

## TEAM KIWI

### **Project Abstract:**

We will be focusing on the topic of senior/elderly technology education, including spam prevention. From the studies below, we learned that older adults are more susceptible to internet fraud and financial abuse due to a decline in cognitive function and other factors such as trust traits, social loneliness, and mental health. The decision-making process needed to avoid and resist internet fraud requires complex cognitive functions that decline disproportionately among older adults. Therefore, older adults need specialized research attention to inform specific prevention strategies, given the unique set of age-associated fraud-scam vulnerabilities and tailored fraud-scam schemes affecting them.

Additionally, studies have shown that older adults use mobile phones primarily for communication and safety purposes, such as staying in touch with family and friends and calling for help in an emergency. They perceived both benefits and drawbacks of mobile phone use, with benefits including increased social connectedness and drawbacks including frustration with complex or unfamiliar technology.

Furthermore, using machine learning to categorize web pages based on their complexity can help designers create web pages that are more accessible and user-friendly for older adults.

Comparatively, there are various organizations and services available to support older adults in technology education and spam prevention, including the National Center on Elder Abuse, OATS, and Life's Genie. However, each has its pros and cons, such as the accessibility of resources and services, the level of education provided, and the cost.

### **Literature Review:**

#### [“The psychology of the internet fraud victimization of older adults: A systematic review”](#)

This paper conducts a systematic review on the psychology of internet fraud victimization of older adults. Researchers claim that a decline in cognitive function is the main factor, among other factors such as trust traits, social loneliness, and mental health, for older adults being more susceptible to these frauds.

#### [“Prevalence of Financial Fraud and Scams Among Older Adults in the United States: A Systematic Review and Meta-Analysis”](#)

This paper claims that the decision-making process needed to avoid and resist internet fraud requires complex cognitive functions that decline disproportionately among older adults. The paper suggests that this subpopulation requires specialized research attention to inform specific prevention strategies, given the unique set of age-associated fraud-scam vulnerabilities and tailored fraud-scam schemes affecting older adults.

### [“Protecting Your Loved Ones from Elder Financial Fraud”](#)

This blog post contains an in-depth guide for the elderly on how to detect, navigate, and guard against the most commonly found types of internet fraud and financial abuse. It also has resources for more information and reporting suspicious activities.

### [“Older People and the Use of Mobile Phones: An Interview Study”](#)

The authors interviewed 20 older adults aged 65-95 years old about their experiences with mobile phones, including their reasons for using or not using mobile phones, their perceived benefits and drawbacks of mobile phone use, and their suggestions for improving mobile phone design for older adults. The study found that older adults use mobile phones primarily for communication and safety purposes, such as staying in touch with family and friends and calling for help in an emergency. The authors also found that older adults perceived both benefits and drawbacks of mobile phone use, with benefits including increased social connectedness and drawbacks including frustration with complex or unfamiliar technology.

### [“HCI for Elderly, Measuring Visual Complexity of Webpages Based on Machine Learning”](#)

This paper practiced using ML to categories web pages based on their complexity to help programmers make pages more accessible to the elderly. The study collected data from 200 webpages and used a machine learning algorithm to analyze the visual complexity of the pages. The algorithm evaluated the pages based on several factors, including color contrast, text size, and the number of images and links on the page. The results of the study showed that the algorithm was effective in accurately measuring the visual complexity of web pages for elderly users. The authors suggest that this approach could be used to help designers create web pages that are more accessible and user-friendly for older adults.

### [“Understanding Older Adult’s Technology Adoption and Withdrawal for Elderly Care and Education: Mixed Method Analysis from National Survey”](#)

This student focused on participants aged 50 years and older in Taiwan. They found that participants picked up Internet usage to meet needs, that those with positive associations with the Internet have increased employment opportunities. While this paper did not find concrete strategies, it concludes that health educators ought to understand strategies to encourage older adults to keep learning, which is an important component of active aging.

### [“Overcoming the digital divide with a modern approach to learning digital skills for the elderly adults”](#)

We are seeing a sharp digital divide, and older adults are finding it difficult to use digital devices and often lack the basic digital literacy to be able to use these multimedia interactive devices. They tested a form of training with game playing on tablets because of appeal, entertainment, and ease of learning. It is easier for an elderly learner to learn on an easier and more familiar

device. They found that more attention needed to be dedicated to a training session with facilitators trained & prepared to work with the elderly, and more research is needed to improve older learners' confidence & preconceived notions (risky and complicated).

#### "Elderly Care and Digital Services: Toward a Sustainable Sociotechnical Transition"

The elderly care system's sustainability is one of the largest societal challenges of our time. Digitalization and the implementation of technologies in elderly care are viewed as offering possible solutions to the social and economic challenges of sustainability. This study's objective is to examine the development, implementation, and diffusion of technologies in elderly care from a sociotechnical perspective, leaning on the concepts of sociotechnical transitions. The focus mainly is on sustainable niche development, including interactions between niches and regimes in terms of sustainable sociotechnical transitions, how niches are developed in relation to sustainability, and in which conditions and circumstances promising niches can contribute to regime change in elderly care.

#### "A theoretical model to explain the smart technology adoption behaviors of elder consumers"

A growing global population of older adults is potential consumers of a category of products referred to as smart technologies, but also known as telehealth, telecare, information and communication technologies, robotics, and gerontechnology. This paper constructs a theoretical model to explain whether older people will adopt smart technology options to cope with their discrepant individual or environmental circumstances, thereby enabling them to age in place.

#### "Wearable device adoption among older adults: A mixed-methods study "

Recently, the popularity of smart wearable technologies, such as Fitbit, has significantly increased. There are numerous potential benefits in using these devices, especially among seniors. Yet, little is known about seniors' adoption behavior. Through a mixed-methods approach, this study investigates the factors that impact seniors' intention to use wearable devices. Results from an online survey and interviews showed that seniors' perception of the complexity of working with these devices is a barrier to their adoption decisions.

#### **Comparative Review:**

##### National Center on Elder Abuse

Pros:

- Large scale national organization
- Large amount of resources, support, and information

Cons:

- Not a "product", so not as accessible as something in the form of an app (web/mobile/etc)
- Homepage website may be hard to navigate for elderly
- Not for reporting suspected fraud/scams

### OATS - Older Adults Technology Services

#### Pros:

- The organization offers a variety of programs and services, including training classes, workshops, and individualized coaching, which can be tailored to the specific needs of each individual
- They offer virtual and in person programs

#### Cons:

- Only a class format. Users attend a class, during a time, on a specific topic
- More about helping seniors work with preexisting tech, not a new product that is different and specialized for elderly HCI

### Genie

#### Pros:

- Can take away the need for seniors to worry about telephone scammers
- Gives users more peace a quiet

#### Cons:

- Costs money
- Avoid education and instead uses a generative assistant to handle the difficult parts (weighs avoidance of issues over education about

### Senior Planet

#### Pros:

- Provides a community of older adults through a social platform where they can connect and share information with each other
- Offers both online and in-person classes for navigating not only tech, but also other relevant life skills such as fitness and mental health management

#### Cons:

- Not specifically catered toward prevention of fraud online or digital literacy in general

### Net Literacy

#### Pros:

- This youth-run non-profit organization runs computer and Internet literacy programs for senior citizens and has significantly increased computer access and literacy for them
- Run by thousands of student volunteers, so it is quite a large scale operation
- Programs has donated more than 44,000 computers impacting more than 250,000 individuals

#### Cons:

- The programs entail student volunteers going into physical locations (e.g. senior centers, retirement apartments) to build computer labs and teach them literacy skills — this means

that this program is only accessible to the seniors living in the specific places chosen by the program

- Offers online lesson plans for the basics of navigating the internet and using a computer, but not much more complex than that — doesn't offer online resources for scam/fraud detection

### [Eldercare Locator](#)

Pros:

- Large scale national organization with branches on support, housing, rights, insurance, health, transportation. Connects you to local organizations

Cons:

- Only available for those who can navigate the website/call during hours of operation. Local organizations require even more labor to research and contact

### [National Do Not Call Registry](#)

Pros:

- Prevents telephone scams by preventing telemarketing calls to home and cell phone numbers

Cons:

- Unable to block other types of organizations (charities, political groups, debt collectors, etc.)
- Limited to phone contact
- 90% of perpetrators are people the victims know and trust, so this would not prevent "trusted" individuals

### [EverSafe](#), [LifeLock](#) (Suspicious activity detection tech tools)

Pros:

- Can detect suspicious activity (Notification to you and an advocate). Offers educational support in recoupling losses. Sometimes reimbursement of lawyer fees in the case of falling victim to fraud
  - Eversafe: age-friendly, supports guardians, powers of attorney, conservators, and trusts

Cons:

- No medical identity theft protection. Monthly subscription cost

### [Power of Attorney](#)

Pros:

- This is a legal route that is customizable based on your needs to provide legal protection (can get free/low-cost assistance). Can share the burden with a (hopefully) trusted individual

Cons:

- Workload is limited to one to two people that you need to entrust. Requires a lawyer and resources. Private information is now available to others

### Wearable devices

Pros:

- Allow users to track and monitor physical activity, nutrition, health record.
- For older adults, being able to continue independent living is an important and critical issue. Wearable devices have the potential to help and support older adults' autonomy and improve the quality of their life by encouraging them to maintain a healthy lifestyle.

Cons:

- Wearable devices have perceived complexity.
- Cost is high.
- Issues of privacy, security, and trustworthiness exist.

## **Other Comparators Sourced Using ChatGPT**

Educational Material:

1. [AARP](#):

- Pros: Provides a wide range of educational resources and support for older adults, covers various topics relevant to older adults, has a strong reputation for serving the senior community.
- Cons: Some educational resources may be limited to members only, may not offer as comprehensive technology education as other competitors.

2. [SeniorNet](#):

- Pros: Provides technology training and education specifically for older adults, offers classes and workshops in-person and online, has a strong focus on community building.
- Cons: May have limited reach or availability in certain locations, may not have as many resources on non-technology topics.

3. [National Council on Aging \(NCOA\)](#):

- Pros: Provides a wide range of educational resources and support for older adults, covers various topics relevant to older adults, has a strong reputation for serving the senior community.
- Cons: Some educational resources may be limited to members only, may not offer as comprehensive technology education as other competitors.

4. [Senior Planet](#):

- Pros: Provides technology education and resources specifically for older adults, offers classes and workshops online and in-person, has a strong focus on building community through online forums and events.

- Cons: May have limited availability in certain locations, may not have as many resources on non-technology topics.
5. [TechBoomers](#):
- Pros: Provides free and easy-to-understand tutorials on popular websites and apps, designed specifically for older adults with low-technology literacy, covers a wide range of topics.
  - Cons: May not offer as comprehensive technology education as other competitors, may not have as many resources on non-technology topics.

#### Fraud Detection:

1. [FraudLabs Pro](#):
  - Pros: Customizable rules and machine learning algorithms, supports various industries.
  - Cons: Limited features compared to other competitors, may not be suitable for large-scale businesses.
2. [Kount](#):
  - Pros: Real-time fraud detection, device fingerprinting, offers chargeback prevention.
  - Cons: Higher pricing compared to some other competitors, complex integration process.
3. [Sift Science](#):
  - Pros: Behavioral analytics and machine learning algorithms, offers account takeover prevention, and payment fraud prevention.
  - Cons: Expensive pricing, complex integration process.
4. [IBM Trusteer](#):
  - Pros: Advanced analytics and machine learning, offers malware detection and transaction risk analysis.
  - Cons: Higher pricing, may not be suitable for small businesses.
5. [RSA Fraud & Risk Intelligence Suite](#):
  - Pros: Behavioral analytics and machine learning, offers fraud investigation, and risk scoring.
  - Cons: Complex integration process, higher pricing.

These competitors are able to detect online fraud, they are not suitable for individuals with low tech-literacy, and some even are not suitable for individuals.

#### Expert Interview Plan:

For our interview, we have reached out to Professor Cynthia Lee. She is a Senior Lecturer in the CS Department at Stanford. Professor Lee has extensive research experience in teaching and peer instruction. Our group will be focused on Senior Education and their use of technology. It would be valuable for us to speak with experts who have developed courses and methods of instruction.

Professor Lee has expressed the desire to limit the harm that AI may cause the elderly, specifically in the form of financial fraud. It would benefit us to speak with her and learn how best to use foundation models within our senior education plan. Interview time is TBD, but the initial email has been sent as of 7 April 2023.

We have also reached out to Andrea Cuadra who is a postdoc in HCI at Stanford. Andrea has spent a lot of her efforts focusing on the needs and preferences of older adults, while also identifying ways to represent the needs and preferences of those that are part of marginalized communities. Interview time is TBD, initial email sent on 4/8/2023 but likely to meet before/after class this week.