

Exploring the Potential of Conversational Interfaces for Care of Older Adults: Insights from Stakeholder Workshops

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Abstract. This study aimed to explore the utilisation of conversational interfaces (CIs) by local care service providers (CSPs) and their potential applications in improving the quality of life for older adults. Two workshops were conducted with stakeholders to gather insights and requirements. Although currently not yet utilised by CSPs, stakeholders expressed their openness towards CIs and believed that older adults are very likely to appear receptive to them. Loneliness and isolation were identified as significant challenges, even among older adults living in care institutions. Key requirements for chatbots included complementarity to in-person interactions, user-friendliness, 24/7 availability, and seamless integration into daily life. Ethical considerations, data privacy, and security were emphasised, also highlighting the importance of transparency and limited data retention. Various use cases were discussed, such as assistance, self-management tools, and reminders. The financing issues remained inconclusive, but health insurances showed their potential interest in solutions targeting loneliness.

Keywords. AAL, Active Assisted Living, conversational interface, user interface, chatbot, older adults, technology acceptance

1. Introduction

Conversational interfaces (CIs) have a long history, dating back to the 1960s with the development of ELIZA, a computer program for natural language communication between humans and machines [1]. However, it is only in recent years that CIs, in the form of chatbots, have gained widespread attention and adoption, thanks to significant advancements in machine learning and artificial intelligence, particularly in the field of natural language processing [2] [3] [4] [5]. These advancements have greatly improved

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the capabilities of CIs, enabling more natural and human-like interactions. By leveraging chatbot technology, healthcare professionals and caregivers can provide personalised and accessible support to older adults, addressing their needs and concerns in a timely manner. CIs are being utilised as virtual companions, assisting in everyday tasks, providing mental health support, facilitating behaviour change, and promoting overall well-being [6] [7] [8] [9] [10] [11] [12] [13].

In light of these advancements and potential benefits, it is essential to explore the various applications and requirements of CIs in healthcare for older adults. This research aims to shed light on the topic by conducting workshops and engaging with stakeholders who are interested in utilising CIs to improve the well-being of older adults. By understanding the perspectives and needs of these stakeholders, effective strategies for the implementation of CIs can be identified in healthcare settings and contribute to the ongoing efforts in enhancing the quality of life for older adults. To gain a better understanding of potential CIs in use, which applications care service providers (CSPs) are interested in, and what requirements exist, two workshops were conducted with representative stakeholders. The workshops implementation and their outcomes are presented in the following sections.

2. Methodology

To gather insights on the use of CIs in CSPs business environments, a stakeholder group was invited to participate in two user-centered design workshops, each lasting for two hours. The workshops followed the world-café method, which encourages group discussions and peer-to-peer knowledge-sharing [14] [15]. Before the workshops, conversation starters and various introductory questions were prepared and shared with the stakeholders to guide and structure the discussions. All conversations were held in the local language (German). Notes written by the participants, as well as written logs about the conversations were collected during the workshops.

The stakeholder group consisted of:

- Chief operating officer (female) of a local assistance and care service provider with 820 institutionalised care places and over 200 apartments. The company employs more than 1,000 people.
- Chief executive of a local association (male) for ambulant assistance and care services, consisting of counselling, treatment care, basic care, evening/night care, meals on wheels, psychiatric care, housekeeping, family support, etc. The tasks are covered by more than 100 employees who made more than 100,000 visits to clients at home in 2021.
- A representative of a local association (male), which fosters a resource-oriented old-age policy and the active participation of the generation of 60 years and older. Among other activities, they are utilising their Office for Older Person Affairs to contribute to the age policy of their city.
- A lecturer (female) in the domain of social work and law, specialised in social work (mental disorders, addiction) and counselling methodology in social work and person-centred dialogue.
- A lecturer (female) from the domain for rehabilitation and healthy ageing.

The last participant was not present during the first workshop. All stakeholders were recruited from the contact network of the project team and all stakeholders offered their time without charge.

3. Results

Although all stakeholders indicated that they are rather open to the idea of utilising CIs, none of the stakeholders were using them in their professional environment. While there could be several potential applications assisting the professional caregivers, all workshop stakeholders were mainly focused on the question of how CIs could be used to improve the quality of life of older adults. The shared opinion is that nowadays many older adults are open to CIs. Their estimation was that currently 4 out of 10 older adults would already show their acceptance towards chatbots, and they were also convinced that the acceptance rate is expected to increase over time.

Among the concerns and needs, isolation or loneliness were ranked as a major challenge. It was pointed out that even older adults living in care institutions often find themselves stricken from loneliness. Therefore, they indicated that CIs addressing loneliness could be an attractive avenue.

As a result, based on the stakeholder inputs during the two user-centered design workshops, the view of potential and requirements of chatbots can be summarised as follows:

- a) Chatbots represent a highly promising complement to in-person interactions, rather than a complete replacement.
- b) Chatbots can be utilised at home or in other settings.
- c) Chatbots offer round-the-clock availability.
- d) The threshold for seeking assistance from a chatbot is lower compared to asking a real person for help.
- e) The implementation of chatbots should incorporate playful elements to ensure engagement and avoid monotony.
- f) Chatbots should possess an intuitive and user-friendly interface, keeping simplicity as a priority.
- g) Voice interfaces are attractive, when reliable enough.
- h) The inclusion of the local language and in dialect is crucial for effective expression of emotions.
- i) Older adults should be able to seamlessly integrate chatbot usage into their daily lives.
- j) It is important to distinguish between individuals who are oriented and those who may require support as their cognitive abilities decline.
- k) The use of a chatbot itself can be considered an intervention.

The workshop participants identified ethics and data privacy as important aspects to consider, or to derive requirements from. In summary the focus was laid on the following:

- l) Scepticism may be expressed by individuals when it comes to sharing their personal data.
- m) Comprehensive information about ethical considerations related to chatbot usage should be provided to older adults.
- n) Emphasis should be placed on transparency regarding data usage.
- o) Privacy should be ensured by clarifying who has access to data.
- p) Robust measures for data security and cyber security should be implemented.
- q) The option for users to delete their history or profile should be provided.
- r) Data should be stored for a limited period of time.

When the participants discussed potential use cases, the following have been mentioned:

- s) Games
- t) Tests
 - o dementia assessment game
 - o assessment support to determine self-care abilities.
- u) Assistance
 - o conversations
 - o proactive companion for older adults
 - o supplement for cognitive-behavioural therapy (not psychoanalysis)
 - o support in everyday life (rather than ambitious therapy)
 - o feedback in everyday life
- v) Self-management tool
 - o daily positive moments diary (capturing delightful/surprising moments)
 - o interactive mood diary - app detects worsening situations (like a "health app")
 - o providing information about good times during difficult periods
 - o future-oriented events: Prompting users to plan and share positive events in the next three days.
- w) Reminders
 - o cherished memories (possibly through photos)
 - o for medication/therapy appointments, with input from relatives/professionals.
 - o trivial reminders (e.g., watering plants, taking medication)

The conversation on who would finance the operation of such CIs was inconclusive. However, it was agreed that institutions and organisations would only buy such a system when a clear impact on their business can be measured. Moreover, it was assumed that health insurances would be very interested in obtaining a tool that could help to combat loneliness.

4. Discussion

The estimation of CIs acceptance (4 out of 10) by the workshop participants must be analysed and compared to other findings in literature. In a previous study [16], adults over 60 years of age were asked about a chatbot for health data collection, usability and satisfaction and reported relatively high perceived ease-of-use (5.8/7), usefulness

(4.7/7), and usability (5.4/7). These positive earlier findings are consistent with our conclusions from the workshop and may indicate a cautious assessment by the workshop participants. However, it is important to consider the fact that older adults who are institutionalised are generally no longer able to meet the demands of daily living. Therefore, there may be a bias in our workshop data towards a larger proportion of older adults with severe limitations, such as those suffering from dementia, who may have difficulty expressing themselves. This view is represented in item “j”). The user interface must be adapted to the needs of the user.

Another requirement related to the user interface is the usage of simple language (“f, h”) and being of a playful nature (“e”). These aspects are in line with the results of other publications [17] [18] [19]. Among other requirements, the latter publication also emphasises the value of lowering initial barriers, which was also identified as a potential of the technology by the workshop participants (see “d”).

In the beginning of the workshop, the participants pointed out that even among institutionalised clients, loneliness is a major problem. One expectation is that chatbots could be part of a solution by becoming an intervention themselves (“k”). This could be realised in various ways, e.g., by offering games (“s”) or as part of assistance (“u”) in the form of a virtual companion or as a substitute for conversations. The validity of the idea to combat loneliness and isolation by conversational agents is supported by [20].

Although not directly mentioned by the workshop participants, the ability of the chatbot to become a virtual companion, or to react in an empathic way when emotional support shall be provided, derives a further requirement: it is to be expected that acceptance will be increased if the chatbot becomes more empathetic. This challenge could be tackled by utilisation of such technologies like sentiment analysis and affective computing [21].

The potential value of CIs for such use cases as supplement for cognitive-behavioural therapy, especially for mental health and depression support, has been demonstrated in [22] [23].

5. Conclusion

Stakeholders are open to utilising CIs to improve the quality of life for older adults. Although none of the stakeholders currently use CIs in their professional environments yet, they believe many older adults are already receptive to them, and even more end-users are expected to open up in the coming years. Loneliness and isolation were identified as major challenges, even among older adults living in care institutions. Key requirements for chatbots include being complementary to in-person interactions, user-friendly with playful elements, available round-the-clock, and capable of seamless integration into daily life. Ethics, data privacy, and security are important considerations, emphasising transparency, privacy, and limited data retention. Potential use cases include games, assessments, assistance, self-management tools, and reminders. Financing remains rather inconclusive, but health insurances may be already interested in tools that address loneliness.

To make the idea of a smart diary a reality, it will be implemented and validated in the near future. The smart diary will combine the advantages of the highly regarded “6 min diary” [24] with an innovative reminder feature. Although there is a potential for similar concepts in the field of CIs applications, we are aware that there are also technical

challenges to overcome, such as emotion recognition and dialogue management. In addition, the business cases that ensure economic viability need to be further refined.

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