

## User and Developer Perspectives of Technology Enabled Care

### Initial Findings from Public and Patient Involvement (PPI) and Expert Panel Workshop Studies

Derek Ross

Lero SFI Research Centre for Software  
University of Limerick  
Limerick, Ireland  
Email: derek.ross@ul.ie

Gobe Leinaeng Mphusu

University of Limerick  
Limerick, Ireland  
Email: 23296224@studentmail.ul.ie

Deepa Narasimha

University of Limerick  
Limerick, Ireland  
Email: 23138831@studentmail.ul.ie

Kevin Moore

Ei Electronics  
Shannon, Ireland  
Email: Kevin.Moore@eielectronics.ie

Ann-Marie Morrissey

Ageing Research Centre  
Health Research Institute  
School of Allied Health  
University of Limerick  
Limerick, Ireland  
Email: Annmarie.morrissey@ul.ie

Ita Richardson

Lero SFI Research Centre for Software  
Ageing Research Centre  
Health Research Institute  
University of Limerick  
Limerick, Ireland  
Email: Ita.richardson@ul.ie

Katie Crowley

Lero SFI Research Centre for Software  
Health Research Institute  
University of Limerick  
Limerick, Ireland  
Email: Katie.crowley@ul.ie

**Abstract**—Technology Enabled Care (TEC) products and services are expected to be increasingly used by an ageing global population. TEC has the potential to enhance the health and lives of older people. However, factors affecting their acceptance, adoption, and use need to be understood. Two models, the Technology Acceptance Model (TAM) and Health Information Technology Acceptance Model (HITAM) can help to identify acceptance, adoption and use factors. For the current research, two qualitative workshop studies with a Public and Patient Involvement (PPI) panel (N=20), and a TEC Expert group (N=18) were undertaken to identify these factors. The workshops revealed several key issues of importance to the PPI and TEC workshop respondents. These include privacy, costs, and usability of TEC. The use of TAM and HITAM in the workshops proved useful to identifying factors affecting the acceptance, adoption and use TEC by older people.

**Keywords** - *Technology Enabled Care; Public and Patient Involvement; Acceptance; Adoption; Use.*

#### I. INTRODUCTION

Global population ageing is expected to result in an increase in health and related conditions that are associated with age [1]. In order to meet increasing health needs, innovative products and services will be required. Technology Enabled Care (TEC) has the potential to transform the health, well-being and lived experiences of older people. For people living with chronic health conditions and related health risks,

health technologies, such as TEC, have the potential to enable continued independent living with minimally invasive or disruptive monitoring and intervention. While healthcare service users are the primary users of TEC, user groups can extend to formal and informal care providers. These secondary users can also benefit from TEC by knowing when and how to provide appropriate care and support. TEC can be used for health monitoring, to support ageing in place, and for prophylactic purposes [2]. Therefore, TEC can provide peace of mind for the various users and stakeholders in a digital health connected system. This suggests a win-win situation whereby TEC can enable people to live better lives into their older age while institutions responsible for care will be better placed to manage the resources required to provide services to older people. Yet, health technology developers and service providers need to be aware of factors that can affect the performance, acceptance and use of the TEC solutions they offer [3][4]. TEC capabilities and limitations need to be well understood to optimise design, development and application in practice. This is the focus of the current research.

Having introduced the rationale for and focus of the current research in Section I, Section II provides an overview of key literature on TEC factors that can affect its acceptance, adoption and use. Following this, Section III states the Research Questions addressed in the empirical work undertaken. Section IV defines the methodology for this research. Sections V and VI describe the context, participants, procedures and findings of the two studies undertaken for this

research. In Section VII, the findings are discussed vis-à-vis the literature. Finally, in Section VIII, conclusions drawn and future research proposed.

## II. THE LITERATURE ON TECHNOLOGY ENABLED CARE

The literature on TEC has identified key factors concerning the needs of older people including the provision of healthcare, and the potential for TEC to adequately address these needs.

Two important theoretical contributions to TEC are the Technology Acceptance Model (TAM) [3] and Health Information Technology Acceptance Model (HITAM) [4]. Both TAM and HITAM highlight important factors that underpin acceptance and adoption of TEC. According to TAM, two key factors influence an individuals' willingness to adopt technology: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) [3]. An extension of TAM, the Patient Technology Acceptance Model focuses on technology acceptance within healthcare settings and incorporates factors including perceived health threats and patient physician relationships. More recently, HITAM has become increasingly recognised as a useful framework [4] for TEC. Unlike TAM, HITAM considers health related aspects, such as health status, beliefs and health information literacy. It has been posited as a valuable framework for studying how older adults embrace technologies that provide health information or aid in making health related decisions [5]. Both TAM and HITAM offer the potential to better understand factors that are key to achieving acceptance and adoption of TEC. In addition, perceived necessity, ease of use and social influences such as the perspective of care providers and peers can help foster positive attitudes and inform older adults' likelihood of acceptance and adoption of TEC [6]-[9].

Although models such as TAM and HITAM offer insights into the factors influencing the acceptance of technology, they may not fully grasp the experiences and requirements of TEC for older adults. The ways in which TEC may impact adults' health, continued independence [10] and overall quality of life need to be addressed [11]. Issues of trust in technology, privacy and the fear of losing independence are significant concerns for TEC use. There may also be organisational and financial obstacles, as well as ethical issues to be considered [12][13]. The preferences of potential TEC users should be considered along with satisfaction and emotional wellbeing in technology impact adoption, use and the potential of positive health outcomes [5][9].

The various issues set out in the literature affords an understanding of factors that can affect the acceptance, adoption and use of TEC by older people. Interdisciplinary insights from gerontology, technology, gerontechnology healthcare, and social sciences can offer an understanding of the complex landscape of TEC for older individuals. Careful attention needs to be paid to these if they are to realise their potential in promoting ageing in place, improving quality of life and reducing caregiver demands.

## III. RESEARCH QUESTIONS

For the current research, it was important to determine an initial understanding of preferences, concerns and functionality features of TEC. To this end, the following research questions were posed:

- What are the actual and/or perceived TEC needs of older people?
- What factors affect the acceptance, adoption and use of TEC by older people?

These were intended to establish target user group and TEC developer perceptions of what product and service features should be incorporated into the design, development and implementation of TEC. They also helped to understand of how well the assumptions of the TEC literature met the perspectives of the user and developer groups.

## IV. METHODOLOGY

### A) Research Design

The current research employed a qualitative design that elicited data from two target groups using Workshops as a method. The method is outlined below with the two studies subsequently presented which describe the participants, study specific procedures, and findings. Each study followed a similar Workshop method.

### B) Workshop Method

Workshops are a method used to problem solve and develop new knowledge about an issue of interest [14]. An important contribution of Workshops is that they facilitate genuine participation of target groups and enables researchers to elicit valid and reliable data on specific topics. They are collaborative activities where researchers facilitate the agency of participants to produce new knowledge. Workshops were integral to the research process and data elicitation for the two studies described here. Ørngreen and Levinsen [14] posit the use of Workshops in participatory design and related areas such as Human Centred Design making them particularly relevant to the studies presented below and the interdisciplinary nature of this research.

### C) Data Analysis

Data were recorded during Study 1, a Public and Patient Involvement (PPI) Workshop, as field notes by members of the research team, and from data provided by respondents using post it notes during Study 2, a TEC Expert Workshop. The field notes and written data provided by respondents were analysed following a thematic template approach [15] that was informed by the literature review and subsequent research questions.

### D) Research Ethics

Ethical approval for this research was obtained by the Ageing Research Centre (ARC) from the Research Ethics Committee (REC), University of Limerick.

## V. STUDY 1: PPI WORKSHOP

The first study undertaken as part of this research was a PPI Workshop that addressed the perceived TEC needs as well as factors that can affect the acceptance, adoption and use of TEC by older people.

### 1) *Research Context*

The PPI Workshop was designed to elicit an understanding of perceived health needs of older people, potential contributions of TEC to support these needs, and the factors that may affect uptake and use of TEC by older people.

### 2) *Participants' Information*

20 respondents participated with the PPI Workshop. They were made up of older people living in the community, some of whom have health conditions, some who do not, and others including carers. They were members of a PPI panel organised by the Ageing Research Centre (ARC) at the University of Limerick. During the PPI Workshop they were organised into four groups of four to six people.

### 3) *Procedures*

The PPI Workshop participants were asked to consider TEC products and services that older people use or envisage that they may use in the future. They were also asked to consider factors that would be likely to affect their acceptance and use of TEC products and services.

### 4) *Findings*

The PPI Workshop findings identified the following themes:

- The potential of household technologies
- Safety and Security Issues
- Health Monitoring Tools
- Psycho-social considerations of TEC tools

#### *A) The potential of household technologies*

Initially, the PPI Workshop respondents considered everyday household devices such as video doorbells, which they reported to be potentially useful as an alert system. However, they also noted that doorbell cameras are ineffective if suspected perpetrators are not close enough to them. They also discussed technologies that can be used to control household devices such as switches. Some Study 1 respondents reported that voice controlled, and voice recognition of some household functions were desirable. However, others raised concerns about their use. For example, remote controlled lights and accessibility tools were posited to have the capability of improving quality of life. Temperature control in the home was also reported to be important for comfort and safety. Others felt that they wanted to retain control and direct use of household equipment rather than relying on voice activated technologies to control them. Similarly, Alexa, and similar voice-activated technologies were considered useful and helpful by some respondents, although there was inconsistency about its capabilities and functions. In fact, other PPI respondents felt that Alexa was not always reliable, particularly for more complex tasks such as scheduling appointments.

#### *B) Safety and Security Issues*

PPI respondents then addressed the use and potential of home safety and security. For home safety, they considered smoke alarms to be essential for safety. They reported that smoke and carbon monoxide detectors need to be functional and reliable. The discussion of Study 1 respondents on home security focused on security cameras and the use of online tools. They felt that security cameras alone were not sufficient to deter incidents. They also discussed security of online banking and risks of hackers and scams. In general, they expressed concerns about the security of personal data and access controls collected from any source. There was also strong resistance to the idea of constant surveillance and tracking of people through technologies.

#### *C) Health Monitoring Tools*

Wearable devices for health monitoring and assistance were also discussed by the PPI respondents in Study 1. Respondents raised potential issues about these with concerns about privacy and feeling under surveillance. Concerns about the increasing reliance on technology for essential services like healthcare were also expressed by respondents. Regardless of their age, some respondents felt that they were not old enough to need such technologies.

Pendant alarms were acknowledged as a common health monitoring tool, which informed views on features and functions of health monitoring technologies. The use and features of wearable health monitoring technologies repeatedly flagged a number of preferences including: that they should be affordable; they should be non-invasive wearables used exclusively for health monitoring and assistance; they should not include social features (e.g., communication, data sharing) nor require daily attention such as inputting information or requiring constant interaction. The PPI respondents noted that some smart watches provide regular alerts (e.g., fall risk) and some users would want to disable these as they can cause false alerts that can result in panic among users and carers. Additional issues raised about health monitoring technologies in Study 1 included concerns that an adverse health event could occur in unmonitored locations. The PPI respondents also expressed concern about a device that might be unable to directly contact a spouse or support worker in case of emergency.

#### *D) Psycho-social considerations of Enabl TEC tools*

Several psycho-social dimensions relating to the acceptance, adoption and use of TEC tools were posited by the PPI respondents in Study 1. These include perceived and actual competence in their use with the respondents reporting that competence levels in using technology can vary greatly. A lack of understanding on how to use technology could result in a fear of it. Therefore, there was a perceived need for better training and feedback in the use of TEC. These were also reported to relate to levels of confidence in the use of TEC. Study 1 also flagged the potential of fear of technology leading to social isolation. Even for competent and confident

users of TEC, there was an expressed desire to maintain independence and not rely on technology for everything.

It was noted that older people often rely on younger individuals for tech support. In fact, PPI participants reported that technology use for people over 75 years old to be largely non-existent. Cognitive aspects were also considered in Study 1 including difficulties remembering passwords and navigating the fast pace of technological change. Related to this, it was reported that updates to devices often change the user experience, causing frustration. Psychomotor and sensory functions of older people were also raised with declines in motor skills and visibility/hearing issues as potential barriers to using TEC. One potential mitigation against this was a view that some TEC users prefer to talk to tech rather than type when using TEC tools.

## VI. STUDY 2: TEC EXPERT WORKSHOP

The second study undertaken as part of this research was a TEC Expert Workshop that addressed the perceived TEC needs as well as factors that can affect the acceptance, adoption and use of TEC by older people.

### 1) *Research Context*

Study 2 took place in the premises of a company who are exploring the potential of TEC products in social housing.

### 2) *Participants' Information*

18 respondents participated in the TEC Expert Workshop. Participants were all employees of the company.

### 3) *Procedures*

To prepare TEC Expert Workshop participants for the research activities, a series of presentations were made that outlined the topics of interest and scope of the study. The presentations included findings from the literature outlined in the Introduction. The aim of this presentation was to focus the workshop activities on TEC relevant literature. Following this, Study 2 participants were invited to take part in the workshop. The workshop used Affinity Diagrams and consisted of interactive sessions addressing questions that are discussed as part of the findings presented below.

### 4) *Findings*

The findings of the TEC Expert Workshop identified the following themes:

- Perceived TEC needs of older adults
- Design considerations for TEC
- Health and Safety at Home
- TEC Concerns

#### A) *Perceived TEC needs of older adults*

In Study 2, the TEC Expert Workshop respondents were asked to consider what needs older adults potentially have in the home. The ability to do things independently dominated as a recurrent theme. Managing one's own mobility, health and medicines management were the most frequent anticipated needs reported by the TEC Expert Group. The second most reported needs by the TEC Expert Workshop respondents were managing hygiene, daily schedules and communication. Additional needs identified in Study 2

included safety, being able to cook, and accessing and using things easily and comfortably.

### B) *Design considerations for TEC*

Design features that TEC Expert Workshop respondents felt would make older adults feel comfortable about using TEC in the home were focused on ease of use, interface design, and reliable performance. Ease of use that enabled a positive user interaction and experience were notable comments. It was suggested that simple and minimalistic design features for ease of use could include, visual aids, use of pictures, and colour coding with appropriate style and size. Clear feedback was also considered be helpful to build confidence in TEC use. Study 2 respondents reported that the technology should be ideally non-intrusive or at least minimally intrusive. They also reported a preference for TEC to be part of currently used technologies and be integrated into everyday activities. Considerations regarding reliability features included whether the technology should be on a mobile phone or not. However, help with any TEC should have readily accessible support by phone.

### C) *Health and Safety at Home*

When asked about potential safety issues in the home that would concern older adults, the TEC Expert Workshop participants reported health emergencies, accidents and resulting injuries, and security concerns as dominant issues. Health emergencies were most prevalent with falling considered to be the most common concern. Other accidents and injuries for example, house fires and burning oneself were also reported with examples of cooking or making hot drinks as possible risk factors. House and personal security issues such as burglaries and even fear when answering the door were also suggested. Being alone when experiencing any safety issue was an exacerbating aspect of each of the proposed concerns identified in Study 2.

### D) *TEC Concerns*

The TEC Expert Workshop participants were asked to provide what they considered were some of the concerns about using TEC that older adults were likely to have. Privacy and safety concerns were core concerns considered by the TEC Experts. In addition, usability, including ease of use was also reported as a key concern. Complexity, particularly difficulty understanding and navigating instructions was posited by the Study 2 respondents. A number of other factors presented by the workshop participants included: reliability of the TEC; product expense; resistance to accepting the need for TEC and embarrassment at having to use it, along with embarrassment at not understanding it; and a wish to not be a concern to family members and carers were also considered to be important issues that would affect the uptake and use of TEC by older people.

## VII. DISCUSSION

The two studies outlined above have provided contributions to knowledge on perceived use of TEC applications for older adults. Following the TAM [3] and

HITAM [4] models, the findings have identified that there is potential for technology to support health and well-being for older adults if important factors are considered.

For Study 1, the Public and Patient Involvement (PPI) workshop respondents reported several very specific issues. These are summarised below. Following the summary of findings a discussion of four topics, the PU, PEOU of TEC [3] privacy concerns and preferences about the use of TEC.

For the PPI Workshop respondents in Study 1, several very specific issues were noted. When considering everyday use of technologies such as camera doorbells, household device control (e.g., lights) and heating technologies that offered improved quality of life, convenience, reliability and comfort were notable preferences. However, regardless of the nature of the device, Study 1 respondents were clear that they wanted to retain control over the use of their households [10]. For home security and safety, reliable functioning (e.g., smoke alarms), quality of features such as security cameras, perceived risks of hacking (e.g., online banking), and passive surveillance stood out as concerns [5]. Health monitoring technologies raised several key issues. These included concerns for privacy and discomfort about wearable health technologies that could lead to constant surveillance. Other notable issues raised about wearable health technologies in Study 1 included cost concerns, potential invasiveness (i.e., privacy), and questions about their reliability if something should go wrong [12][13]. The PPI Workshop respondents in Study 1 were also adamant that health monitoring technologies should be easy to use and require low levels of maintenance and interaction (i.e., active use) [16]. They also considered that any data collected by TEC should be only what is necessary and there should be no social features as opposed to movement tracking devised for fitness. The PPI Workshop respondents in Study 1 also discussed issues about their perceived competence, related anxieties and their functional capacities to use TEC. They reported that competence in the use of TEC would be likely to affect the confidence of users, so adequate training and support was essential to ensure that people did not reject TEC due to anxiety or fear of its use [16]. Study 1 respondents also noted potential challenges of remembering passwords, adjusting to updated functions and displays, and motor (e.g., dexterity) and sensory (e.g., vision and hearing) limitations that could affect user experience of TEC. They offered potential mitigating features such as talk over type as ways of addressing some of the posited challenges.

One of the dominant aspects of the PPI Workshop in Study 1 was focused on factors affecting PU and PEOU in TEC. Many of the respondents recognised the potential benefits of technology for managing their health. These included an appreciation of tools such as Electrocardiography (ECG) monitors in wrist-watches which they were very happy about. PPI Workshop respondents expressed concern about the risk of falls [17] coupled with a lack of safety features in homes, particularly in bathrooms and on stairs. However, wearable devices for fall detection received mixed reviews. Some

respondents found them helpful, but one respondent reported that they had abandoned them after negative experiences (e.g., false falling alert when walking fast or placing something down with force). Other respondents felt they did not need to wear one. Participants also expressed concerns about the potential for adverse medication incidents with polydrug use. They suggested that medication management technologies and tools for checking drug interactions, and flagging allergies upon prescription could be beneficial. The PPI panel also considered that apps or devices that promote mindfulness, encourage attentive walking, and help with minor medical care (e.g., treating bruises or cuts) would be useful. They also talked about having faith that Artificial Intelligence (AI) could solve the issue of prescriptions.

The PPI workshop discussion involved a mix of anticipation and apprehension about TEC among older adults. TEC was considered to be potentially helpful especially if it works in the background and doesn't intrude on daily life. In fact, the PPI workshop panel devoted a considerable amount of time to discussing seemingly pervasive concerns among the older adults regarding the intrusiveness of technology [10]. These concerns centred around the uncertainty of how collected information could be used or where it might go. However, the PPI participants emphasised that with a proper introduction to technology to help understand its benefits, affordability, and the availability of continuous training, help prompts, or customer support, barriers to entry could be reduced. The panel talked about the importance of educating older adults on using technology effectively, suggesting that clear explanations and support on how to use TEC could enhance adoption rates [16]. They also stressed the importance of maintaining an open mind towards new technologies, as the upcoming generations are expected to be more tech-savvy. From this it can be submitted that the focus of TEC products and services should be on user-friendly technology that addresses safety concerns without sacrificing privacy or independence [5][10].

The main home TEC needs of older adults identified by the TEC Expert respondents in Study 2 focused on quality of life issues [11] that would enable continued independence while managing mobility, health and medicines and remaining safe at home. Independence focused on Activities of Daily Living (ADLs) such as hygiene, personal care, nutrition and managing daily schedules and appointments. Design feature priorities of TEC were reported by the Expert respondents as requiring ease of use to enable positive interactions with TEC. Confidence building features were also considered to be important to encourage TEC use. It was also reported that TEC should be non-intrusive, reliable with support available, and that the functions and features of TEC should match the expectations of normal everyday activities. These design features could enable enhanced PU and PEOU among older people. Beyond design features, the TEC Experts reported on health and safety at home with health emergencies, falling and other accidents and injuries, being of key concern. Home safety and particularly fire risks were

also highlighted. Similarly, home security such as burglaries were noted. Concerns about being alone should a health, safety or security incident occur were highlighted too. In Study 2, the discussion continued to examine TEC concerns. These focused on privacy, complexity and ease of use, reliability of technology, costs associated with TEC products and services [5]-[13]. Resistance to accepting the need for TEC, embarrassment around its use, and not wanting to concern carers were also commonly reported.

The TEC Expert Workshop respondents did not offer the same level of detail as the PPI Workshop panel. However, the comments and responses largely echoed the issues raised in each workshop and aligned with TAM [3] and HITAM [4]. In fact, for both groups the principal factors that could affect the acceptance, adoption and continued use of TEC were privacy concerns, cost of products and services, and ease of use [5]. These key issues and others raised by the PPI panel and TEC Experts will inform the next phase of our research.

While the findings above demonstrate progression in knowledge and understanding of TEC by user groups and expert developers following TAM [3] and HITAM [4] models, it is worthy to note methodological features of this research that may have affected our findings. It is evident that the TEC Expert Workshop participants were briefed on the findings from the literature review. Naturally, this approach could prime and bias TEC Experts' responses. However, this is not considered as problematic for the current research. Progress towards practical outcomes in action research was facilitated by continually advancing the discussion within and between research participants. This enabled knowledge to be developed and refined in a structured way. The dialogical nature of each of the workshops supported the active and genuine participation of the PPI and TEC Expert groups. The workshops were collaborative and facilitated the agency of participants who provided new knowledge [14].

#### VIII. CONCLUSIONS AND FUTURE WORK

The research set out to identify factors important to the acceptance, adoption and use of TEC for older people. Two workshops, a PPI Workshop and a TEC Expert Workshop, were undertaken to identify relevant factors. The findings were in line with the literature supporting the view that TAM and HITAM are dependent on PU and PEOU. Additional issues such as privacy, cost and independence were noted. The next phase of this research will use the findings reported here to advance knowledge through additional Human Centred Design workshops. These will introduce actual TEC products and services that will enable workshop participants to critically appraise PU, PEOU, and identify enablers and barriers to TEC acceptance, adoption and use.

#### ACKNOWLEDGMENTS

This research has been co-funded by Lero, the Science Foundation Ireland Research Centre for Software, and Ei

Electronics, Shannon, Ireland. We are grateful for the participation of the PPI panel and TEC Expert groups.

#### REFERENCES

- [1] Global strategy and action plan on ageing and health. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO.
- [2] S. T. MacMahon and I. Richardson, "Pathways, technology and the patient-connected health through the lifecycle," *Front Digit Health*, vol. 19, no. 5, Oct, 2023.
- [3] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly*, vol. 13 no. 3, pp. 319-340, 1989.
- [4] A. A. AlQudah, M. Al-Emran, and K. Shaalan, "Technology acceptance in healthcare: A systematic review," *Applied Sciences*, vol. 11, no. 22, 2021.
- [5] O. Zafrani, G. Nimrod and Y. Edan, "Between fear and trust: Factors influencing older adults' evaluation of socially assistive robots," *International Journal of Human-Computer Studies*, vol. 171, pp. 1-14, 2022.
- [6] G. Dermody, R. Fritz, C. Glass, M. Dunham, and L. Whitehead, "Family caregiver readiness to adopt smart home technology to monitor care-dependent older adults: A qualitative exploratory study," *Journal of Advanced Nursing*, vol. 80, no. 2, pp. 628-643, 2023.
- [7] H. N. Kim, "Characteristics of technology adoption by older adults with visual disabilities," *International Journal of Human-Computer Interaction*, vol. 13, no. 37, pp. 1256-1268, 2021.
- [8] D. Liu, A. Liu, and W. Tu, "The acceptance behavior of new media entertainment among older adults: Living arrangement as a mediator," *The International Journal of Aging and Human Development*, vol. 91, no. 3, pp. 274-298, 2020.
- [9] T. Ohashi, M. Watanabe, Y. Takenaka, and M. Saijo, "Real-time assessment of causal attribution shift and stay between two successive tests of movement aids," *Integrative Psychological and Behavioral Science*, vol. 55, pp. 541-565, 2021.
- [10] K. M. Sozio, "Exploring Older Adults' Perceptions of Issues Influencing Their Decisions to Adopt Gerontechnology," University of Arizona Global Campus ProQuest Dissertations and Theses, 2022.
- [11] K. L. Rush et al., "Telehealth Use for Enhancing the Health of Rural Older Adults: A Systematic Mixed Studies Review," *Gerontologist*, vol. 62, no. 10, pp. 564-577, 2022.
- [12] K. Kabacińska et al., "Functioning better is doing better: older adults' priorities for the evaluation of assistive technology," *Assistive Technology*, vol. 35, no. 4, pp. 367-373 2023.
- [13] A. Franke, E. Nass, A. K. Piereth, A. Zettl, and C. Heidl, "Implementation of Assistive Technologies and Robotics in Long-Term Care Facilities: A Three-Stage Assessment Based on Acceptance, Ethics, and Emotions," *Front Psychol*, vol. 26, no. 12, 2021.
- [14] R. Ørngreen and K. T. Levinsen, "Workshops as a Research Methodology," *Electronic Journal of E-Learning*, vol. 15, no. 1, pp. 70-81, 2017.
- [15] V. Braun and V. Clarke, "Using thematic analysis in psychology," *Qualitative Research in Psychology*, vol. 3, no. 2, pp. 77-101, 2006.
- [16] J. Alpert et al., "Identifying barriers and facilitators for using a smartwatch to monitor health among older adults," *Educational Gerontology*, vol. 50, no. 4, pp. 282-295, 2024.
- [17] G. Tónay, T. Pilissy, A. Tóth, and G. Fazekas, "Methods to assess the effectiveness and acceptance of information and communication technology-based assistive technology for older adults: a scoping review," *International Journal of Rehabilitation Research*, vol. 46, no. 2, pp. 113-125, 2023.