

AGESTRIDE: EMPOWERING FUTURE AND CURRENT SENIORS THROUGH AR FITNESS ADVENTURES THROUGH GEOLOCATION WELLNESS TRACKING

STATEMENT OF RESEARCH PROJECT

Background:

By 2030, 1 in 4 Singaporeans will be above 65 (Ministry of Health, 2016). Part of the strategy in promoting successful ageing is motivating future and current seniors to become more physically active. Engaging in physical activity brings about many health benefits, such as improved physical, cognitive, and psychological outcomes, slow the onset of age-related physical functions, reduce fall risk and cardiac and metabolic diseases, bring about better mental well-being, and to live longer (Lin, 2020; Ng et al., 2020). Currently there are several national initiatives that leverage digital technologies to motivate physical activity among older adults. First, the Healthy 365 mobile app was launched to encourage users to adopt a healthy lifestyle through logging step counts and exercise (Health Promotion Board, 2022). Second, the National Steps Challenge is a nation-wide public health intervention initiated in 2015 to improve population-level physical activity through interventions such as the use of fitness trackers, redeemable rewards, and gamification to motivate individuals to take 10,000 steps daily (Chew et al., 2021).

While there are some successes in motivating physical activity among the general public, there remains key challenges. First, according to the 2020 National Population Health Survey, the lowest proportion of adults that exercise regularly were seniors aged 60 to 74, while the highest was young adults aged 18 to 29 that made up of 41.2% of the sample (Ministry of Health, 2020). Second, in a separate survey of 2,558 seniors in Marine Parade, the data showed that while many were healthy enough to live independently, many suffered a fall in the preceding 12 months, with half of the participants above 60 indicating that they did not exercise. Also, about 400 seniors showed signs of depression and dementia (SingHealth, 2021). Finally, while national initiatives such as the National Steps Challenge achieved success in having a sizeable participation, research evaluating its impact has shown that the senior population were underrepresented (Yao et al., 2022).

Objective and Research Questions:

This research aims to develop a sustainable community engaged digital health technologies ecosystem, by bringing together and building capacity among stakeholders such as senior centres, community partners, health coaches, as well as future and current seniors (aged 50 and above) and their peers, in leveraging mobile health technologies and games to improve physical health and mental well-being.

This research aims to address the overarching research question (RQ):

RQ1: What are the motivations and barriers to mobile health adoption among future and current seniors and how to leverage them for active ageing?

RQ2: What are the perceptions and attitudes toward the use of AR games in mobile apps to improve seniors' physical health and mental well-being?

RQ3: How can one build AR gaming in mobile health apps in an inclusive manner to motivate seniors to embrace active ageing?

RQ4: How efficacious are AR mobile health gaming in improving seniors' physical health and mental well-being?

SCOPE OF WORK FOR SELECTED PHD STUDENTTheoretical Framework: Communication inequality

To guide this research, we would draw from the theoretical framework of communication inequality. Communication inequality postulates that there are differences in the generation, manipulation, and distribution of information among social groups; and differences in (a) access and use, (b) attention, (c) retention, and (d) capacity to act on relevant information among individuals, resulting in widening health disparities (Viswanath & Emmons, 2009). The framework identifies several key factors that influence successful use of digital media technologies and how they eventually translate to health behaviors. At the fundamental level, social determinants—defined as individuals' socioeconomic status as determined by their level of education, income, employment, and their built environment play a huge role in the type of media they use and consume. For instance, people with low income living in poorer neighbourhoods are less likely to purchase health apps and wearables that are costly.

However, the framework of communication inequality also highlights certain modifiable conditions that could improve health apps and wearables adoption among seniors. For instance, researchers could examine and change some of these conditions such as: (a) external factors such the design and usability of health apps/wearables, as well as support from government and non-profit and for-profit organizations; (b) social norms (e.g., how many close friends and family members are using health apps and wearables, and (c) individual level factors (e.g., attitude and perception of health apps and wearables, trust in privacy) to improve health apps and wearables use. Once individuals successfully adopt the use of mobile health apps, it would motivate health communication outcomes such as seeking and processing of health information. Over time, this would translate to improvements in health outcomes such as better physical and mental health.

Research Plan:

The student is expected to produce three studies for the PhD. The first study is a systematic review of the impact of mobile health apps, particularly those leveraging AR technologies, in impacting seniors' physical and mental health. The second study revolves around developing a senior friendly mobile health AR app with geolocation tracking that would motivate seniors to exercise in outdoor settings while engaging in game play. Dr. Francis Lee would provide the technical expertise in advising this study. Finally, in the third study, the student would implement the AR health app among a select sample of seniors using a field experiment, and evaluate its efficacy in improving physical and mental health.

In line with the 3 studies the student is expected to produce for the PhD, the scope of work would involve:

Study 1: Systematic Review of AR health apps

- Examine the existing landscape of digital health apps in accordance to PRISMA

Study 2: Developing AR mobile health app

- The student will leverage the main supervisor (Dr. Edmund Lee)'s existing technology called SingaporeWALK app, which has been developed to track seniors physical health, mental health, and nutrition.
- The student will conduct usability tests, co-creation workshops with stakeholders to identify how AR gaming could be incorporated
- The student will develop 2 AR games to improve seniors' physical and mental health

Study 3: AR Mobile health app evaluation

- The student will conduct a field experiment by recruiting seniors to engage in AR game play
- The student will develop different research conditions based on the theoretical conceptualization, and evaluate how efficacious the app is in improving physical and mental health