

Leveraging Emotional Wellbeing and Social Engagement of the Oldest Old by Using Advanced Communication Technologies: A Pilot Study Using Uniper-Care's Technology

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Abstract

Physiological changes in old age that affect mobility along with losses such as widowhood and shrinking of social circles, may lead to isolation and to lower levels of emotional well-being. Remaining engaged in activity and in society in later life is associated with emotional well-being for many older adults. This paper presents the results of applying an easy-to-use/accessible technology-based intervention aimed to promote social connectivity and to provide entrainment content for older adults. Forty people between the ages 77-100 participated in the study. The system's hardware was installed on participant's television set and enabling them to participate in Senior Center activities from far, allowing them to connect with family and friends through video calls and share photos, as well as watch curated video content. The system that this study used was developed and deployed by Uniper-Care Technologies. Data regarding emotional well were collected at two time points, the first point on the day that the system was installed at each participant's home, the second point was four to five weeks later. Results show that participants were successful in adopting the system and using it as intended. In addition, a significant decrease in measurements of loneliness, and depression as well as an increase in emotional well-being as well as a growth in social engagement.

1 Background

The aging of the world's population poses new challenges for our society regarding health-care, social welfare and residential systems [1]. The sub-group among the population of older adults that is extremely vulnerable for social isolation, loneliness and a low level of emotional well-being is the oldest-old group (over the age of 80 years) [2]–[5]. Technology may hold the answer to dealing with many of these challenges and presents an opportunity for our society to innovate its way out of the challenges that an aging population creates [6]. Using technologies can help compensate for lost capabilities associated with the old age, such as sensual loss and losses of motor capabilities that can

lead to difficulties in independently executing activities of daily living (ADLs).

In particular, advanced communication technologies (ACT), such as smartphones, social media applications, social robots and virtual reality applications can promote the quality of life for an aging population [7]–[10]. The majority of research on ACT use has been conducted with younger populations, for example it was found that social media use by adults with disabilities or chronic illnesses, who may experience limited opportunities for social face-to-face interactions, contributed to their social capital, perceived social support and emotional well-being [11]–[14]. Hence, such ACT has the potential to promote social connectivity among older adults and to increase their emotional well-being but may also have negative effects (e.g., increased levels of loneliness, depression, and anxiety), as found among younger cohorts.

To examine the potential of ACT use by older adults, more technologies accommodated to this old population, are needed. Uniper-care addressed this need and developed an ACT based system targeted at older adults. The technology that the company introduces is installed on the older adults' television, enabling a large set of interactive capabilities. Using Uniper-Care's technology clients can connect with family and friends, view recorded content and most importantly participate in community activities and meetings from their home. The system introduces a simple interface that enables easy transition between television content and interactive content.

The pilot study reported below examined the effect of using Uniper-Care's technology on several indicators of emotional well-being.

1.2 Intervention Design

The system that this study examined (see figure 1) consists of three components. A communication box connected to the participant's existing television, a specially designed remote control and a web camera. The communication box bridged between existing television service, streaming existing television content and the new live or recorded content that the project made available to participants.



Figure 1 – System components

The system introduced three new functions to participants:

1. *Live content* included remote participation in social meetings and in classes that were held at the senior center run by JFS. These included exercise classes that were taught each morning as well as a weekly social gathering. Remote participants were visible (on a locally installed television screen) to the participants attending the class at the senior center and they were greeted by the instructor as well as by their peers.
2. *Communication with family and friends* was enabled by creating a capability to hold video calls as well as share pictures. Both of these functionalities were enabled using the Whatsapp application that Friends and Family installed on their phones. Video calls could be initiated by either side (the older adult or his connections) and were viewed on the television. While pictures shared on dedicated chat channels were visible via the system on the participant's television. The System's remote control incorporated a microphone allowing the user's voice to be heard clearly (see figure 2).



Figure 2 – Remote control containing microphone

3. *Curated content* was available in a VOD format and included specially recorded classes and lectures on various topics, such as brain training and

2 Methodology

This study was executed in partnership with Jewish Family Services (JFS) Los-Angeles. JFS was responsible for locating the participants as well as for the live content that was incorporated into the program. Uniper-Care's technology was installed on the television set in participants' homes allowing them to participate in activities that take place in the Senior-Center from their homes.

2.1 Sample

The sample included 40 older adults living independently in the community were chosen by the JFS caseworkers to participate in the pilot study. Due to funding considerations, participants were older adults that fall under the definition of Holocaust Survivors as defined by the Conference on Jewish Material Claims Against Germany. Participants were predominantly female (65.9%) with an average age of 85.86 (ranging between 77-100 years). Approximately a third of the sample (29.3%) live alone while the rest of the participants live with significant others or with children.

2.2 Procedure

A technician and caseworker visited each participant in their home. While the technician installed Uniper's system the caseworker interviewed the client, filling out several research tools detailed below. This served as the first data point. Four to five weeks later the study instruments were repeated, obtaining the second data point.

2.3 Measurements

The measurements included:

1. Loneliness – Measured using the UCLA Loneliness Scale [15]
2. Depression – Measured using the PHQ9 Depression Screener [16]
3. Emotional Well Being - Measured using the Mental Health Continuum Short Form (MHC-SF) [17]
4. Social Engagement - Measured using the Lubben Social Network Scale [18]

3 Results

3.1 Technology Adoption

Participants demonstrated high levels of adoption and engagement with the system. This is of note as the participants were among the oldest old and many were not proficient with using a smartphone or a personal computer, two technologies that enable similar capabilities. Out of 40

participants, 35 participants used the live content that the system provided, 31 used the system to make or receive calls from family or friends and 34 used the recorded content feature.

3.2 Emotional Well-Being

A series of paired t tests were carried out, measuring the difference between the intake data point and the data collected after using the system for four to five weeks.

Loneliness:

Participants exhibited less loneliness after using the system for several weeks when comparing rates before ($M=42.1$, $SD = 11.99$) to the rates measured four weeks after introducing the intervention ($M=36.7$, $SD=7.48$). A statistically significant mean decrease in loneliness of 5.5 (95% CI, 2.38 to 8.61) points, $t(39)=3.57$, $p<0.001$ was found.

Depression:

Participants were found to be less depressed after using the system for several weeks when comparing rates before ($M=14.9$, $SD = 5.01$) to the rates measured four weeks following the intervention ($M= 10.8$, $SD = 4.1$). A statistically significant mean decrease in depression of 4.26 (95% CI, 2.54 to 5.55) points, $t(39)=5.42$, $p<0.001$ was found.

Emotional Well Being:

Participants exhibited an increase in the Mental Health Continuum score, when comparing rates before ($M=58.42$, $SD = 15.27$) to the rates measured four weeks after introducing the intervention ($M= 62.57$, $SD = 10.93$). A statistically significant mean increase of 4.15 points was found (95% CI, 0.66 to 7.66), $t(39)=2.4$, $p<0.001$.

The scale includes three sub-scales: emotional, psychological and social well-being. Participants exhibited a statistically significant increase of 1.26 points on the emotional well-being scale ($t(39)= 2.5$, $p<0.001$) and social well-being scores ($t(39)=2.38$, $p<0.001$) while no significant change was found in the psychological score.

Social Engagement:

Participants exhibited a mean increase of 3.9 points in the size of their social network when comparing the reported network size before ($M=19.71$, $SD = 5.66$) to the reported network size as measured four weeks after starting to use the system ($M= 23.69$, $SD = 5.55$). A statistically significant increase in the size of social networks (95% CI, 2.86 to 5.08), $t(39)=7.23$, $p<0.001$ was found.

4 Discussion

4.1 Technology adoption

Technology adoption among older adults in general and among the oldest old in particular is one of the significant challenges that the field of Gerontechnology faces [19]. Being a requirement for the intervention made adoption crucial for the success of the study while considering the advanced age of the sample population, ensuring the adoptability of the

introduced system was a particular challenge. The high adoption rates can be attributed to several factors:

1. *Platform* – basing the system on the existing television that the participants own and are familiar with played a pivotal role in the success of adopting the system. New technologies are often not adopted simply because they remain unpowered in their boxes. The decision to base the technology on the participant's existing television set ensured that the system was powered and that it was placed in a central location in the home. Using a familiar existing platform, one that the participants were intimately familiar with helped by lowering anxiety among users. With lower anxiety surrounding the new technology, users felt free to experiment and discover the different capabilities.
2. *System design* – The system had a clear and simple to understand interface. Using large and clear icons (see figure 3) the system communicated the different functionalities and enabled simple movement from the system to watching television.

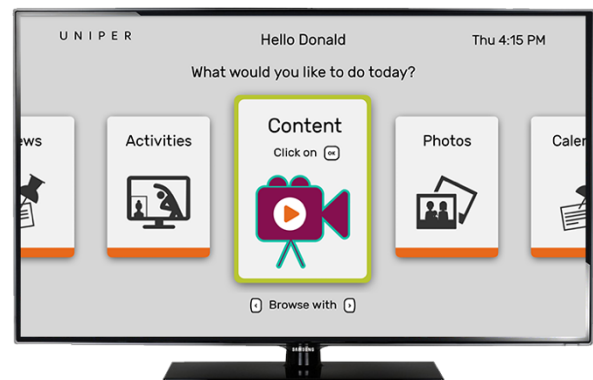


Figure 3 – Greeting Screen

The remote control that the system incorporated was simple and easy to use. Given the many buttons that remote controls generally have including a simplified and easy to use remote control was well received by the participants. Including the microphone in the remote control contributed to the system's simplicity by not introducing an additional device while it ensured that the microphone was in close proximity to the user allowing for high voice quality.

3. *Installation and support* – recruitment to the study as well as the installation of the system was done by caseworkers and in their presence respectively. The caseworkers were familiar with the participants and had ongoing relationships with them. These existing relationships created an environment of trust between the participants and the technician that entered the participants' homes together with the case worker at the time that the system was installed. This trust allowed the technician to calmly introduce the system and train the participant in using the system's different features.

4.2 Emotional Well-Being

Results show a clear positive impact that using the system had on indicators of emotional well-being. Participants exhibited both lower rates of negative feelings such as loneliness and depression combined with higher rates of positive emotions such as happiness, interest in life and life satisfaction. This combination of lowering negative emotions while heightening positive emotions can be the best possible scenario for increased well-being.

The challenge in interpreting the success that the system had on improving emotional well-being lies in the fact that the system is comprised of different components. The system is not solely the use of technology but rather relies on the live content and the community aspects of the Senior Center or service provider that it serves. The strength of the system is in making 'real' connections, people and social situations accessible to those who are permanently or temporarily homebound. It is this reliance on a service partner and the service providers essentiality to the success of the intervention that makes measuring the system's impact complex. It is not possible to disconnect the technology from the interactive content and the strength of the community within which it is deployed. In this study, we were fortunate to benefit from the hard work that the hosting organization invests in connection with its clients as well as in the content that it provides for them. That said, the study nevertheless demonstrates a new and innovative way in which older adults can benefit from technology.

5 Conclusion

This study demonstrates that social connections can be preserved and nourished using technology among the oldest old. More than that the study demonstrates a technology-based approach to elevating several of the difficulties that older adults who are homebound face. The successful adoption of the technology along with the demonstration of higher emotional well-being among users presents a viable affordable solution with which social isolation can be addressed among the oldest old and among older adults who are homebound. As life expectancy rises and more people live alone we as a society need such solutions to address the distress that many older adults encounter.

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