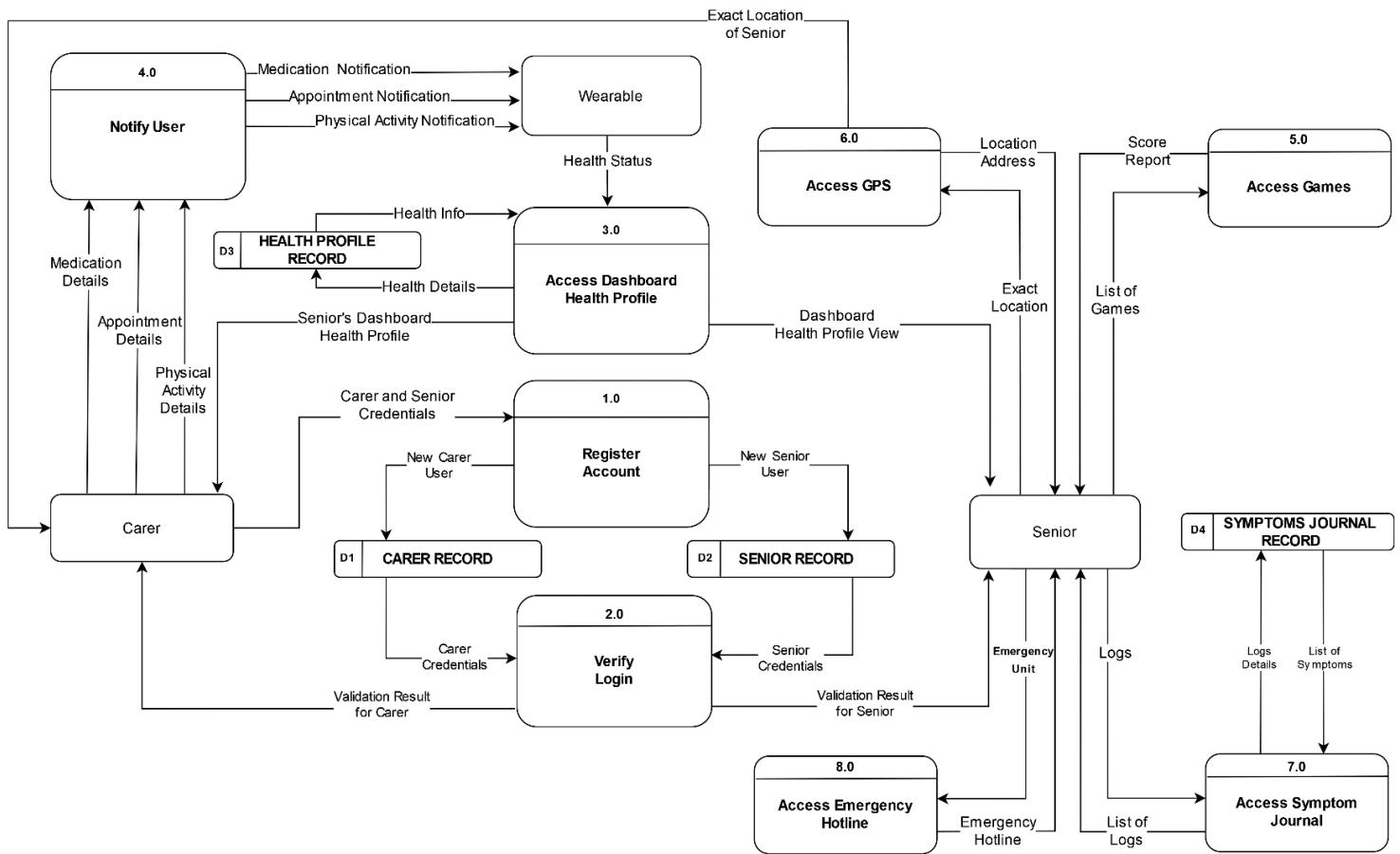


Figure 20.1 Data Flow Diagram of the Application

Process Narrative of DFD

1.0 Register Account

The user for either Senior or Carer will create an account by registering to the application system. The user will provide the email and phone number. The user will also be asked to select their gender, date of birth, and password. The user will also select if they want to Store a Cookie to remember their Identity, but this can be changed anytime. If the registration is complete and does not consist of any errors, the registered credentials will then be added to the Senior Users Database Table, and the user will be redirected to the process 2.0 Validate Login.

2.0 Verify Login

The user for either Senior or Carer provides login credentials that consist of the correct combination of their username and password to confirm their identity. Process 2.0 - Verify Login checks the Senior Users or Carer User Database Table and compares an encrypted version of the password with the stored encrypted version they provide upon registration. Suppose the credentials provided match the credentials stored in the database. In that case, the profile is updated with the latest login date and time, and the user for either Senior or Carer will now have access to processes 3.0 Access Dashboard Health Profile, 5.0 Access Games, 6.0 Access GPS, 7.0 Access Symptom Journal and 8.0 Access Emergency Hotline. The 4.0 Notify User is for Carer users only. If the user provides incorrect credentials, the user has three attempts to log into the user's account.

If these three trials run out, further considerations are applied and will be redirected to alternative paths like a Forgotten password or Store a Cookie to Remember my Identity.

3.0 Access Dashboard Health Profile

Both Carer and Senior users can view and access the process 3.0 - Access Dashboard for Health Profile. It is a tool to monitor the condition of the senior's health dynamically and interactively. It helps both of these users analyze the senior's healthcare metrics by accessing the important health statistics in real-time. It also consists of automated healthcare reports that monitor and improve senior clients' performance.

4.0 Notify User

The process 4.0 - Notify User is a popup message that displays outside of the application user interface to inform the Senior Client about taking medicine, appointment details, physical activity details, medication details, or other timely information that the application provides. The client can tap the notification to open the application or take action directly from the notification. The User will also receive different kinds of notifications like medication notifications, appointment notifications and workout notifications.

5.0 Access Games

The process 5.0 - Access Games is only available to log Senior Clients. They can choose and access all the cognitive enhancement games with the application. The mechanics of the games are to finish the mission and get a reward. It includes a badge or points. Also, users improve their level or rank by accomplishing activities. The scoreboard appears on a different window that shows the ranking of the top players with

high scores, which according to the research, encourages clients to work on the game diligently to compete. The score of the user will be saved by default in the database.

6.0 Access GPS

The Senior user will be able to use the 6.0 Access GPS to send their exact location to their carer. Seniors will find this tracker exceptionally useful if they get lost or disoriented. Similarly, the Carer user can see and receive the exact location of their adult patient using the Access 6.0 GPS. The carer can keep track of their adult patient without hindering them from their daily routines or limiting their freedom.

7.0 Access Symptom Journal

The process 7.0 - Access Symptom Journal is only available to Senior users. The user can read and write in this journal by taking digital notes of all the different symptoms the user is experiencing at a particular time and day. All the inputs in this symptom journal are then saved in the database so the Carer client or a doctor can view it later for further assessment.

8.0 Access Emergency Hotline

The Senior user will be able to use the 8.0 Access Emergency Hotline to contact an organization about a specific subject or in case of emergency. It will be convenient for senior users to have easy access to provide their health conditions using their smartphones.

APPENDIX D

Child Diagram

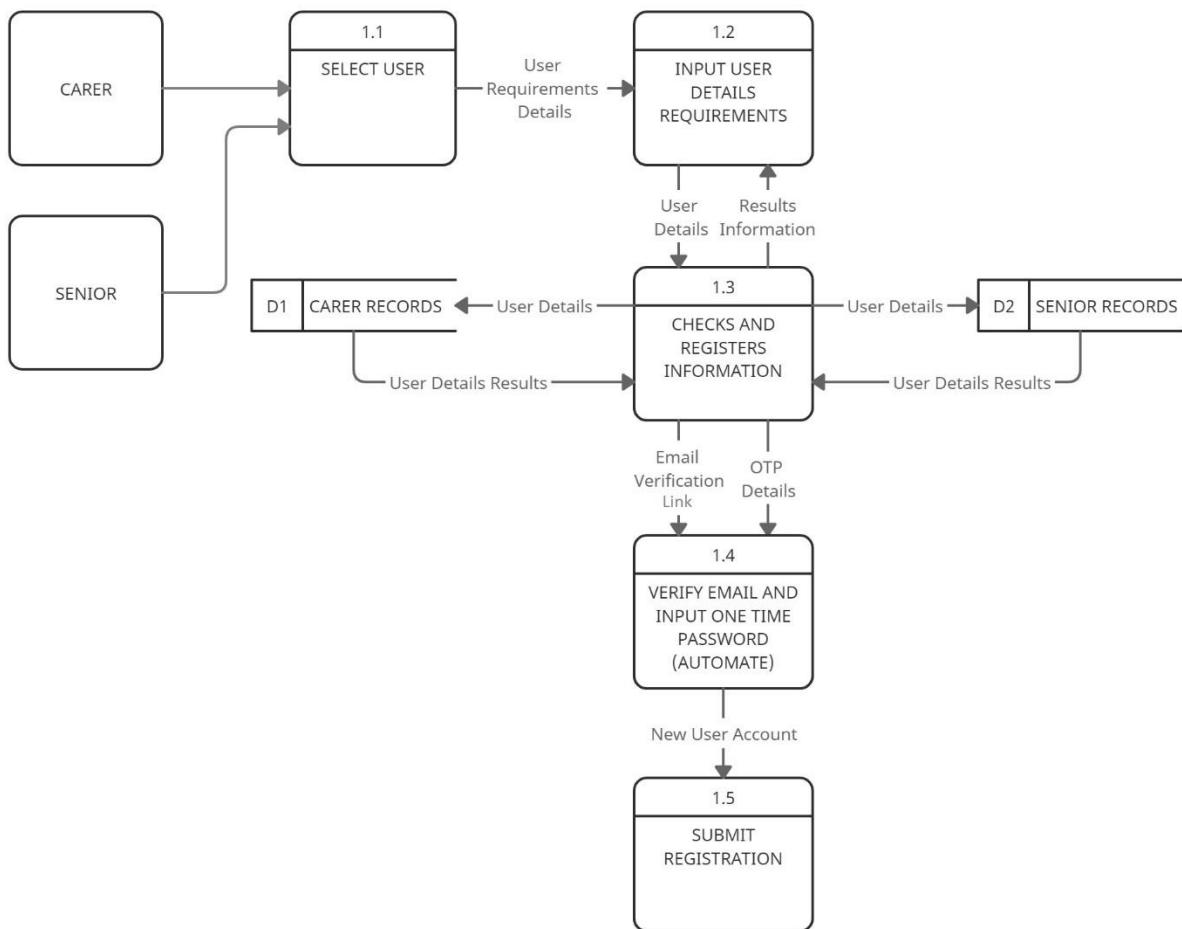


Figure 21.1 Process 1 Registration of Carer user and Senior user

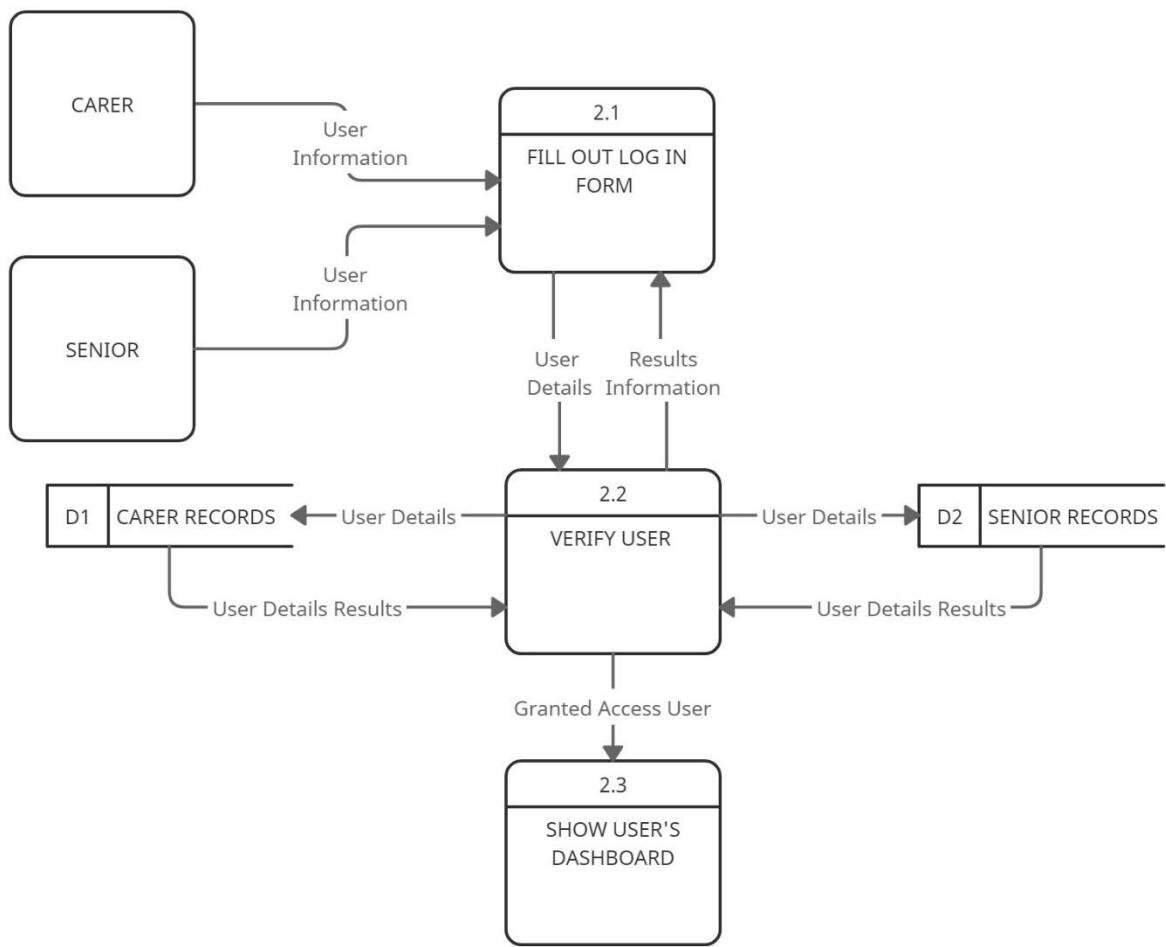


Figure 21.2 Process 2 Log in of Carer user and Senior user

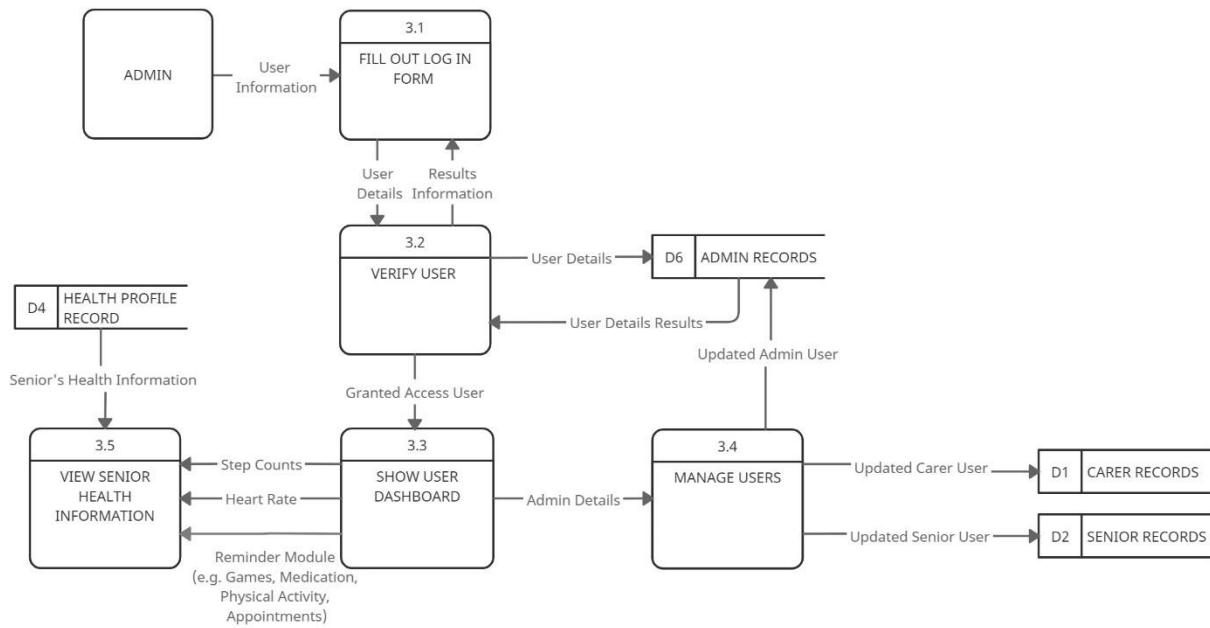


Figure 21.3 Process 3 Accessing of Admin User and Dashboard Profile

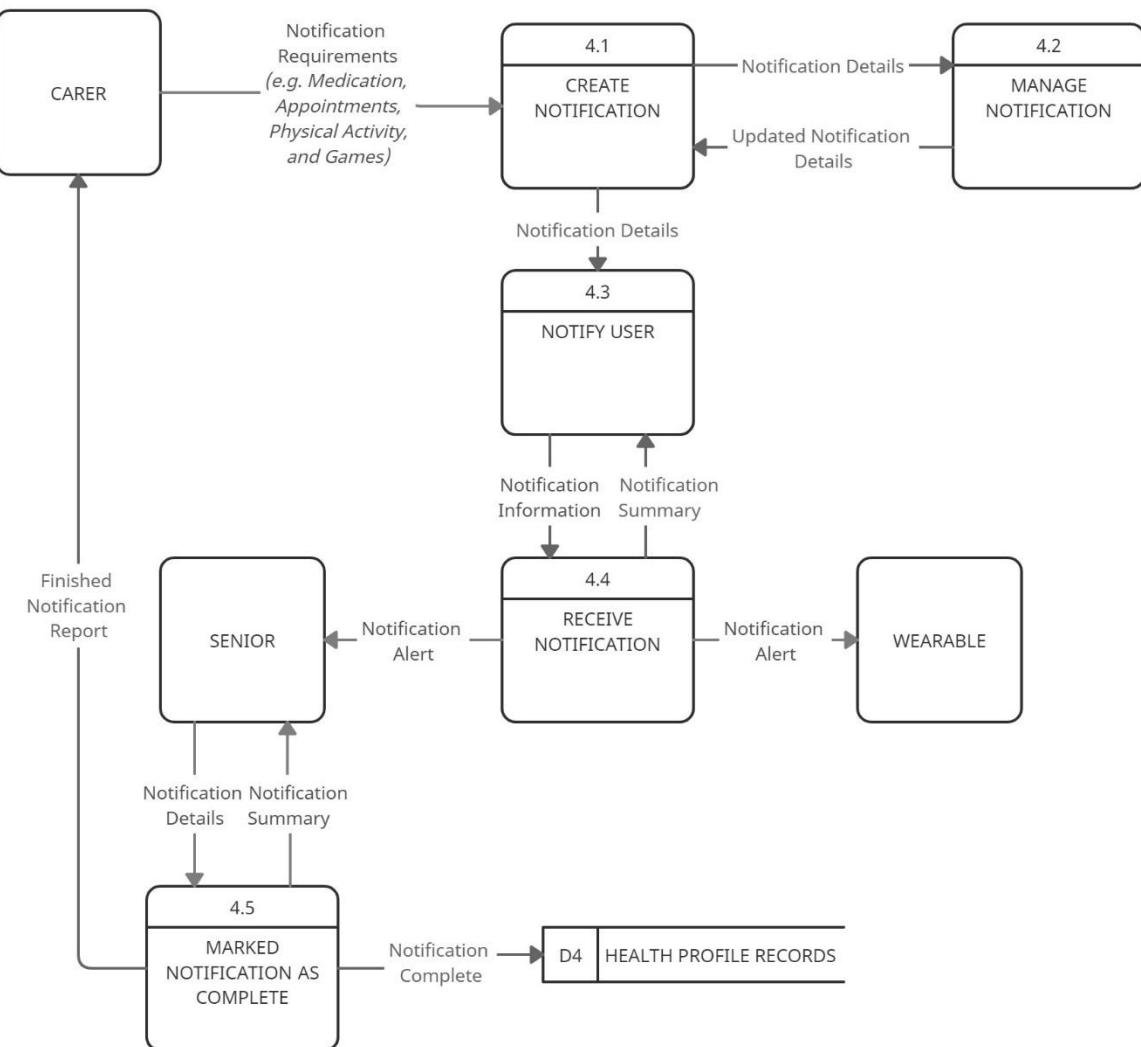


Figure 21.4 Process 4 Creating Notification for Senior User

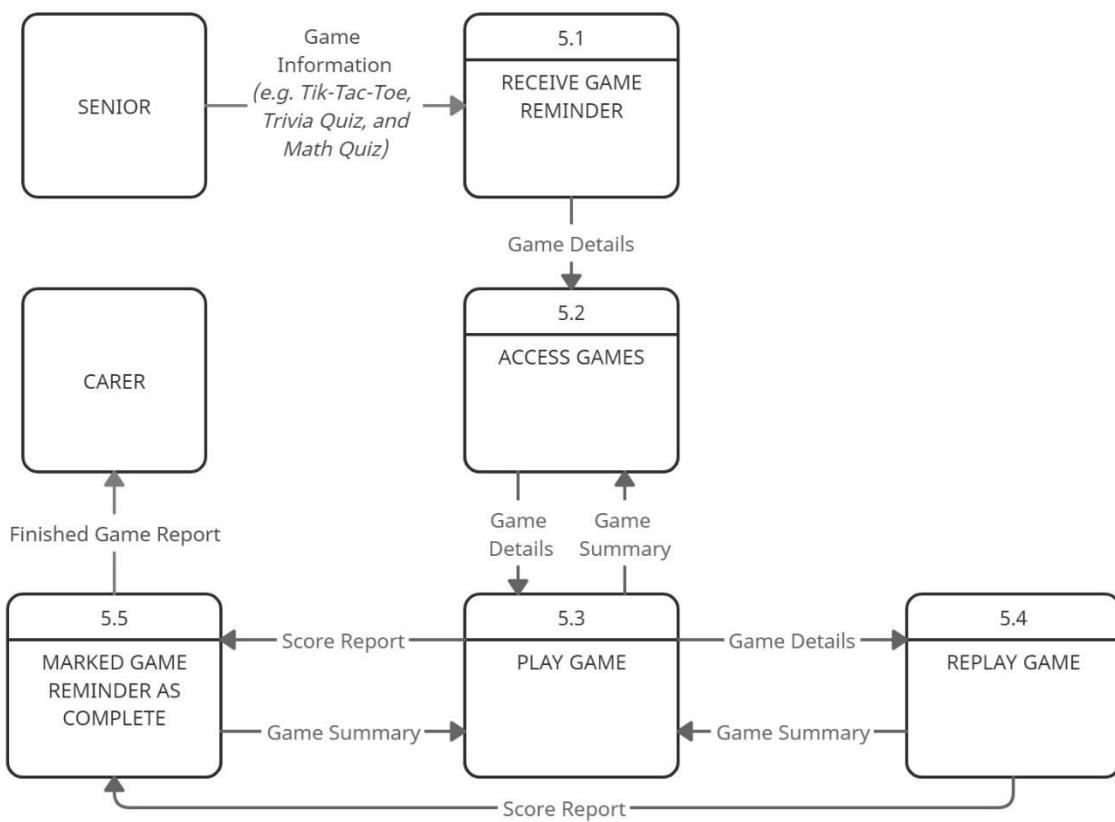


Figure 21.5 Process 5 Accessing Games for Senior User

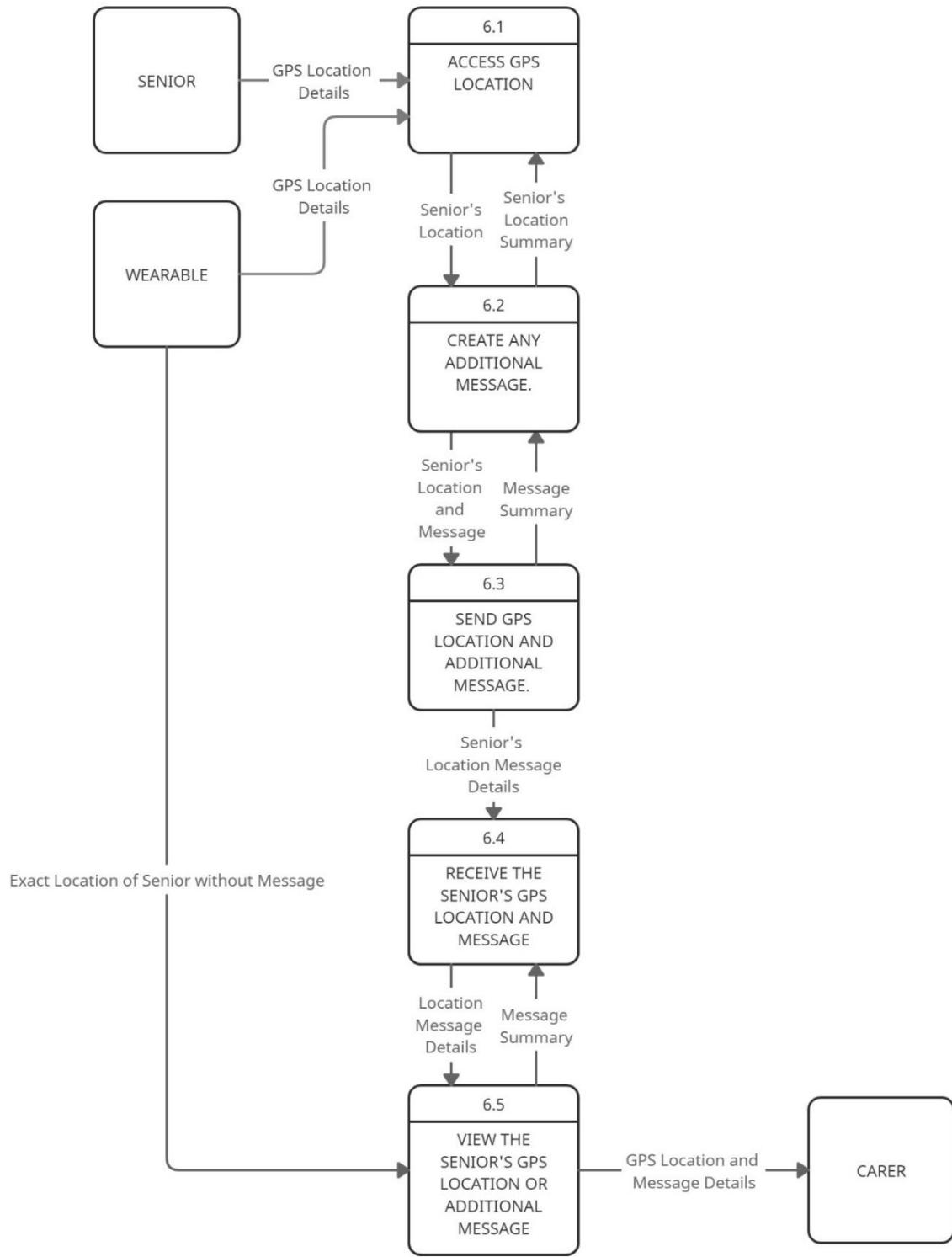


Figure 21.6 Process 6 Accessing GPS Location for Senior User

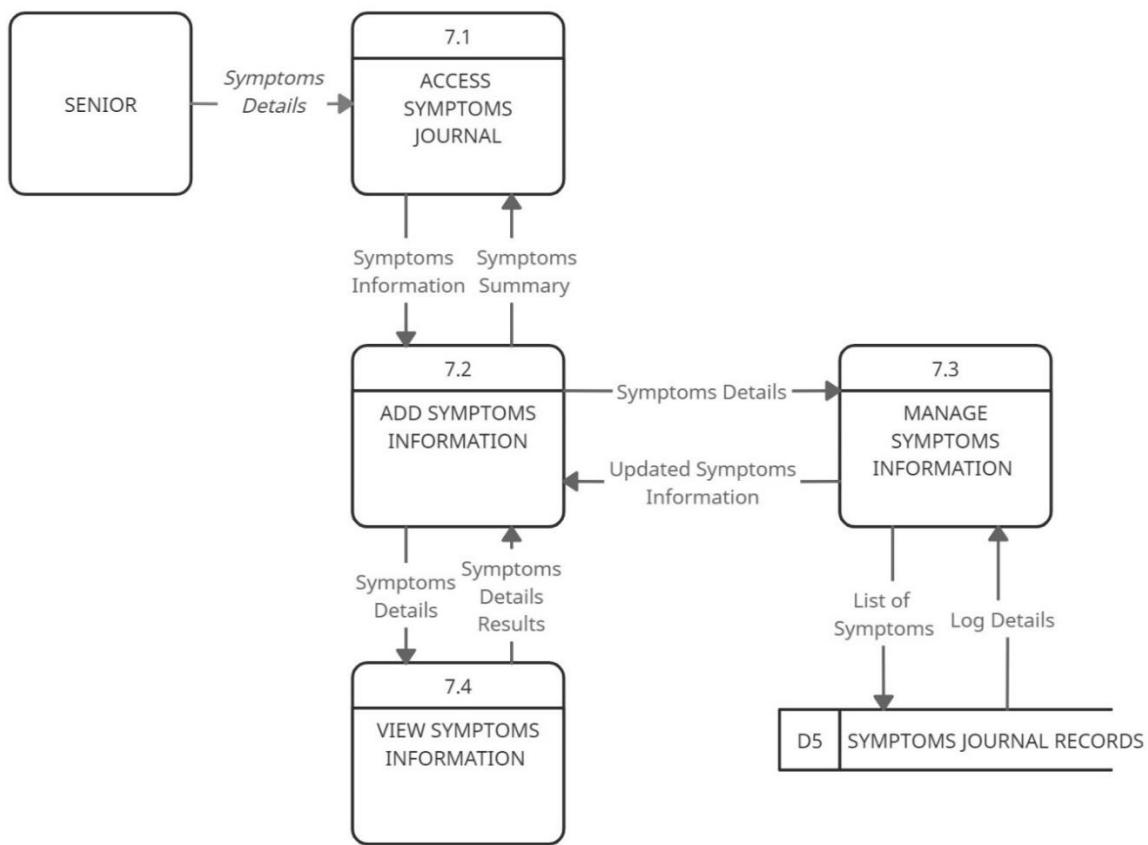


Figure 21.7 Process 7 Accessing Symptoms Journal for Senior User

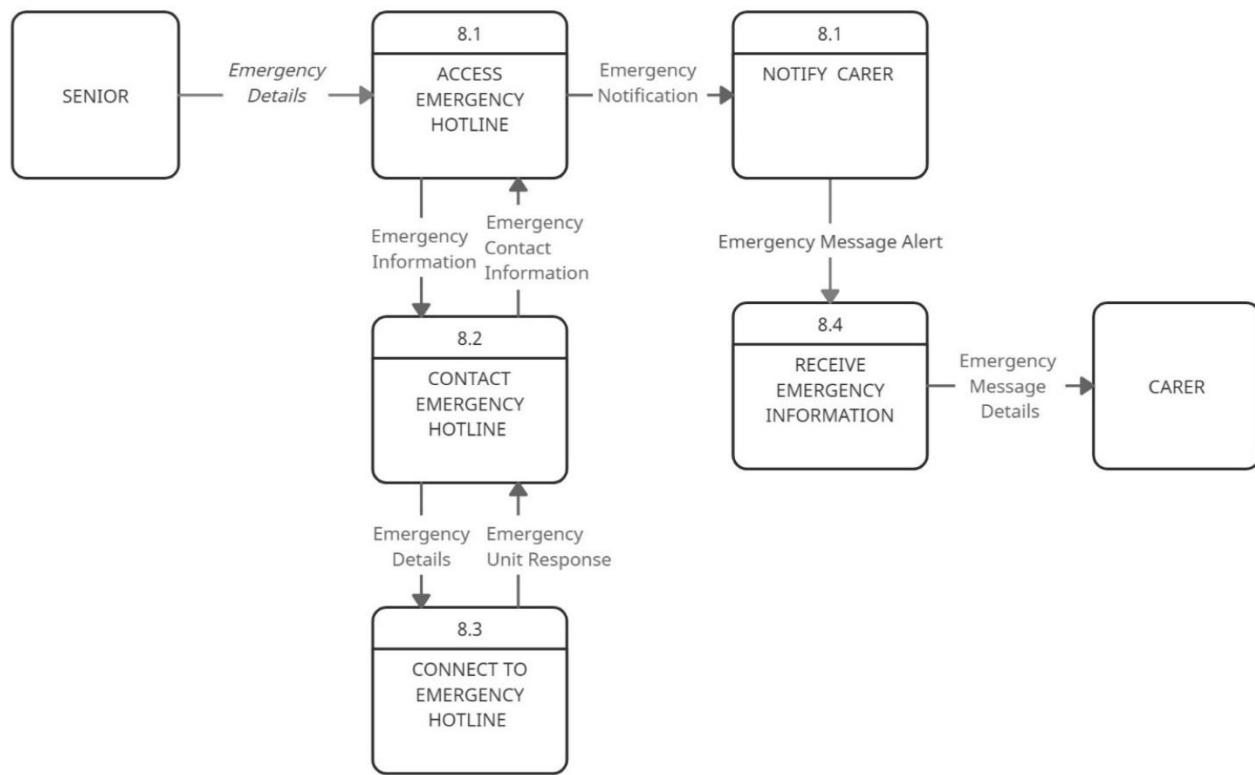


Figure 21.8 Process 8 Accessing Emergency Hotline for Senior User

APPENDIX E

Entity Relationship Diagram

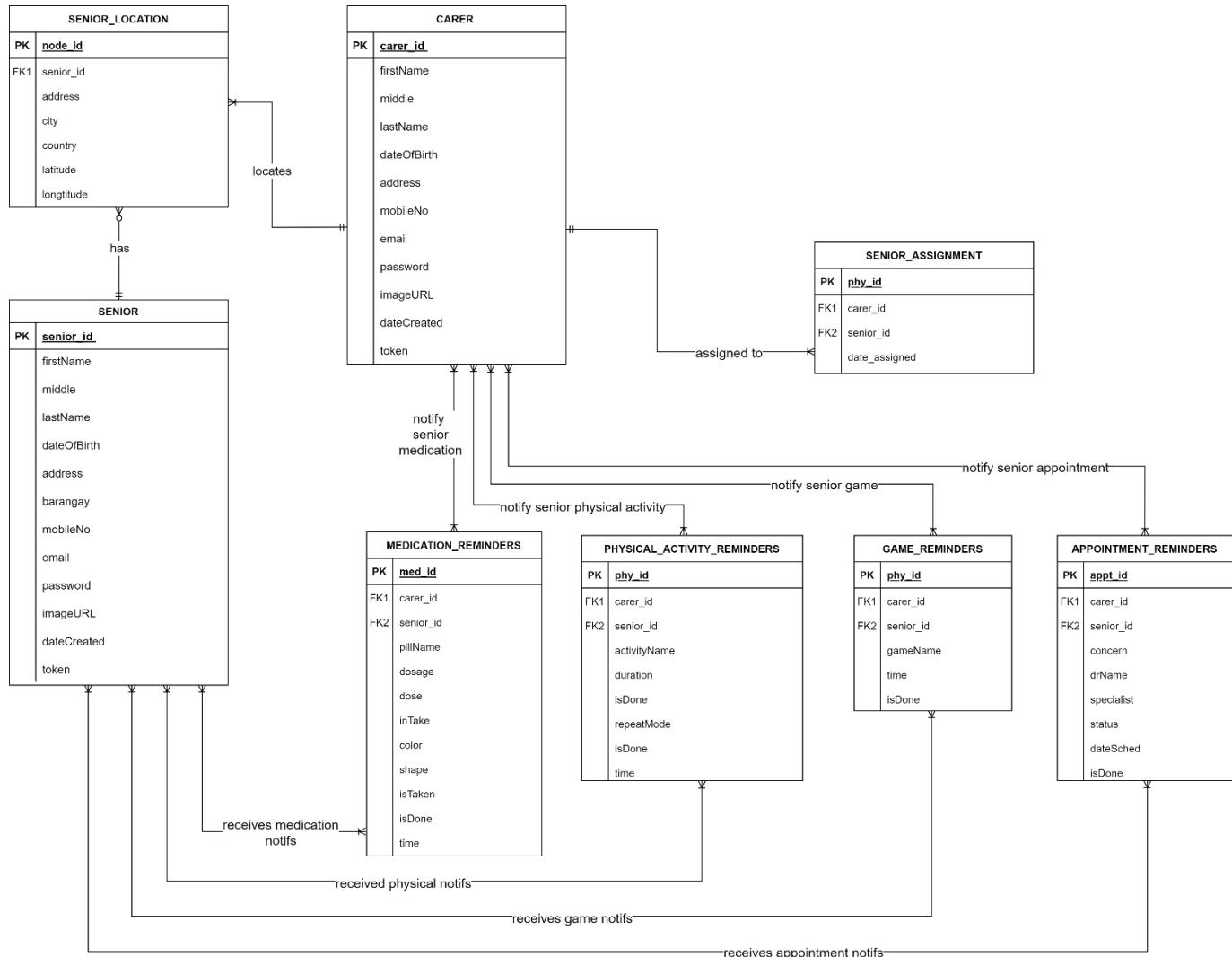


Figure 22.1 Entity Relationship Diagram of Synapse Application

APPENDIX F

Date/time: March 24, 2022 / 1:00pm

MR: Marianne Rario

PD: Paulo De Leon

RMM: Rikki Mae Martinez

JM: Jennifer Marquez

Case 01 Interview Transcript (Online)

MR: Hello po. Good afternoon po, ako si Marianne Rario.

PD: Good afternoon po! ako naman po si Paulo De Leon.

Case 01: Good afternoon din sainyo iho.

MR: Kayo po si **ANONYMIZED**, and isa po kayo sa president dito po sa OSCA? Tama po ba?

Case 01: Tama tama iha.

MR: okay po, bago po kami mag simula mag interview. Salamat po at nag reply po kayo sa email namin agad agad at pinayagan nyo po kami mag conduct ng interview dito po sa OSCA ma'am **ANONYMIZED**. So, ipapaliwanag po namin muna ang aming study. We are 3rd year students po from Jose Rizal University currently taking up Bachelor of Science in Information Technology. Ang title ng aming research is "Synapse: A Memory Support Application with Wearable Technology for Senior Citizens". At napili namin tong organization dahil, nung tumawag kami sa office nyo po, napag alaman namin na lahat ng senior citizens sa Mandaluyong ay miyembro mo ng OSCA. We believe po na makakatulong po ang aming research sa mga seniors po dito sa OSCA. Okay po ma'am **ANONYMIZED**, i-rerecord po pala namin to. Kung okay lang po sa inyo?

Case 01: Sige ok lang naman mag record iha.

MR: Ilan po ang makakalimutin sa pamilya nyo?

Case 01: Yung na e-encounter ko samin? dalawa

MR: Pano pong makakalimutin po?

Case 01: Yung isa ano, dati kilala ako non, alam niya pangalan ko, pero ngayon hindi na nya ko kilala, lagi niyang tinatanong, anong pangalan mo, sino ka? Yun ang na e-encounter ko sa kanya, paulit-ulit. Tapos ung isa naman, talagang di nya na ko matandaan.

PD: Eh kayo po nakakalimot po ba kayo? Medyo may lapses po na pa onti onti.

Case 01: Pa minsan minsan meron akong mga bagay na nilapag, minsan nakakalimutan ko kung san ko nilagay.

MR: May maintenance po ba kayo?

Case 01: Wala naman, food supplement lang.

PD: Nakakalimutan nyo po ba minsan yung inumin yung food supplement nyo?

Case 01: Hindi naman.

MR: Gumagamit po ba kayo ng notes o sulat kamay na titignan nyo po na eto pala kailangan niyong gawin?

Case 01: Ay hinde. Hinde pa.

PD: Pero natatandaan nyo pa kung ano ginawa nyo mula umaga hanggang gabi.

Case 01: Oo. Pag may gamit lang na nilapag ko tapos hindi ko na matandaan kung saan ko nilapag, pero na rerecall ko naman.

PD: Eh ung kunyare po yung sa mga hawak nyo po na mga senior may nawawala po ba dun? Kunyare may nagtatanong sa barangay nyo na san po ba yung bahay ko? O kaya san ba yung bahay neto ganon po.

Case 01: Wala pa ko na e-encounter, oo

MR: Wala din pong nag p-paging na mga anak ng mga senior citizens na nawawala daw po yung lolo o lola nila?

Case 01: Meron kami na e-encounter sa barangay kaso ibang lugar, naliligaw napupunta sa barangay namin, pero sa lugar namin wala.

PD: Gumagamit po ba kayo ng cellphone?

Case 01: Oo eto

PD Ano po yung ginagamit nyong applications dyan?

Case 01: Youtube lang atsaka messenger.

MR: Naglalaro po ba kayo?

Case 01: Hinde, hindi ako naglalaro naiinis ako

MR: Matandain pa po ba kayo sa mga lugar, dates kung kailan nangyari yung bagay?

Case 01: Minsan hindi na, minsan nililista ko na rin, minsan parang wala akong pakialam.

Pero pag talagang importante ni n-notes ko yun.

PD: Pag kayo po ba na bored o walang kausap, nakakatrigger po ba yun sa pagiging makakalimutin ng isang senior?

Case 01: Prayerful kasi ako eh, praying lang ako, hindi ako yung walang ginagawa hindi.

MR: May kasama po ba kayo sa bahay?

Case 01: Meron ako yung mga anak ko pati mga apo, pero may sarili akong kwarto kasi gusto ko yung nag-iisa. Kasi gusto ko yung nakakapagdasal ako ng maayos.

PD: Saan po religion nyo?

Case 01: Dati ako sa el shadai tapos ngayon region of mary.

PD: May nakakalimutan po ba kayo isang bagay, kunya're magluto ng adobo tapos nakalimutan nyo po lagyan ng suka mga ganon.

Case 01: Ay hindi naman kasi 22 years ako sa hongkong atsaka hindi ako nagluluto, hindi ako marunong magluto.

MR: Ano po yung medyo mahirap nyo pong ginagawa?

Case 01: Wala naman.

MR: Pero lahat po gawain nyong naaalala nyo kung ano po kung paano gawin.

Case 01: Oo

PD: Ilan po anak nyo?

Case 01: Dalawa.

MR: Ilan po kayo sa bahay?

Case 01: 5

MR: Lagi po kayong may kasama?

Case 01: Oo, lagi

MR: May nag aalaga po ba sa inyo?

Case 01: Wala naman.

PD: Sa mga nasasakupan nyo pong seniors may nag aalaga po ba?

Case 01: Yung iba meron, may mga anak sila.

Case 02 Interview Transcript (Online)

RMM: Kayo po ung president sa barangay nyo ng mga senior po, ah ilan po yung mga nahahawakan nyong senior citizens,

Case 02: Ahh 722.

JM: Ahhh tanda nyo pa po nay.

Case 02: Ah marami sila e.

JM: Ah binibisita nyo pa po ba sila madalas or hindi naman po.

Case 02: Ah hindi na masyado, kase pag ako napunta don sa kanilang lugar, lahat yon nakaka ano ko nakakahalobilo ko pero di na kami nagkukwento kasi may mga lalaking iba e ayoko naman na may mga lalaking.

RMM: dalaga pa rin po pala.

Case 02: Inaudible.

JM: Ahhh okay lang po muka pa po kayong bata.

Case 02: Inaudible.

RMM: Ah opo.

Case 02: Inaudible

JM: Ano po un ahh mga lalaking senior citizen

Case 02: Basta meron akong kabataan mga kahalubilo ko lang, mga kumakausap sakin pag may kwento, sinasagot ko naman, di naman ako nag snob.

JM: Ay mga ano po nakakalimot po, malaking problema po ba yon sa, kayo po nakakalimot po ba kayo?

Case 02: Alam mo wala naman taong hindi nakakalimot e lalot gusto kalimutan isang bagay, diba.

JM: Ahh, opo pero...

Case 02: Di naman, awa naman ng Dios, halimbawa makalimot ka ngayon maya maya malalaman mo rin matatandaan mo rin.

JM: Ahhhh, sa ano , pero sa mga senior citizen po na nahahawakan nyo may mga nakakalimot po ba don na madalas ung medyo ulyanin na po ung medyo ulyanin na po may,

Case 02: Meron na naman na medyo ulyanin kase mga ano lang sila, lalo't walang asawa, byudoat byuda tapos mga apo lang kasama sa bahay syempre alam mo madami sila problema alam mo problema nilang ganon pag nakaupo sa isang tabi iba na iniisip non e, kaya pag tinanong mo parang tulala parang ganon lang yon.

JM: So nakaka contribute po ung parang boredom yung sa pagiging makakalimutin po ng tao.

Case 02: Ah oo totoo yan at saka stress.

RMM: Nagiging medyo ulyanin na sila pag ganon.

Case 02: Kase diba ang stress diba maraming klase yan, lalot pag wala kang pera, meron kang gustong bilin wala ka namang magagawa, parang naano ka sa buhay mo parang nabuburyo yung kaba ganon ung iba.

JM: Pag ganun po parang makakalimutin na po sila.

Case 02: Di naman makakalimutin kundi bugnot, bognutin kase walang magawa, walang magawang paraan para sa kabuhayan nila sa mga apo sa mga anak kaya nagiging ganon ung iba marami kang mababalitaang nag oorimentado, para ganyan yung mga dahilan nyan e.

RMM: E kunwari po wala na po silang ginagawa sa buhay, kunwari po inactive po, nagiging parang ulyanin na po ba sila na parang wala na po silang ginagawa na nood nalang na kakain na lang tas paulit ulit na lang ginawa nila, nagiging ulyanin po ba ung mga ganon sa tingin nyo?

Case 02: Ah sa palagay ko hindi, kase ang isang ulyanin, ah diba sa parte ng probinsya nalang ito ha, diba sa parte ng probinsya parang wala silang libangan diba, di katulad dito sa maynila maram, maraming mapaglilibangan, tumanaw ka lang sa kalsada, makikita mo marami na silang nakikita.. Di sila nabuburyong , di sila nakakalimot, nalilibang sila kumbaga, ganon lang yon dito. Pero sa probinsya, nakita mo sa probinsya malungkot don walang kuryente, walang ganito walang mapaglilibangan kaya sila naano, nabuburyong di katulad dito sa maynila marami kang mapaglilibangan dito, ikaw taga maynila ka?

JM: Opo, isang ganon mo lang , oh bat may ganito

Case 02: Oh diba, konting ano bayon, oh dibaa ganon.

JM: Opo, kunwari po may cellphone po ba kayo?

Case 02: Ang cellphone ko nasa manugang ko kasi ayoko nga nyan e, kase ano, ano ako , di ako mahilig sa mag selfie selfie, wala ako nyan,

JM: Di din po kayo gumagamit ng parang facebook.

Case 02: Hinde dalagang pilipina kase ako hahahaha

RMM: Hahahahahaaha

Case 02: Hindi ako mahilig sa ganyan, gusto ko kung kakausapen mo ko sa harapan

JM: Ahh opo tama nga naman

Case 02: Wag mo ko tatawagan ng ano di ako maano don.

JM: Ah tama naman po yun , ah may ginagawa din po ba kayong mga complex, na parang mahirap po na ginagawa

Case 02: Ahh sa amin kase, bilang presidente ng mga senior, mga trabaho kase namin eto katulad neto gagawa ng aming notice, tapos kaya kami nandito naghihintay kami ng ibibigay samin kung kelan schedule ng para sa senior or take out or para sa venue

RMM: Ahhh, di nyo naman po nakakalimutan yung mga bagay na yun?

Case 02: Ay hindi, kase obligation yon, kase ang isip ko once pumasok mo sa isang bagay pangatawanan mo diba, wag mo kakalimutan

JM: Aah opo, tama po

Case 02: Ahh tama ba ako

JM: Opo tama po, ah minsan po naligaw na po ba kayo? Kunawari

Case 02: Ng??

JM: ng daan po kunwari po papunta po kayo dito tapos di pala dito ung daan na dapat kong daanan

Case 02: Ay hindi

RMM: Ay hindi naman po talagang alam nyo naman po

Case 02: Kase ano, naligaw ako dyan noong kapag botohan, nung kapatid ko isinama ako sa ganyan kase ako naman sumama lang kasi noon kasalukuyang nagtrabaho ako pero nag stop ako ng isang linggo ngayon sumama ako sa kandidato, dito sa (address). Marami kase itong sikot sikot, pag pumunta kami sa isang lugar tutumbokin namin kwarto pagbalik dito kusina parang ganito lang ligaw pero pag sasabihin mo sa sarili mo hindi, di ko pa naranasan maligaw.

JM: Eh ung mga senior citizen po na hawak nyo pano parang naliligaw din po ba minsan nagtatanong din po ba sila sa barangay na nasan yung ganito nasan yung ganyan

Case 02: Mayroon marami

RMM: Ah marami po nakakalimot po ng lugar

Case 02: Ah hindi, hindi naman sa nakakalimot ang lagi nilang tinatanong ay kung kailan ang pay out at puro ganon,

JM: Ahh opo

Case 02: Ung pera alam mo naman yung senior

JM: Parang lola ko po , ganyan na ganyan po yung lola ko po, di po nakakalimot yon, pero po ibang bagay nakalimutan nya pero po pag date kung kailan siya papadalhan ng tita ko di nya nakalimutan po yoon

Case 02: Kase pera yon

RMM: May standard po ba kayong date na dapat na kung labasan ng payout po

Case 02: Ahh oo meron kami

JM: Ahh every ano po un

Case 02: Every three months ngayon dati every 6 months kami, ngayon every 3 months kaya kami nandito, inaantay namin ung notice na nagsulat kami ng isang araw, nagsulat kami dito ng mga pangalan , pero ang venue at oras ng pagkuha ay wala pa

RMM: Ahhh magkano po every 3 months

Case 02: Ahh 1500

JM: Ahhhh 1500 po

Case 02: Ah kase 500 ang isang buwan nyan kase sa dswd kase yan

RMM: Ahh opo galing nga po, ah minsan po ba parang kayo po kunwari tinatanong nyo po yung kapamilya nyo na minsan na paulit ulit nyo pong tinatanong na hindi nyo po namamalayan na paulit ulit nyo pong tinatanong

Case 02: Hindi naman wala naman kase pano ako magtatanong ng ganon e umaalis anak ko ng maaga ako lang naiiwanang may edad sa bahay namin , bawal naman ako tanong ng tanong sa mga bata, wala naman

JM: Wala po kayong maintenance

Case 02: Wala

JM: Vitamins po

Case 02: Ang vitamins ko ay parex

RMM: Nakakalimutan nyo po ba inumin minsan yon

Case 02: Minsan pag halimbawa meron akong pinuntahan imbis na uminom ako kanina pag uwi ko nalang saka ko iinomin

RMM: Ahh pero natatandaan nyo po

Case 02: Ahh oo

RMM: Ah matalas pa po memorya nyo

Case 02: At alam ko payan kase nga, ang isip ko kase pag pumasok ka sa isang trabaho, trabaho di ko yan kinakalimutan

RMM: Ilang taon na po kayo

Case 02: 80 na ako

JM: Ah parang lola ko po, 78 po un mag aano na

Case 02: Mag 881 na ako this october

JM: Ah malakas pa po, ah di pa po malabo mata nyo. Ah sakin po malabo kaya po minsan ang taray ko tignan

Case 02: Kasi nga, kaya tayo naano ng ganon, kase nga sa edad kong ganito nagbabasa pa ako ng pocket book, madaling araw na halimbawa nagising ako para ako antokin ulit, nagbabasa ako pocket book kahit mga ilang pages lang mabasa ko para maano lang utak ko ,

JM: Ahh importante po talaga yun para hindi po maging makakalimutin ir maging ulyanin

Case 02: Pagbasa at pagsulat, yan ang aking trabaho ko , baka di ka maniwala marami akong notebook at diary, sulat ako ng sulat

RMM: Ahh importante nga po para tumalas ang memorya

Case 02: Kase ano parang ayan ang vision ko sa sarili ko ang magbasa ang magsulat, wala akong pakialam anong ginagawa ng ibang tao basta di ako nakakaano sa ibang kapwa ko wala akong pakialam hahaha

JM: Ahh thankyou po ha thankyou po

Case 03 Interview Transcript (Online)

MR: Ahm ilan pong yung senior citizen po na nahahawakan nyo po sa barangay nyo po

Case 03: Ahhh sa ngayon, kase uhm senior namin bale sa barangay namin almost to lang 600 sabihin na lang natin ang active ay 400 tapos ang kalahati don ay wala pa naman kalahati ang iba don ay nag sosocial pensyon ang madalas doong nahahawakan ko ay ang nag-sosocial pension kasi pag iactivate ang pension ay para ibigay sa social care ay kailangan namin umattend at saka yung mga ibang senior na talagang kaibigan ko ay may tinatanong sila na kung ano nararapat sa mga senior kase ang una sinasabi ko ang iniimplement natin ngayon ay yung talagang walang pensyon ayun talag aang always na kasama listahan, bilang kayong mga merong inaano, di abswelto kung kase random yan e diba, abswelto kayo kung mapapasama kayo incase na di ako nagsusulat, kaya di nila maintindihan lalo naman pagbigyan, e lalo ako malabo naman pangunawa ko, e ganyan lang po, e kelangan papalinawangan mo sila kahit galit sila kahit ano, sabi ko di rin ako minsan pero di ako pwede sumagot kasi pwede ako isumbong dito kasi servant group ako kasi nag seserve ako kaya minsan sige nanay next time pag-ano, parang sakin ibibigay ko na lang sayo, para ano, alam mo naman mga senior maseselan at maramdamin, totoo yan

MR: Opo nga, sa mga senior po na nahahawakan nyo po, nakakalimot po ba kayo, medyo madalas,

Case 03: Di naman kase actually kung nakakagawa ako ng kunawari tulad ako presidente ako ng senior, meron akong case na binibigay na papel na inaalala ko sya na natatandaan ko na sya

MR: E yung nahahawakan nyo pong senior na nakakalimot po ba

Case 03: Di kasi maiwasan yon eh, kase minsan ung sa environment na sakamasa sa pamilya niya kase ang senior napakarami sa pamilya ko na puro babae , sa aming pamilya dalawa ang dalaga isang 43 isang 32 magkasunod, syempre iba na ang generation saka hindi katulad noon, tayo nagbabayad sa magulang, sinasabi ko lang ang totoo, ang ginagawa natin noon ay di natin ginagawa ngayon sa anak natin, kase ngayong generation yon, hahaha, nakakapagsalita sila ng di maganda, imposible pa kaya sa senior na katulad ko

PD: Nag mamaintenance din po ba kayo??

Case 03: Ay oo maintenance lang, minsan lang, kase matagal na akong nawalang ng menstruation, I think parang 50 pa, tapos parang ayon binigay ng doctor sakin,

PD: Minsan po ba nakakalimutan nyo po uminom ng maintenance

Case 03: Nakakalimot pero iniisip ko kase pag meron akong gamot, saka tinatanda ko sa kalendaro kung kailan ako mag start kung doon lang ako mag start, kase kung iinom ako tas biglang may tumawag sakin tinawag ako, ilalapag ko tas iniisip ko kung nakainom

na kaya ako kaya kailangan ko bago ako uminom bibilangin ko kung ilan pa yung naiwan ko, para ayon pagbabatayan ko,

PD: Gumagamit po ba kayo ng cellphone

Case 03: Yess, actually ang cellphone ko ay ordinary lang at hindi ganito, kase walaain ako, dahil minsan pag may kausap ako ilalapag ko, minsan pag may kausap ako ilalapag ko at minsan tapon lang ako ng tapon, kaya pag ordinaryong cellphone lang pag mawala man sa akin di mabigat kaya pag nagkaroon na ako maingat na ako

MR: Minsan po ba nakakalimutan nyo kung saan nyo na nilalagay ang mga gamit

Case 03: Pede rin

MR: Parang namimiss place

Case 03: Oo katulad ung kanina may tumawag sakin na pupunta kami city hall parang alam kung san ko nilagay sa iba, babalikan ko sya, parang alam ko dito ko yon nilagay

MR: Sa mga senior citizen po na nasasakupan nyo , parang may makakalimutin na sa kanila na masyado na parang kayo po kilala nyo sila kaso sila nakakalimutan po nila pangalan nyo

Case 03: Di pa naman, dipa naman kase kung makakalimutan nila ako di na sila baba sa amin para sasadyain ako na tatawagin akong susan, pres ano balita at saka hindi parin e katulad kunwari meron akong allowance itetext ko sila minsan anak nila tas sasabihin ko sila tas sasabihin nila sige sasabihin ko kay mama, pero parang meron din akong kilala, kase may edad syang 87 mag 88 parang magkakaroon din sya ng ano, ng alzheimer kaya pinapaliwanag ko sa kanya na, nanay kakakuha mo lang, kasi nag text ako sayo nung birthday mo yun yung nakuha ka, ay oo nga natandaan mo ha

PD: May lapses po ba?

Case 03: Oo kase mag 88 na sya ee, sana nga abotin sya ng 90 para may 10,000, pinag prapray ko lagi sila na matikman lang naman sana nila kahit 10,000, oo yon nalnag pinag prapray ko sa kapwa ko kahit di ko sila kaano basta pinag prapray ko tapos ngayon bilang presidente ng senior kunwari ikaw po, lagi kang magagalit ka sakin kase wala kang ano, ang ginagawa ko ay sinusuklian ko parin pero di ko sya tinatabla kahit magalit sya sakin, para kung sakaling wala na ako, maalala nya na kahit di ako kasali lagi nya akong ano, yun na lang pinag prapray ko sa kapwa ko, kase di naman lahat binibigyan e, diba pero

ayoko mag back list, totoo naman po pero ayoko minsan na kase sa katulad neto na katulad na ganyan, wag ka na mag alala ililibre nalang kita

PD: Yung senior citizen po ba na yon may nag alalaga po sa mga anak nila?

Case 03: Oo saka hindi, biglang naging presidente ito nakita may senior na may edad, parang ikaw katulad ikaw, may pamilya ka, alagaan mo lang nanay mo, e paano kung wala nang nakukuha, ayon yung sinasabi ko , ayon yung bawal ko na saklawan kase may pamilya sya, parang di naman sya masyadong alzheimer. Sabi nya sakin, te kelan ba grasya, sabi ko malapit na paxerox ka na lang ang nangyayari, samahan ng anak tas papakainin mo ng ilang araw bukas makalawa wala na,akala ko talaga pelikula lang ayon pala meron pala grabe, makalipas kalahating buwan parang sinabi nang magsarili ka na audible ,.... Kaya swerte pa rin pala ako kahit ganito ako, sabi ko maswerte pa rin pala ako kahit ganito ako, sabihin natin kahit na di sila masyado na advantage na inaalagaan ng anak, katulad ng kinikita ng asawa nila maliliit, alangan unahin kita or unahin ko apo mo diba.

PD: Kunwari po may senior citizen na audible natrigger din po ba yon na makakalimutin po kase nawalan na po sila ng

Case 03: Pwede po kase katulad po ako hindi po ako napasali dito maaring wala ako sa activity, nagzuumba kami tapos sumasama ako sa discussion discussion, e paano na ung nanay na di pinapayagayan ng anak, pede po yun, kasi ang sinasabi ko po sa inyo ay ang environment na kasama sa bahay, kase ang unang una ang mag aalala lalo na sa senior ay kelangan nasa loob ng bahay mo, hindi kasi ikaw pwedeng senior po kayo pwedeng nakasama kita, te malapit na grasya mo, hindi pwede na aanohin kita malayo ka, at isa pa tas sasabihin ng anak ano yan ano yan, kase ganyan lagi e ang nanay, ano sinasabi ng presidente nyo, kaya pag ako hii tee malapit na, kaya natutuwa naman sila, totoo yun kase minsan kasi nasa kasama mo sa bahay mo, ang masakit nangyayari pa sila pa ang umaano. Magaling sila pag may pakinabang , okay pag wala , wala na

Case 04 Interview Transcript (Online)

MR: Ako po si Marianne sa JRU po kami

Case 04: Ano interview mo sakin

MR: Tatanong ko po

Case 04: Wag muna akong interviewhin kase alzheimer na nga e

MR: Ahh may ano po kayo makakalimutin na po kayo

Case 04: Ah hindi naman, joke lang Para lang naman bola

MR: Ahhhh

Case 04: Anong gusto mong tanong

MR: Yung sa organization nyo po, uhm ilan po siguro yung percent ng makakalimutin or papunta sa ulyanin or mga ganito

Case 04: Di mo masabing ulyanin dahil mostly talaga pag nagka kaedad limot limot na may mga bata pa ngang mas masahol pa doon e hindi ba. Minsan nadadala yan sa problema sa sobrang problema , tulad ko may anak akong dalawang pwd. Saka ako din halos tumatayong nanay tatay, kung ang asawa mo naman ay go here go there ganon alam mo na barkada alam mo pasan mo edi lahat pasan mo , ngayon sa daming iniisip mo sa kabuhayan pano pag assist sa mga anak mo , iisa lang ang problema ayon din, tapos gusto mo tumulong mostly ako mas nauuna pa nga pag may nakikita mong nangangailangan sa tulong, number 1 kahit madaling araw yan sinasamahan ko yan kahit 3 o'clock in morning para makatulong lang sa gustong makahingi ng tulong, nakukuha ko rin yon, pero ayan mga sinasabing limot limot nadadala rin yan sa daming ng problema na ano, kaya halo halo, hanap buhay paano ka kikita pano araw araw mo, anakk mo na meron kang depression, ako inaamin ko na may depression ako, dalawa anak kong pwd. 46 yrs old ang lalaki ko 44

MR: Ah parang si sir panelo po diba po yung anak po nya naano po may ganyan po, buti nga po nandyan po kayo

Case 04: Pinapanalangin ko na sa panginoon na sila na mauna kahit masakit sa loob mo sila na mauna wag lang ako at wag lang ako kasi kawawa kase nakikita ko kawawa

MR: Yung spokesperson po ni pangulong Duterte, si sir panelo po ganyan din po anak nya e kaya po masakit daw po pero pinapanalangin nya dati na yung anak nya nalang daw mauna sino daw po mag aalaga kung siya daw po mauna

Case 04: Ayon totoo yon

MR: Kaya yung sinusulong nya ngayon sabi nya gusto nya magkaroon ng office din na magkakaroon ng office din na parang ganito na magkakaroon ng ano

Case 04: Si konsehal jessie meron siyang kaibigan na senator o congresso yun yung dinaing nya,kase sinabi nya na alam mo iniisip nya yung mga senior saka yung mga pwd saka single parents kaya nainterview sya ng gma dahil sa single parents, pero may batas na wala paring umakson pero dito naaksonan nya kaya meron sya ditong single parents ngayon yung pwd sya parin kaya akong coordinator ng pwd dito sa lugar namin kase kinausap nya yung mataas na tao kase di ko na maanohan kung sino yon kase ang gusto maglagay ng foundation sa pwd. Kaya katulad ng nag meeting kami nung mga senior na kuma kandidato, e sabi ko lagi kayo sa senior pano naman ang pwd. Mayroong magbibigay ng tulong sa pwd may limit pa. Ahhhh 17 ata or 14 yrs old na pababa e paano yung mga iistroke o diba madami ngayong bata na katulad nyo na age nyo na nasstroke e pano yon wala pang 60 yrs old ayon yung pinaglalaban ko

MR: Ako po mild parang may bumara po sa utak ko

Case 04: Kaya mag ingat ka di ka ano, wag ka masyado baka mamaya ma dispere ka baka masira ulo mo , wag mo sirain ulo mo sa walang ka kwenta kwenta hahahaha kelangan lakasan mo loob mo, katulad ko wala akong magulang noong bata ako. Broken family na kami apat kaming magkakapatid para kaming ibon na nagkakanya kanya kaming buhay. Maige naman naipakita namin sa lugar namin na hindi kami pabigat sa kamag anak o kanino man. Tumayo kami sa sarili naming paa, di naman kami nagmuka kaming pulubi na ano. Sa awa naman ng panginoon nagkanya kanya na kaming pamumuhat may bahay may ano. Walang tumulong samin ayon yung pinagka malaki ko sa kamag anak namin. Mayroong nagkasakit man sa yung namatay kong sa unaudible sa awa naman ng Dios sarili nyang gastos ayon yung turns God kase naging matatag kami sa buhay namin. Kaya hanggang sa miski anak ko tinayo ko yang mga anak ko sa paa ko at kamay ko pagod ko. Ang katuwang ko dito ay ang panganay kong anak sya din ang nagpalaki doon sa dalawa kong kapansanan

PD: Ilan po ba anak nyo

Case 04: Tatlo lang. Yung panganay ko normal kaya kami nagka spartle disease di kami kompatible ng dugo ayon ang diperensya kaya siguro meron talagang kilala naming may alzheimer na 90 yrs old na kaya di ko din alam bat na nagka alzheimer na lang yon pero minsan din natatandaan ko lang mostly lagi nyang nababanggit yung 1st boyfriend nya

PD: Bumabalik po kase sila sa dating memorya

Case 04: Oo, di rin miski noon pa lagi niyang naalala yung tiyo namin , yung yung first boyfriend nya. Siguro para bang desperate sya, kase napatay ng hapon yung boyfriend nya e. yon Alzheimer sya

PD: Ilan naman po hawak nyong senior citizen sa barangay nyo po

Case 04: Ako mahigit 1000

PD: Dami nyo po pala Tas kayo po president po

Case 04: Oo

PD: Sa lahat po yoon wala pong nakakalimot na medyo ulyanin

Case 04: Oo meron ako mas maige pa nga kung ayon po ma iiinterview nyo e

PD: Ahh ganon po

Case 04: Bibigyan kita ng panahon miski yon ang interviewhin nyo. Mostly mga nandito mga yan e parang sa katandaan sa damping iniintindi minsan kabuhayan katulad ko pero, actually ngayon e medyo nakaka katulad ng pagkain ng ako naman nakakatanggap ako ng goods sa kapatid ko puro goods naman walang pera noh. Inaamin ko yon pinapamigay ko narin di ko rin naman kayang kanin naman e, mga can foods di ako palakain yon e. buti pa yung gagala ka tas kakain ka. E yung anak ko maluho anak ko. Ang ganda ganda mo

PD: Sa tingin nyo po nakakatulong po ba yung, ay ilan po sa senior citizen nyo po ay may technology?

Case 04: Ako wala akong alam, meron akong tropa pag nasira, kung sino naka ano tatawagin ko kase ayoko naman pag mag mememorya na pano ba ito yung ganito di ako conscious basta ganon. Mas maano pa pwd kong lalaki. Nag chechess yon paa nya pa ginagamit nya. May wifi na kami bumili pa ng sarili nyang wifi na ta 700. Nag cheches pa yon ayon yung nagtuturo. I am sorry pero matatalino sila kaso ang ano nga lang ay yung physical. Pero matalino. Nagkaroon din ako ng apo na may autism, ang talino naman. Kaso bawal ipinagbabawal ng doctor

MR: Ay opo kase iba po di nila alam kung ano po ang tama at mali baka gayahin nila

Case 04: Ay ayon limang beses sa isang araw binilan ko ng laptop limang beses sa isang araw pinababalik ng sa grade 1 half semester grade 2 half semester paulit ulit. Ayaw pababasahin ng mataas kaya kailangan level lang kaya tinuturuan ng tagalog. Kaya puro english. Mga autism puro english yan. Ang gagaling din nila sa computer ang bilis

MR: Magagaling din po talaga mga ganon. May contest nga din po sila puro sila autism ang tatalino po talaga nila.

Pupunta yan sa mall kundi sa national bookstore magbabasa at nakadapa yan

MR: Kase po yung unang pilay di po nahahati hati kase parang isang buo focus na focus po talaga sila sa gusto nila

Case 04: Oo kung ano lang gusto nila saka sa pagkain di mo mabibigyan ng pagkain ng ice cream yan pati soft drinks. Tubig lang

MR: Ahh galing po ahhh

Case 04: Kaya isa din yan kaya ako nagkakaroon ng depression. May depression ako kaya ako napapasama din dito e

Case 05 Interview Transcript (Online)

Case 05: Hi, Good Ffternoon ako po si Ofelia Martinez Lamtin of a Barangay Barangka Drive. Mailap po ako ng 2015 out of 35 po kami na elect and then ako po yung the highest elect tapos uhm out of 27 barangay na elect po ako as vice president ng CMI. Ang CMI acronym po ay Association of Senior Citizen in Mandaluyong tapos po pagiging vice president naging very supportive ako sa presidente kung ano man po ang dapat gawin ng vice presidente siguro naging hilig ko na din since then bago ako pumasok ng senior citizen naging presidente po ako ng one of the sub paris ng our laid of abandon tapos ho noon nakita po nila siguro na sa reilgous sa mga kasama ko sa mga youth sa mga aming simbahan naging head din po ako so parang enjoy ako kase parang silang mga anak. Noong po siguro naging inspired din po ako nung parang pagbabago non pala yung pagpasok ko dito nong senior citizen tapos po noon I see to it na magka meron po akong programa monthly yan po ang inano ko doon sa aming barangay captain nag submit po ako ng monthly na kailangan po talaga na meron akong programma para po sa mga matatanda ang aking pong senior citizen ng barangka drive nasaan na po kami nasa 1100 tapos po ahh since non po na naging ako po na naging president na po ako kase natapos po ako ng term and nagkaroon po ulit ng election so nanalo po ulit naman ako ng presidente okay po so siguro nakita po nila na kung paano po nila ako trumabaho sa mga matatanda nakita po nila ang aking mga programa at inilaban po nila ako sa 27

barangay nanalo naman po ako ng top 1, opo tapos dun po kami tinawag po kami ng unilab kase parang sponsor nila ayon parang naano naman ako nanalo din so ang saya saya ko parang ganito pala, matanda ka na napapasama kapa sa mga contest pero di ko tinatawag na contest yon kase parang parehas naman ng pagsisilbi sa seniors ganon. Dami kong nadaanan na head ng osca tas nung ako na naging president parang ako na naging osca dun na talaga nakasama ko na sila si sir luisito espinosa. Alam mo kami nasa 1000 non dati haaa, nasa 1100, alam mo ba napababa ko naging 800. Ibig sabihin ang laki so nakakaawa naman din ang city na iniisip nila na ano ng budget ang meron dito sa senior citizen na hindi lang tayo dapat din na umasa o parang mag tatampo na sasabihin natin na di naman kami binibigyan ng tamang tulong at pero alam mo na kaming bibigyan kami ni mayora na programa ni mayora ay 300 pesos ang birthday gift yearly tapos noong pababa na namin naging 500, oh diba tas natulungan pa namn ang pwd na pwd ay kung ano natatanggap nila ay nakatanggap ng pwd kung 300 , 300 din ang birthday nila at 500 din ang bibigay sa kanila so masaya sila masaya sa ganon apos may panibago ulit kaming programa, his december last year nakasama namin si mayora sa isang outing parang get together lang namin parang ano bang pwede naming magawa sa mga senior . Dumating si mayora atopie meron akong gustong maibabab parang ito ay experiment pero titignan muna natin kung maipapasa. Ang 90 yrs old at 99 yrs old ay bibigyan nating ng 10000 hindi 500 kundi 1000 pa birthday alam mo yung nakita ko at hindi lang naman barangay ko ang pinuntahan ko kundi at iba pang barangay at doon ko din nakita talaga kung paano inaalagaan ang kanilang magulang pa paano paano ba bakit tumagal ang buhay nila, sabi ko dapat talaga habang buhay ang magulang talagang aalagaan mo kasi pag inabot namin ang pera, ang saya kasi kitang kita ko ang muka sa mga matatanda kung paano napasya ni mayora so sabi nga namin, mayora para ang iba, hindi naman nila alam dahil siguro may alzheimer.

JM: Madami po bang mga ganon

Case 05: Madami anak madami , oo madami. Tapos ahhhhh yun bang biglang titigan ka tas sino ka ba tas bat ka nandito mga ganon alam mo na nak yung mga ganong marami mga mahihirap. Napakarami dito ko nakita mga labas ko ng buong mandaluyong. Doon ko naramdamang talaga na mas lalo akong. Natakor akong ayoko dumating sa ganyang age. Kung kukunin ako masaya ako, ayoko naman na alagaan ako ng anak ko kasi

mahirap ang mag alaga. Madami anak kung sinabi mong ganon pala sana dinala ko yung accomplishment ko yearly at nandon anak may picture lahat yan nilalagyan ko para bang may story kase isa pa yang kelangan din makita ni mayora ano ba yang ginagawa nyo parang ganon.

JM: Parang resibo

Case 05: Oo minsan parang exercise, pagwawalis alam nyo minsan saturday, oyy mag programa pala ako this month o sige aanhin ko yan o sino sino malakas bibilhan ko ng pandesal para after ng ano , after ng pagwawalis sa umaga tas basta lalabas kami 5:30 hanggang wala paring araw kelangan wag mainit kase kawawa naman ang matanda. Bibigyan ko sa knaila o sige tapos na tayo mga halimbawa tatlong straight o sige breakfast tas kwentuhan kami ano bang mga ano yon, ay ano anak. Ang marami talaga ay maintenance hinihingi nila ayan vitamins lalot dumating ang pandemic kase naranasan ko 1st batch kami na na hospital tas nag cacovid anak ako tas alam mo anak ako. Tatlo kami sa pamilya kase nagka hawa hawa kami, ganito akala ko noon. Paano kami nagbibingi pero yung anak ko sa abroad. Nay ito ang mga symptoms. Hindi ko pinansin kase ayokong tanggapin na meron akong ganito hanggang sa akoy sumakit ang ulo. Nilagnat grabe ako'y nilalagnat at ako n. di ko anak malaman at natakor ako na hindi ako makahinga at sa hagdanan 2 steps at sa hagdanan 2 steps pahinga ilit. Tinatakbo ko ang hagdan para kailangan ko ang mabilis.

JM: Nag nonotes po ba kayo para di nyo po makalimutan ang task

Case 05: Oo meron ako, kase kelangan check ko kase ano ang sunod sunod oo.

JM: Minsan po ba nakakalimot kayo if ever na may ano po, yung kunwari po may nakalimutan po kayo na gawin po or lahat po naalala nyo po lahat.

Case 05: Naalala ko lahat, kaya lang pag ganito lang sa damning biroin mo naman 2015 pa ako sa accomplishment marami na ako nakalagay lahat doon. Noong una nga kase nahihiya ako kasi ayaw mong pasikat ka, sabi nang barangay nay kelangan ka kase documentary lang po ito, totoo pala kailangan pala yon, kelangan talaga na may ipapakita ka na talaga na doon ako nanalo sa unilab na mayroon akong pinakita. Pati noong akoy naging head ng mga youth talagang ginawa ko din yon, parang mga junk shop nag ano kami nag ikot kami tas isa parin pano mo sila madadala sa simbahan. At ma isa pang ineng kami naging mga proj. Sa war on drugs meron akong ano yan e nagka experience

ako. Mas dapat pala na kailangan mo silang unawaain kase may kulang sila. Kaya nga lima ang daliri natin at iba iba size. Maaring ito ay the weakest at ano ang dapat mong itulong sa kanya?

RM: Alalayan mo po sila

Case 05: Alalayan mo, kase parang yan pag bumababa na tukoran mo siya kailangan lagi siyang may kausap at saka ganto. Mayroon akong kamag anak na nilapitan din paano mo ate aub pwedeng magsalita dito o sigi po pakiusap mo lang sakin ipakita mo. Tanggi ng tanggi ang lalaki. Te wala akong ano wala akong ano tamang hinala kayo. Sabi ko talaga?? Parang malapit na mag senior mga 50 plus na parang bata palang daw sya nag drudrugs na. Napaamin ko sabi ko sino mahihirapan ikaw? Hindii. Ang mahihirapan ang asawa mo at anak mo. Oo nahihiapan sila kase hindi nila alam ang gagawin kase samantalang kaya mo yan, ang nangyayari lang sa isip mo kase para kang naaapi, kala mo napagbibigayan ka na ng, akala mo kulang pa rin. So ganon , so hindi tama ang syempre tignan mo din ang estado ng buhay kung ganito lang kaya mo wag ka umakyat, kung nandito ka dito ka lang tiisin mo pero alam mo , ang una mong lalapitan ang panginoong Dios. Kaya sabi ko mas lalo mo syang unawain. Mas lalo mo syang samahan hanggang sa ma korek at ilalayo mo sa, halimbawa pag sinabi nya sayo, pag lalabas kelangan sasamahan mo sya kase minsan nawawala sya sa ulirat. Pag kailangan nya kausap wala pala siyang kausap. Malungkot ang buhay ganoon

RM: So kailangan po ba talaga ang mga senior citizen na kailangan po talaga sila laging may kasama?

Case 05: Kami ang senior citizen. Naka attend kami ng seminar ng pdea yon din, ang sabi nga namin kaming mga senior wala namang ano. Ayon pala meron din. May gumagamit din na senior. Oo meron din yoon, tapos ahhmm ano paba ang ano ko, marami ang mga ano ko tulad ng kahapon. Pinatawag kami dito sa osa ang ginawa naman namin ay 400 plus ang sinulat kong notice. Kase sa mga social pension kase nga minsan nga natutuwa ako. Ay salamat naano eto nakalusot.

JM: Ay dapat pala dito nalang dalhin ang lola ko kase grabe kase mga ginagawa namin. wala po kasi siyang kausap don kase po kasi kami busy, nag aarial kami, at mama ko po nag barbecue.

Case 05: Ilang taon na sya

JM: 78 na po

Case 05: Alam mo anak pag ano yan, pag nag sosolo wala. Alam mo yung hindi nagsasalita ayan. Malapit na yan, malapit sya sa sakit. Lalot sa pag iisip. Kase wala syang kausap e, alam mo anak kaya sabi mo sakin kanina parang ano ako kasi ako gusto ko masaya. Tapos ano ako kailangan ako may gagawin ganon at pag ako tumigil miski ako kinakausap ko anak ko, kinakausap ko mga anak ko sinasabi ko sa kanila na oh anak may tulong ba ako sa inyo. Alam ko pag ang anak ko ay malungkot, alam ko. So sila ganon din nararanasan nila yan kaya malimit kami mag sharing kase sabi ko sa inyo rin ako natututo kase nakaka pick up din ako sa inyo ng maganda kase na pede kong I korek ah sabi ko ahh oo nga naman dapat ganon , ahh ayon. Para kaming opisina lahat sila may mga kasa kasama kumbaga may trusty tulad ko 11 kami. Lahat kami 11 meron lang na 9 merong 25 ang member. Di member ahhh official, ayon ang mga katulong ayon. Ehmm ehhmm

JM: Ilang taon na po yung organization nyo

Case 05: Since ano ito. Since ahhh since pumasok kami 2015 so 3 15 I way back mo ng tatlo pang taon 15 12, mga 14 ay hindi mga 11

Mga 2011 po siguro

Case 05: Ahhm oo oo mga 11 kase mga 3 yrs ang term e. after ng 3 yrs.

Case 06 Interview Transcript (Online)

PD: Yung president po yung may hawak na makakalimutin na senior

Case 06: Sa amin, di ko maano kung ilan pero marami nadin kase dala ng edad.

PD: Pero ilan po hawak nyong senior citizen.

Case 06: Sa barangay namin it is 539, active oo nasa listahan

PD: Dami po pala non, tapos po may mga ano po yun, gaano po kadalas sila nakakalimot.

Case 06: Ayan ang di ko maano kase usually ay sa family lang yan e, kung malalaman ko lang pag mag monitoring ng house visit ako. Maano mo kase yan sa conversation at iba ay paiba iba. Ayon naiba na

PD: Opo, Malaki problem po ba yon sa barangay po nyo sa pagiging makakalimutin ng senior citizen

Case 06: Sa barangay hindi, kase ang mga senior namin ngayon ay nakatira sa mga anak anak at may nag aalaga sa mga kanila kaya hindi ganon kaproblema kase makalimotin kang ang parent ang senior umaalalay ang pamilya diba,

MR: Ah tama po

Case 06: Ang mahirap kung mag isa lang sya, kaya di mo maramdaman na merong na ano thru conversation

MR: Ahh taama po galing po pala, ahh gumagamit po ba sila ng mga cellphone po na active senior citizen

Case 06: Not all kase hindi naman nakaabot lalo na mga 80s although mga ilan lang na papindot pindot, pero not totally latest na model, mas prefer nila na load and text lang mga load 5 wag na lang mga ganon ganon,

MR: Kayo po ma'am may phone po kayo?

Case 06: Meron

MR: Ano po ginagamit nyo dyan

Case 06: Android

PD: Ano po application pong gamit nyo dyan.

Case 06: Marami kasi alam mo naman may mga teke sa bahay may mga games pa ako, pang ano sa utak kahit paano

MR: Ano po nakakalimot po ba kayo, paminsan minsan

Case 06: Oo may lapses sa daming iniisip , halimbawa ang memory card ko ay full na kailangan na mag delete para magkaroon ng space

MR: Kung may application po bang makakatulong po sa inyo para ipaalala sa inyo or para pampa nasa isang application po yung mga games yung mga

Case 06: I played crossword, puzzle at tapos yung sa mga more on words mga ganyan oh see, mahina kase mababa na tas mayroong isang game na kailangan tas magbibigay lang sila ng clue then you have to guess the word

MR: Opo ang galing, pampatalas po ng memorya nyo po iyon?

Case 06: Oo kelangan tapos pag nagbabasa ako, nag sesearch maging updated kahit paano.

Nakikinig papaano sa mga radio sa balita

MR: Ano po yun kunwari po gagamit po ba kayo ng isang application na magpaparemind po sa inyo na kailangan nyo na po uminom ng gamot or kailangan nyo na po bisitahin yung ano nyo.

Case 06: Nandon yun sa alarm

PD: Meron po kayo dyan

Case 06: Meron kase sa alarm o kaya naka schedule

PD: Ah ang galing po ahh

Case 06: Oo ganon yon

MR: Ah nakakatulong po talaga sa inyo mga technology po?

Case 06: Ah oo naman

MR: Ah di na po kayo nagsusulat ng reminders yung di ko nyo na po kailangan ng ganito yung sulat kamay po

Case 06: Ah nagsusulat, kase sa bahay marami akong yung mga maliliit na pad all about papers

PD: Ang galing nyo po, ah sa tingin nyo po sa lahat po ng senior citizen, magkaka impact din po ba yung mobile phones po

Case 06: If they learned how to operates the phone, may pakinababang kase less time at marami din benefits din, lalo magamit ka sa application ma gastos at ubos ang load, kaya sa bahay may internet ayon nalang free.

MR: Pero di pa po kayo nakakalimot no kahit konti

Case 06: May time pero parang san ba ito tas babalik ka na parang ganito

MR: Ahh ganon

Case 06: Ay oo

PD: Ay ganun po ba, ay sa iba nyo pong hawak na senior citizen ganun din po ba sila or di nyo po naano

Case 06: Mostly senior ayaw ng mga apps, mas gusto nila kagaya nyan gusto nila tawag di bale na maubos ang load basta makatawag, naiintindihan mo naman kase ang hirap naman nyan, pagkatapos pag tumatanda lumalapad ang daliri di naman mag kasya sa pad

PD: Opo, sa tingin nyo po may mga senior citizen po na nabobored na mag isa nalang

Case 06: Ohh yes naramdaman ko yan, lalo na yung pandemic bawal lumabas imagine mo 3 months nasa loob ako ng bahay though nagiikot ako sa labas or sa loob sabi ko, blanco talaga ang utak ko di na gumagana sabi ko, manang pwede naman ako sa labas bawal ang 65 sa taas at bawal 65 sa taas. Mommy bawal pa naman sigi na bored na bored ako pag alis parang bagong salta sa maynila

PD: Ahh so yung bored lang po nakaktrigger po ba sya ng limot?

Case 06: Oh yes sa totoo lang blanco talaga isip ko, ano ba gagawin ko ganyan ganito lalo na kung mga anak mo nagtatrabaho mag isa ka? Sabi ko parang wala akong silbi na ano ba ito anong trabahong gagawin ko ano ba ito, kakain matutulog

PD: Buti bumalik na po pala dito noh.

Case 06: Hindi although di naman sa bahay kahit naka lock down secretary kase ako. Ginagawa ko update ako ng update kung sino mga patay. Mommy tinuturuan ka na namin ng shortcut ng excel bat ini isa isa mo pa pangalan sa excel bat mo pa inisa isa ang pangalan, sabi ko hayaan mo. Kahit hindi ko sila makikita at least sa pangalan na familiarize ko na sila kaya kahit magtanong pa sila maam, maam nandyan ba kami sa pangalan, ahm oo ano pangalan uhmm andyan na nga yung recall recall diba

MR: Sa excel paano ano lang po yun diba

Case 06: Oo paisa isa, at saka ulit ulit para matandaan ko , di naman mag mamatch ang mukha sa pangalan. O sige bahala ka

MR: Ah minsan po ba nakaka dim po ba kayo ng mga muka halimbawa mga hawak nyo po sa barangay. Parang nakakalimutan nyo po sa pangalan pero sa muka po naalala nyo po pero sa pangalan hindi.

Case 06: Hindi maiwasan yan lalo na kung ako ako bago, tapos pag ka introduced marami. Pag ikaw lang mag isa pasok ka sa marmi ikaw lang mag isa matandaan ka ng marami pero pag ikaw sa marami mahihirapan ka imatch ang muka, oh dib a natural yan e

MR: E kayo po bibisita po kayo sa senior makakalimutan nyo po kaya kung ano pangalan nyo

Case 06: Oo minsan lalo na pag first time ka, kase hindi naman lahat pag punta mo nandon. Magpakilala at after that pag nameet mo sa kalsada nandun na yung familiarization.

PD: Kunwari po sa pagdalaw nyo po may nakakausap po ba kayo na matatanda na nalolost sa middle sa ng conversation parang nalilito po sila

Case 06: Oo hindi lang nalolost kundi repetitive , diba yung paulit ulit. Meron yan meron kaming sa may vice president namin may alzheimer na may parkinson pa. Kakasabi mo lang di na agad matandaan. Oo paulit ulit kase mahirap yan pag alzheimer lifetime yan gamutan. Saka sabi ko sa mga anak nya wag yan iwanan lalo na pag nakalabas yan di na makauwi

PD: So sa tingin nyo po pag ganon makakatulong po yung whereabouts kunwari po smartouch. Kunwari...

Case 06: Parang tracking

PD: Makakatulong pa sa mga anak nila or sa mga alaga or mga inaalagaan nila

Case 06: Oo wag lang pakialaman pag yan tinanggal wala hahahaha, paano mo yan maano pag di tinanggal kaya kailangan one on one na bantay

MR: E kunwari po mga iba po nag aalaga po sa kanila na anak makakatulong po kaya na technology na yon, yung whereabout kahit di naman po sya ulyanin pero medyo maalala nya po ba na meron ako ganito, mag nonotify na mag,,,

Case 06: Ah yung bagong relo na bagong messages na bagong timer

MR: Ahh opoo

Case 06: Sabi ko sa anak ko gusto ko yan

MR: Ah opo pabili po kayo

Case 06: Ahh oo gusto ko yan

PD: Ilan po ba anak nyo

Case 06: Apat mga ano na sila. Young adults. Ang panganay ko ay 36 ang bunso ko is 27 all singles at nasa bahay lahat.

PD: Babae po sila

Case 06: 3 boy one girl

PD: Ahh opo, so nakaktulong po talaga yon

Case 06: Ah oo kase gusto ko yan kase steps ko binibilang. Ay mommy naka ilang steps ka. Ay 100 lang bakit. Ay selpon lang ang naiwan ko sa lamesa at nagikot ikot kalaan naman laging nakadikit sakin. Sabi sakin marami ka nang relo di pa nagagamit. Pag may message poot poot poot. ayun ma message

MR: Kahit po makalimutan nyo po cellphone nyo naano nyo po na ay may nag ano po.

Case 06: Oo kase naka sync kase yan e diba ohhh

MR: Ahh galing nyo po aht talagang teki po talaga kayo

Case 06: Di naman ano lang siguro. Ang memory ko lang siguro ay medyo maano at mga kasama ko ay maano sa technology

MR: Ano po bang trabaho nila

Case 06: Wala na. May age pero yung dalaga pa ako I was a secretary to a consultant and manager to filipino ang consultant ko ay different nationals kaya iba ibang adjustment kase kanya kanyang character yon.

PD: E mga anak nyo po ano po mga trabaho nila

Case 06: Dalawa nasa food industry ang babae ko ay hr. Psychology graduate ang bunso ko ay technology sya

PD: Ay parehas po pala kami

Case 06: Ay dati di sya nakatapos dahil may accute arimia yung ano sa puso. Pero supposed to be mag aano ng thesis nya sa I academy sayang anak yung mass communication.

Marianne: Minsan po ba yung kunwari po yung mga senior citizen po na nabibisita nyo po. Yung parang pag kinakausap nyo po nakakalimutan po nila yung mga word na gusto po nilang sabihin.

Case 06: Oo . You have to feed the word that they need tas ayunn tas tuloy tuloy na

MR: Kayo po nagaganon po ba kayo.

Case 06: May times.syempre ma memental block lang. Di maiwasan yan sa mga terminology

PD: Ahh opo. E kunwari po. Recall po ng current age ng mga anak nila or anak nyo po. Kayo po mga nabisita nyo po na seniors na nakakalimutan po nila yung edad nila edad ng anak nila or malapit na tao sa kanila pio

Case 06: Oo nakakalimutan talaga , wag lang ang year. Ay oo nga pala . Sabi ko nga pala ay ganyan na pala ang tanda ko noh. Para namang kasi pag nakita ko mga anak ko na tumatanda sabi ko tumatanda na kasi ako. Ilang taon ka na ba mga ganito

MR: Pati po mga sa kanila naman po mga nasasakupan nyong mga senior ganon din po nangyari sa kanila.

Case 06: Oo meron din ganyan. Minsan nga si ano si ganyan mga pangalan nakakalimutan minsan nga ako pag ano. Mommy pag mag roll call ka mali mali pa. Minsan nga pag may ganyan may mali mali pa at iba nasa isip

MR: Ahh ganun po, e kunwari po kayo po parang nakakalimutan nyo po ba yung chronology ng life nyo parang nangyari kahapon na nagpapalit nyo po nangyari sa isang araw or nangyari sa isang linggo or nagpapalit po sa nangyari sa ano.

Case 06: Ang even ay di ko nakakalimutan ang nakakalimutan ko ay ang date at time , madalas yan

MR: E sa mga senior po na nasasakupan nyo. Pag kinkausap nyo po sila pag tintanong nyo po yung mga event, minsan po ba nakakalimutan nila.

Case 06: maiwasan oo, kahit kung ako nga oo nga, pero ang event ang kwento ay hindi mo makalimutan. That's why I hate history, memorization of names date and places pero ang event ay vivid sa akin.

PD: Uhm meron po ba sa inyong, uhm kayo po nalost na po ba kayo sa isang lugar na lagi nyong tinandaan or ..

Case 06: Unless matagal na hindi nakabalik kase may mga development pero kung sa lugar lang lagi hindi na

Marianne: E sa inyong mga seniors po na hawak nyo po naano po kaya yon para pong na minsang may nag rereport na nawawala si ganito or may lumalapit na sa barangay nyo na nasan na ba yung daan

Case 06: Wala naman

MR: Ah wala naman

Case 06: Ah sabi ko nga bawat senior alaga ng mga anak a

PD: Ah mga anak po pala

Case 06: May mga pamangkin din na kasama sa bahay at ngayon mga senior din takot kaya lumabas kahit sabihin mo na okay na lumabas ano na tayo level 1 na wala na. Ay hindi na nag hahanap ng card pasok lang ay hindi lalo na pag unvaccinated.

MR: Uhm kayo po madalas po ba kayong natatanong mga anak nyo po or kasama nyo po sa bahay kung ano po nangyari halimbawa po kelan ba yung ganito or ganyan kumain na ba

Case 06: May times ganyan, may ganito ganyan anong date ba iyon. Ganyan.

PD: Pumunta na ba ako dito pumunta ka na ba dyan tapos mo na ba ito yung paulit ulit na nagtatanong.

Case 06: Sabi ng mga anak ko paulit paulit daw sabi daw

PD: Ahh di nyo po namamalayan, ah sila din po ba na nahahawakan nyo po, ganon din po ba?

Case 06: Mostly, oo mostly Ahh paulit ulit sila oo

MR: Ahh paulit ulit sila ah kala nila di pa nila natanong

Case 06: Kase lets take it na habang tumatanda ang hearing ay dumedeclined din pati ang memory kaya ganon.

PD: Ay eto po yung yung complex po yung task. Ginagawa nyo po ba yung isang run or hindi dino doble doble nyo po

Case 06: I want challenges ahhhhh, challenges yann kaso ang problema sa akin ay distracted ako .Mag shift ako sa kabila pero pwede naman yan pagsabayin ang babae ay magaling yan sa multitasking

PD: Di nyo po ba nakakalimutan yung minsan ay di ko pa pala nagagawa yung mga ganito

Case 06: Minsan pag nag divert attention ko nakakalimutan ko yung mga unfinished job hahahhaa sabi ng mga anak ko di ka pa tapos pero may mga natapos naman

PD: Pero di nyo naman po completely na nakakalimutan

Case 06: Hindi kase pag ano naalala ko wala namang ibang gagawa kundi ako lang

PD: Ahhh kunwari po pag procedural minsan po ba nakakalimutan nyo pano gawin yon

Case 06: Like baking , syempre kelangan may recipe to make it perfect kasi alam mo naman baking kelangan perfect yon, sabi mommy diba ilang beses ka na nagluto nyan oo pero kailangan may recipe parin

MR: Ano pa po yung mga nakakalimutan nyo po na lagi nyong ginagawa

Case 06: Ah hindi na kase pag iba na nagluluto magluto ako ng ulam may taga tikim ako pag tikim ko tama lang sakin pakatikim nga pag tama lang sa inyo kase nagiiba nadin taste ng matatanda, eto mommy kulang. Syempre pag baking kailangan talaga naka recipe ako

PD: Ay kunwari po sa iang bagay, alam nyo po ba kunwari kung ano mali or kelangan itama. Kunwari po may papakita po na kunwari po sa bahay nakikita nyo po ba kunwari

po na misplaced po yung remote sa tv sa ibang lugar naalala nyo po ba or bat nandito ito or hindi nyo na po ba napapansin

Case 06: Napapansin ko yan tapos mga anak ko kase mommy mga ganyan ganyan. Kase kelangan mo din sense of balance sa loob ng bahay. Kung ganyan din o sige na nga ganyan tama

PD: Binabago po ba nila or sa tingin nyo po nabago

Case 06: Kung binago napapansin ko

MR: Pag hindi naman po

Case 06: Hindi

PD: Kase po sa lola ko po yung tinapon po ng papa ko po yung kabinet puno ng abubot. Tapos...

Case 06: Kase ako rin mahilig rin ako mangolekta kaya tawag sakin ng mga anak ko horder. Hindi kasi ang generation namin mahilig mag reuse recycle at everything kase sa panahon namin ang everything ay expensive kaya ipon ng ipon, kaya di tulad ngayon ang lahat ay disposable pati ultimo lagayan ng kapi, ginagamit namin yan katulad sa lola mo

PD: Tinapon ng papa ko buong kabinet pagpasok nya nandon ulit ang kabinet pinasok ulit ng lola ko hahaha

Case 06: Dapat kasi sabihan ang lola, nay itapon na natin ganyan

MR: Ayaw po kase ng ganyan kala po ng papa ko makakalimutan ng lola ko e hindi nakalimutan sabi nya bat nandito yung cabinet ulit

MR: Thankyou po ulit yun nalang po salamat po

Case 06: Okay enjoy ba?

PD: Opo hahaha.

APPENDIX G

EVIDENCE OF DATA COLLECTION

A. Letter of Intent

Jose Rizal University

80 Shaw Blvd. Mandaluyong City

Date: March 23, 2022

Sir Luisito E. Espinosa

Senior Citizen Integrated

Center Brgy. Addition Hills

Dear Sir Espinosa,

We are 3rd-year students from Jose Rizal University currently taking up Bachelor of Science in Information Technology. We want to ask your good office for permission to allow us to conduct research for our study entitled "**SYNAPSE: A MEMORY SUPPORT APP WITH WEARABLE TECHNOLOGY FOR SENIOR CITIZENS**" in partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology.

In connection with this, we would like to ask the respective seniors of the Mandaluyong office to provide the necessary data for our study. We will provide the questionnaires and conduct an interview. Rest assured that the data we gather will remain absolutely confidential, anonymous, and only be used for academic purposes.

We believe that this good organization is with us in our enthusiasm to help the respective senior citizens and carers and finish the requirement as compliance for our subject. We would appreciate your assistance and support in this research endeavor.

Thank You.

Yours sincerely,

The Researchers

De Leon, Paulo

Marquez, Jennifer C.

Martinez, Rikki Mae M.

Rario, Marianne C.

Noted by:

Dr. Ryan A. Ebardo

Technical Adviser, CSE

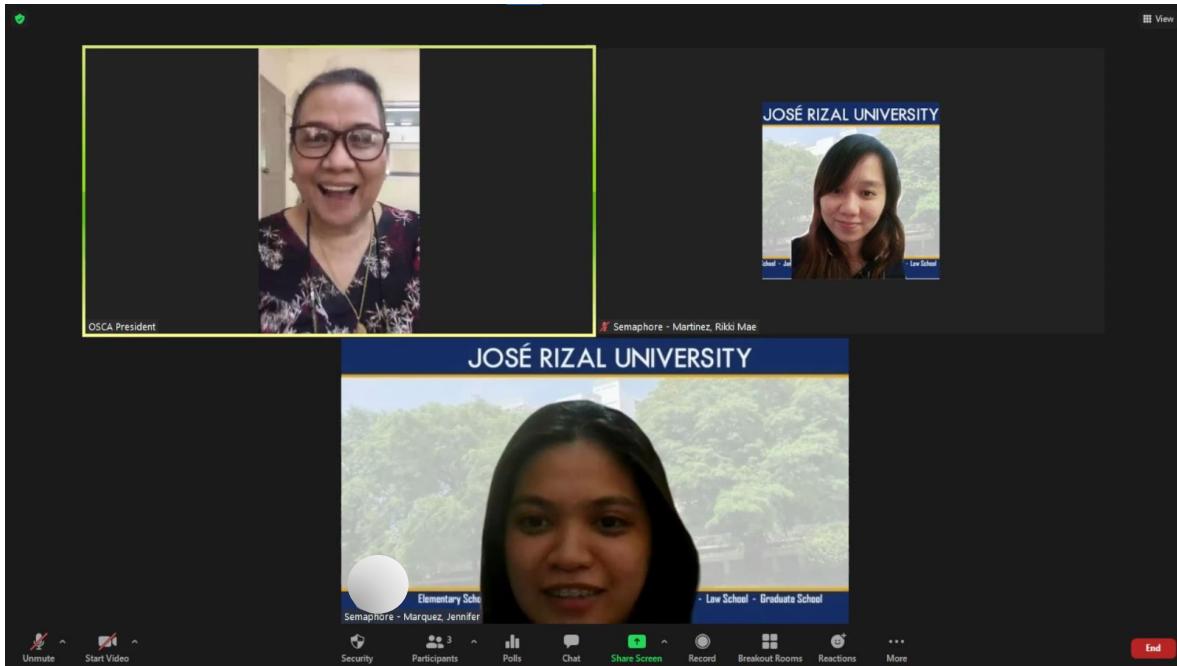
Dr. Emerson C. Flores

Subject Adviser, CSE

Approved by:

CREUZA M. LANTH

B. Interview through zoom



Screenshot #01



Screenshot #02

SCREENSHOTS OF GROUPMATES DURING THE MEETINGS



Screenshot #01



Screenshot #02

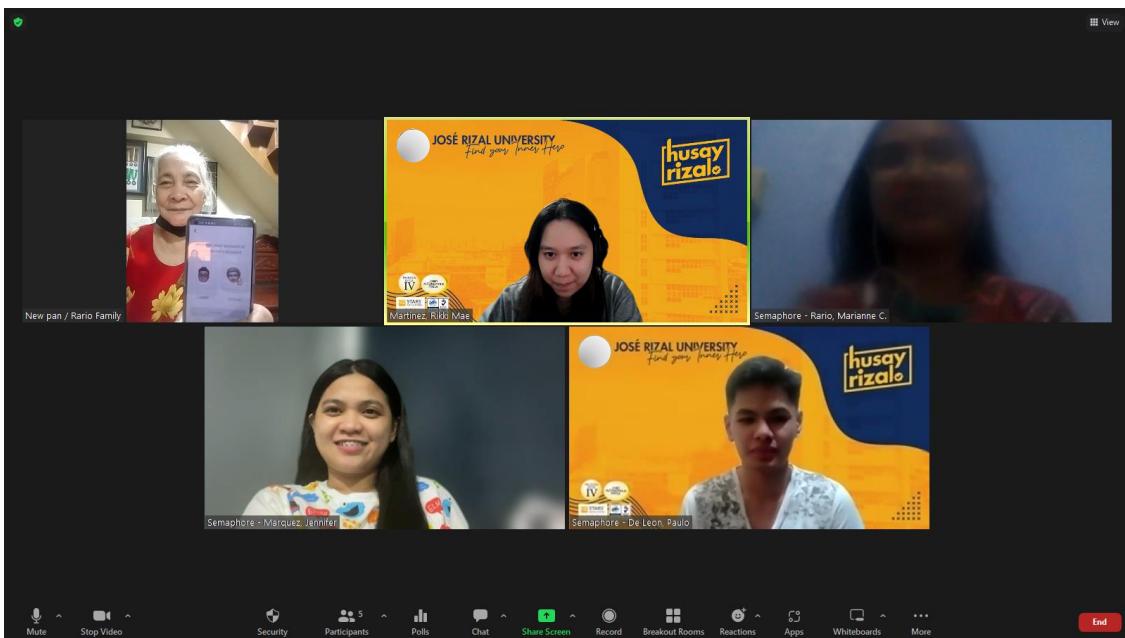


Screenshot #03

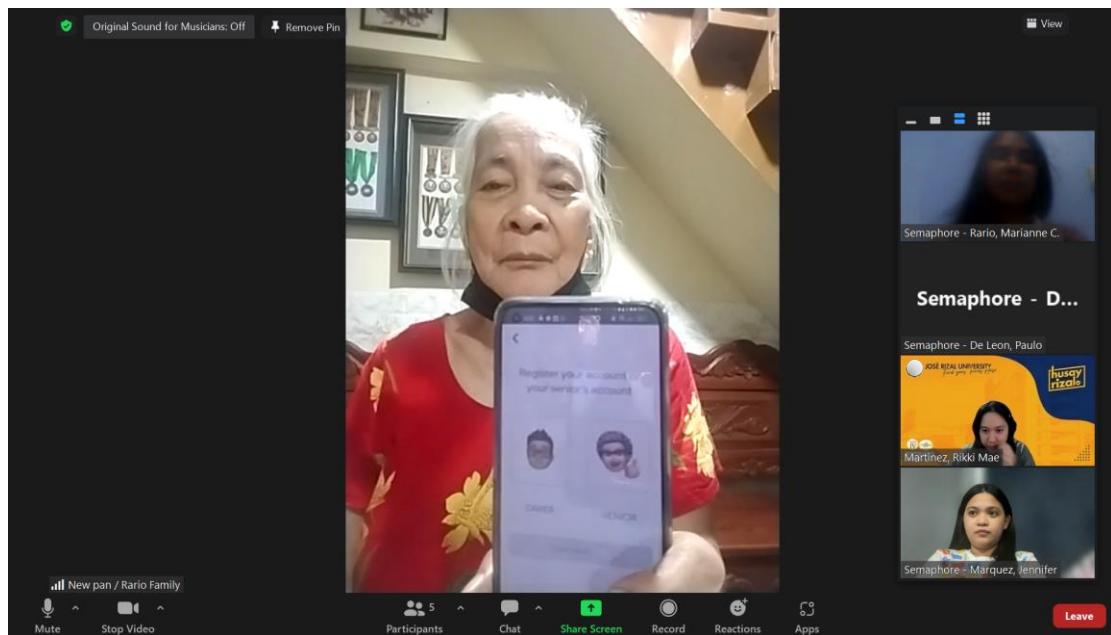


Screenshot #04

SCREENSHOTS OF BETA AND ALPHA TESTING



Screenshot #05



Screenshot #06



Screenshot #07



Screenshot #08



Screenshot #09

ACKNOWLEDGEMENT

This research is our work of art. The result of our perseverance in obtaining and analyzing the variables and data that were acquired. This would serve as a representation of our knowledge, skills, and abilities that were honed and developed at José Rizal University.

This Capstone project would not have been possible without the guidance and help of several individuals who, in one way or another, contributed and extended their valuable assistance in the preparation and completion of this study.

It is our utmost gratitude to our dear almighty **God** for blessing us with enough strength and optimism during the conduct of this study. With God's guidance, we are led to different people who made significant contributions to completing this research.

To our Technical Adviser, **Dr. Ryan A. Ebardo**, we are thankful for his patience, kindness, and understanding. Even though we are often always late in zoom meetings and submitting our paperwork for his evaluation, he still did not complain. With his kindness in the way he made comments, we were able to feel respected and cared for by him. With his generosity in guiding us in our research endeavor, we were able to achieve the objective of our study. The developers also wish to thank **Dr. Emerson C. Flores**, who served as the Subject Adviser and guided the development of the system, as well as the Panelists **Dr. Rodolfo C. Raga**, **Prof. Virginia B. Loyola**, and **Prof. Jyr Marie V. Reyes** who provided suggestions for improvement.

To the **Presidents and senior members of the Office for Senior Citizens Affairs Mandaluyong (OSCA)** for their trust and friendly treatment that we experienced during the data gathering.

Dedication

We

Dedicate

This masterpiece

To our Family, to our Friends, to our Inspiration

And to Almighty God