
WeCare: An Intelligent Tool Enhancing Storytelling Experience to Support Retired Elder's Mental Wellness

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ABSTRACT

Retired older adults reported having lower levels of purpose, mastery, and growth mainly due to the lack of social interaction. To solve this issue, they tend to join a social network like an older adult's support group; However, they can still face the same challenge due to the lack of deeper connections within the group. The feeling of disconnection and isolation can lead to mental disorders. We present WeCare, a foldable four screens voice user interface (VUI) tool that supports retired elder's mental wellness through collaborative storytelling. During the process, older adults

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KEYWORDS

Mental Wellness; Older Adults; Retired Community; Storytelling; Voice User Interface; Collaboration;

Participants who have a negative feeling toward retirement:

"Alone, no family or friends support" - P1

"Miss being in a community "tribe" such as my coworkers"-P2

Participants who have a positive feeling toward retirement:

"After relocating my social life improved dramatically because I have time to engage in activities to meet people, and I make the effort to do so." - P3

"Starting support groups for men after suffering thru my own depression upon retirement has vastly improved my life and lives of the 160 men belonging to 16 groups"- P4

Figure 1: Quotes from the questionnaire

engage in a metaphorical way of revisiting, reflecting and reinterpreting their life experience by collaboratively making up a story based on a picture provided by the device. WeCare promotes bonding within a small group, helps older adults to be heard and feel the sense of connection and empowerment.

INTRODUCTION

In the 1980s, the World Health Organization refers mental wellness to the degree to which one feels positive and enthusiastic about life [5]. The physiological experience resulted from mental wellness, for example, empathy, love and optimism, are however not equally distributed in American society -- older adults report lower levels of purpose, mastery, and growth [10]. In the meantime, the number of older adults, especially for the retired community, is multiplying globally. Between 2015 and 2050, the proportion of the world's population over 60 years will nearly double, from 12% to 22% [8]. Mental and neurological disorders among older adults account for 6.6% of the total disability (DALYs) for this age group [8]. In this paper, we focus on the mental health of the retired community, who continue to make significant contributions to our society.

We acknowledge the significant number of retired older adults who suffer from depression and other mental health disorders and shocked by the number of older adults who reported to have a social network but still being disconnected. We identified there is an opportunity to create a positive behavior change for older adults who experience loneliness within a social network. Therefore, we aim to build an intelligent tool to support the retired group's mental wellness collaboratively. In this paper, we first deliver an initial design of our intelligent tool after initial user research. Then, we review the technology of voice user interface (VUI) and the method of storytelling to help build the overall framework of our design. We then iterated the design over user evaluation to be the final product that supports the retired older adult's mental wellness by enhancing the collaborative storytelling experience.

INITIAL RESEARCH

To gain a clearer insight into problems older adult are facing, we conducted an initial questionnaire. This questionnaire allows us to collect data from various participants as well as help us refine our questions in our semi-structured interview. This questionnaire consists of multiple choices, Likert scales, and free text responses. We designed the question to collect demographic data and participant's general attitude toward life before and after retirement, and how has the change influenced their mental wellness. We posted the questionnaire to 3 different forums and received 36 responses in 48 hours. Out of the 36 responses (Figure 1), 50% of the participants feel lonely and concerned about their retirement life. We learned that older adults who are lonely and concerned about their retirement life is majorly due to health issues, financial issues and especially social issues. In contrast, older adults who reported to be happy and fulfilled after retirement tend to belong to a social network, for example, a support group.

P1: Optimism about retired life; Have a social network

P2: Optimism about retired life; Does not have a social network

P3: Concerned about retired life; Have a social network

P4: Concerned about retired life; Does not have a social network

Figure 2: Selected Interviewees

"I Started support groups for men after suffering through my own depression. Trust me, you need your medication, but it is really the support from my group and family got me through my hardest time." – P1

"I do go to the support group weekly, I mean I like it but sometimes you don't get to talk because some people can't stop talking about their problems which doesn't really help with mine. I mean we are friends, but I've not bonded with them much yet, we'll see." – P3

Figure 3: Quotes from the Interview

In order to gain in-depth data from our target users, we selected 4 participants (Figure 2) from our questionnaire pool and invited them for the semi-structured interview. We designed the questions to be open-ended, and we want to discover how participants' life changed after retirement and how they tackle their retirement and mental wellness. The participant spoke about their perception of current condition, plans, desire and hope. We acknowledge both personal and general difficulties our participants face; however, we are especially intrigued by the interview with the participant 3 who have a social network but reported being lonely. Interestingly, participant 1 who is optimism about retired life and participant 3 belongs to a same social network called Men's Wisdom Works Support Group in Asheville, North Carolina. We are inspired by this finding (Figure 3) and through the interview, we realize it can be hard to form a deeper relationship with each other in a social network setting and the sense of loneliness is due to a lack of deeper bonding with others in the group.

LITERATURE REVIEW

Why Design for Older Adults who Experience Loneliness Within a Social Network?

The lack of happiness and feeling of loneliness can result in mental health disorders (MHDs.) They include depression, anxiety, substance abuse, psychotic disorders, aggression, and socially inappropriate behaviors. In 2010, on records from 28,475 older adults with an average age of 79 (range 65–110), prevalence of MHDs was approximately 40%; depression (28.0%) and anxiety (18.9%) [11]. The mental health disorders in older adults can be triggered from different aspects, from family burden to wealth, and one factor needed special attention is loneliness which exposes to the excess risk of depression. One thousand two hundred and ninety-nine people aged 65 and over, recruited through primary care practices, were interviewed and accessed using Wenger's typology, 35% of participants were lonely, and 32% of participants with an integrated social network also reported being lonely. [4]

Why Voice User Interface?

Voice User Interface (VUI) is well known as an easy way for seniors to interact with intelligent systems. The usual visual interface often over-burdens seniors with too many images and multi-touch interactions. A study conducted in 2018 suggested that VUIs may hold potential for increasing usability for seniors. Many voice systems are efficient, intuitive and rely on the speech-interactions already known and practiced every day [12]. Ruan et al. showed that voice input is three times faster in fulfilling a task than input from common devices such as keyboards [9]. Sato et al. also designed a voice-based augmentation mechanism to support elder users with app usage.

While VUI has been proven to be a useful assistive technology for seniors, a more important question needs to be answered: Are seniors willing to use the VUI assistive technology? McCreadie & Tinker conducted a study in 2005, showing the acceptability of assistive technologies to senior citizens [7]. They suggested that the acceptability of the seniors using assistive technology



Figure 4: Affinity Diagram



Figure 5: Sketched Storyboard

depends on the way technology helps disabled users or enriches their life. Thus, VUI would result in higher acceptability of seniors to this technology.

Why Storytelling?

The therapeutic effects of storytelling are well-known. Stories are a transformative force in people's lives, provoking self-reflection and change [3] Storytelling has been used in community projects, health promotion, disease prevention and other concerns of therapeutic nature. [1] It uses creative metaphors to address challenging experiences in users' life, stimulating positive behavior change, helping users rediscover the meaning of their lives, and revisiting the positive insights they gained through the story. Furthermore, storytelling can not only initiate a process of bonding within a group but also gives the older adults the opportunity to be heard and feel the sense of connection and empowerment. The participant can connect their emotional and intellectual worlds and construct an empowered and safe space to speak out about their diverse social realities. [2] According to Mager and Stevens's study, older adults reported to have a feeling of happiness, feeling encouraged and uplifted after the storytelling session. [1, 6]

INITIAL DESIGN

Based on the findings, we identified there is an opportunity to create a positive behavior change for older adults who experience loneliness within a social network. We started our ideation (Figure 4) phase adapting the Round Robin Methods which we go around circles one-by-one and have each person offer ideas until everyone has had a turn. With this method, we end up with 16 different solutions, and by voting, we narrowed it down to 2, including a virtual pet and storytelling facilitating tool both supported by Voice User Interface.

We then sketched storyboard (Figure 5) for each solution and presented them to our focus group. According to their evaluation, we decided to further investigate our second solution. We aim to design an intelligent Voice User Interface Tool that introduces therapeutic storytelling experience to older adults and we hope this design can tackle loneliness and mental wellness of our targeted user within a social network. During the storytelling session, the device will provide pictures and prompts to facilitate older adults to tell a story. We are hoping older adults can find the sense of connection and belonging through storytelling in a group.

CONCEPT TESTING

We conducted low-fidelity concept testing with 8 older adults using prototype, VUI flow (Figure 6) and wizard of oz (Figure 7). From the session, we conclude that storytelling is therapeutic as it engages older adults in deeper emotional connection. We observed that seniors feel related to the stories and often initiate conversation with each other about the stories. Many seniors reported afterwards that their stories reflect their current concerns or major life experiences. The sharing and telling stories make them feel empathetic and that they are not alone.

Initial User Flow

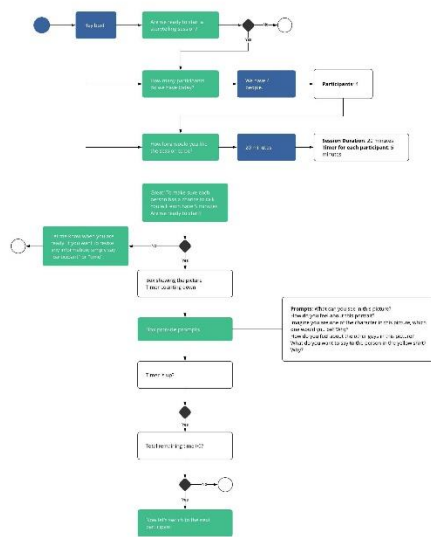


Figure 6: Initial Voice User Interface Flow



Figure 7: Paper Prototype

One of the biggest challenges we found out is that coming up with a story could be hard. Also, storytelling in a group setting can be stressful. However, we identified an interesting phenomenon. When the storyteller gets stuck, other group members tend to intervene and help to make up the story. Moreover, the different perspectives each group member provides can turn the story into unexpected directions. Another challenge we face is that some older adults reported that they feel uncomfortable making up and telling the story in a big group.

ITERATION

Based on our observations, we identified an opportunity to mitigate the difficulties of storytelling by having the group collaboratively tell a story. We think the collaborative method will not only facilitate the storytelling session but also enhance the sense of engagement of each group member. Furthermore, we decided to reduce the group size to a maximum of 4 people in order to create a more intimate environment to better engage seniors in storytelling. We designed a foldable device that enables seniors to easily expand or collapse its sides to better fit the number of users in the storytelling session. (Figure 8)

USER EVALUATION

We invited 4 older adults to our proposed workshop using paper prototype, VUI flow and wizard of oz. The objective of this round of testing is to gain a deeper understanding of how collaborative storytelling could bring a positive influence on seniors' social connection and how might the device better facilitate the storytelling session. One problem we identified is that the voice instruction is not explicit. Seniors are confused in the beginning about what they should do next. During the game, they are also not sure who should talk next when the previous person finishes his/her round. Thus, we added more calls for action in the voice UI as well as visual indicators to help they proceed through the session. Moreover, it wasn't clear whether the session has an immediate therapeutic effect on the participants; however, participants reported that they would like to have a second session with the same people and want to use it with other friends. From this, we think the collaborative storytelling has a direct positive effect on socializing. Overall, we got positive feedback (Figure 9) on the overall experience. We observed from the testing session that our participants were very engaged in the storytelling session, and they all had a great time. Afterwards, they also started reflecting the story they just developed.

FINAL PRODUCT

Our final design (figure 10), WeCare, is an intelligent Voice User Interface (Figure 11) Tool that introduces collaborative storytelling, promotes bonding within a small group, and gives the older adults the opportunity to be heard and to feel the sense of connection and empowerment. The design of WeCare is inspired by origami. It is a foldable device (Figure 12), consisting of 4 screens, that are easy to carry around by the user. User can unfold the device to four screens display, three screens display or two screens display depending on the number of the participants.

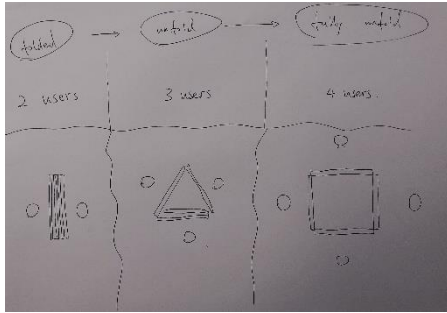


Figure 8: Iteration Sketch

"I am not quite sure what we were doing at the beginning, but at the end of the game, I had a great time." -P1

"I think it's really fun to play and I would love to participate, but I am not sure will this have any healing effect." - P2

"The whole experience is really amusing. I am curious about why other participants have their standpoints. Now I need to talk to them more haha! It's interesting." - P3

Figure 9: Quotes from the User Evaluation

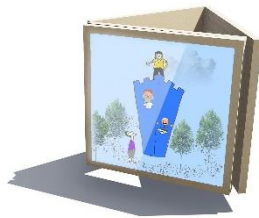


Figure 10: WeCare when 3 participants are using the product

To start the session, user triggers the device by saying: "Hey WeCare!" The device will respond: "Hey, are we ready to start a storytelling session today?" The user will then answer "Yes" or "No" to proceed to the next step. After getting confirmation, the box will help user to manage the time by asking: "Great, how long would you like the session to be?" User will give a number to set the total time of the session. To introduce the process, WeCare then responds: "Great, now let's start the session. In this session, each of you will pick a role in the picture I provided and, based on the role you picked, tell me your side of the story!" The box provides a picture on the screen and, each participant will pick a role from the picture shown on screen, and collaboratively develop a story! If one stuck, just by saying "Next", this person could pass the storyteller role to the next participant. The screen will flash to indicate whose turn to tell the story. After the storytelling session, the box will prompt a discussion session where participant can freely reflect on the story they collaboratively developed.

DISCUSSION

To conclude, there is a clear need for supporting the mental wellness of the retired older adults. WeCare introduces collaborative storytelling, promotes bonding within a small group, and gives the older adults the opportunity to be heard and to feel the sense of connection and empowerment. Our design contributes to the retired community as a quick start for new conversations by building the connection and responding in a short time. WeCare also provides a game experience, which serves as a new and fun method for older adults to make new connections. During the design process, a range of user-centered design techniques was used throughout requirement gathering and usability evaluation. We also conducted the study from our target users - retired old adults - to obtain feedback. As a result, our product could be easily used and is of high value to our target group.

Limitation

In the meantime, our study exposed some limitations of our product, which needs to be further addressed before deploying it in retired groups. First, we do receive positive feedback on the product that the target users enjoyed the process; However, it is hard to evaluate the direct healing effect of WeCare. Second, the VUI has a limited responsive command, which makes the whole therapeutic process less natural and fluent. However, this could be improved significantly by integrating some existing simple Q&A systems into our design.

Future Consideration

While feedback from our target users has largely been positive, there are still many facts that could be considered in future works. We could much improve the interaction experience of talking to the VUI. For the current design, we focus on the voice interaction for the older adults' consideration; However, we could also expand and introduce our design to other groups of users for a therapeutic experience, for instance children's therapeutic session.

