

A Method Using Collective Intelligence for Communication Activation Among Elderly People Living Alone

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Abstract. Among elderly people who live alone, lack of communication leads to delays in responding to their common medical problems and to the onset or progression of dementia. Here, we propose a communication activation method for elderly people and caregivers. Selection criteria for active communication topics that interest elder people are selected from communication contents, using collective intelligence created by communication among various specialists in elderly care. Results are reported for an evaluation experiment in a Japanese setting.

Keywords: Communication · Elderly people · Living alone · Collective intelligence

1 Introduction

In recent years, the population of Japan has been aging at a rate unprecedented in other countries. The population aged > 65 years now exceeds 30 million people. Roughly one in four Japanese people is elderly. The number of elderly persons is expected to peak in 2042 at 39 million, but the proportion of the population over the age of 75 is expected to continue increasing thereafter [1].

In this context, there is an increased need to care for elderly people living alone. Government policies have also switched from an emphasis on institutional care to home-based care. As a result, there is an increased burden on the people involved with providing care, responding to symptoms of care recipients is difficult. Two elderly people with the same disease can exhibit different symptoms, depending on various factors, such as their environments and medical histories.

For elderly people living alone, lack of communication is a serious issue, because communication is a basic element of daily life. It has been noted that for elderly people living alone, a lack of communication can lead to the onset or progression of dementia or delays in the response when a medical problem occurs. To prevent these situations, elderly people need to have more communication. However, measures for addressing this are limited to volunteers or the relatively few visits by caregivers.

Traditionally, institutional care has been the main form of care, meaning that communication with various caregivers and other elderly people was possible. However, for an elderly person living alone, it is difficult to increase communication. For an elderly person who is able to utilize day services and the like, there are opportunities for communication. For an increasing number of elderly people, however, such care services are difficult. Initiatives to increase communication with elderly people have been started in various places, but the current situation is such that these kinds of initiatives are still limited to only a few regions.

Against this background, we developed a means of communication that utilizes ICT without placing a burden on the elderly [2], and the next major challenge is to select topics of conversation for communication with the elderly. Elderly people have a diverse range of characteristics, depending on how they have lived their lives. This means that topics for conversations with elderly people need to be selected with appropriate consideration.

In this study, we propose a method for finding ways to increase communication for elderly people. This study adopts a method of gathering collective intelligence in relation to communication through discussion between diverse caregivers, taking into account the diversity of elderly people. By applying this method, we propose a method for achieving rich communication for elderly people living alone. Finally, we experimentally demonstrate the efficacy of the proposed method for collecting and utilizing collective intelligence through the creation of an appropriate setting.

2 Trends and Issues in Care Observation in the Field

In this study, we consider home-based care, which will increasingly become the focus of care. Home-based care is an arrangement in which the care recipient lives at home and caregivers visit the home to carry out their assigned duties. There are two issues for home-based care, as described in the following subsections.

2.1 Observation Arrangements

Observation is needed in order to track the status of an elderly person and to respond when abnormalities occur. However, the basic approach to this can be broadly classified into the following two types: personal (warm) observation and impersonal (cool) observation.

In personal observation, the elderly person being observed takes the lead in communicating his or her situation. Then, if the information communicated indicates an abnormality, then it is addressed. If the information communicated does not indicate an abnormality, the caregiver is given peace of mind. For this method to work, communication between the elderly person and the observer must be effective, as discussed below. For an elderly person living at home in particular, it is not uncommon for him or her to spend almost all day without talking to anyone, though communication is a fundamental aspect of human life. Having an opportunity for communication is in itself a form of observation, and may also be a way to prevent dementia at the same time.

In contrast, impersonal observation involves tracking the status of an elderly person without regard to the person's volition. In such observation, the elderly person is observed as simply a living creature rather than a human being. In this case, the elderly person is the object of the observation system. There are many cases where the elderly person does not directly understand how he or she is being observed.

In other words, the basic stance of the observer marks the distinction between personal and impersonal observation. With personal observation, the observer treats elderly people as individual human beings. At the same time, this approach also assumes that the observer responds with courtesy and an understanding of the elderly person's psychology. Elderly people, and particularly elderly people living alone, want to be seen as human beings. Elderly people have a desire to be understood through conversation. In other words, elderly people want to have their self-worth as human beings recognized. Personal observation is an approach that meets this desire of elderly people. The central benefit of this approach is a sense of closeness to elderly people. At the same time, this approach is a way of satisfying the various wishes of elderly people. In contrast, impersonal observation universalizes elderly people and observes all elderly people by basically the same method, so that the observations can be done very efficiently. This is because such observation can obtain the same type of information for all elderly people, and with the same timing. This means that the method can be automated. Impersonal observation is extremely convenient for people who develop observation systems and for the bureaucracies that operate observation systems. For bureaucracies, using this system enables the following possibilities: (1) broad trends relating to the elderly can be tracked; (2) bulk management becomes possible; and (3) fixed management becomes possible.

A shortcoming of impersonal observation is that it is difficult to manage abnormal situations that are unlikely to occur. These two types of observations are currently being developed simultaneously and in parallel. However, the key question is not whether only one method or the other is an effective form of observation. Both have advantages and disadvantages. What is important is to strike a balance between the two. How this balance is struck will vary depending on the region and on the community to which the elderly person belongs.

We believe that the fundamentals of observing the elderly consist of the following three points (Fig. 1).

- (1) Affirmation
Elderly people understand and consent to the fact that they are being observed.
- (2) Agency of elderly people
Elderly people explain their own situation themselves, and of their own volition, or indicate that they are unable to explain their own situation.
- (3) Activity of elderly people
Elderly people demonstrate their presence through their own actions, thereby enabling the observation.

To achieve these things, the following three points are likely to be crucial. (1) The observer demonstrates warm-hearted concern, rather than just impersonal monitoring. To do this, the observer must provide messages of concern rather than warning

Preconditions

Affirmation, agency and activity of elderly people

Point 1

- Clinical monitoring versus warm-hearted concern

→ Messages of concern are better than warning information.

→ Observation that cause elderly people to feel like a burden increases their sense of rejection.

Point 2

- For elderly people to feel comfortable with being observed, they need to be able to see the observer.

→ People seek bi-directionality (or agency). This trait leads to the joy of being accepted and known.

Point 3

- Need for a system whereby people are warmly embraced by a nearby network

→ Utilization of informal networks of nearby residents, other than family members.

Fig. 1. Key points for observing elderly people living alone

information. Conversely, impersonal monitoring may exacerbate an elderly person's sense of rejection. (2) It is important to establish a sense of being monitored on the part of the elderly person. In general, people tend to desire bi-directionality. Observation based on an understanding of this is required. (3) Observation should be conducted such that the elderly person has a feeling of been enveloped in a nearby warm network. It is important that observation take place through informal close relationships involving people other than family members. From these considerations, the role played by communication in observing the elderly begins to emerge. Broadly speaking, this is significant in two ways.

(1) Dispelling negative emotions in the elderly

Elderly people tend to harbor various insecurities in relation to finances and other aspects of their lives. Giving elderly people an opportunity to express these kinds of negative emotions as part of warm communication is helpful for dispelling these insecurities. At the same time, this can also provide an opportunity for elderly people to make known detailed physical complaints that they might have.

(2) Enhancing positive emotions in the elderly

Elderly people often talk about their past experiences. Affirming this gives elderly people a sense of self-worth. At the same time, from these conversations positive feelings about the future can also emerge.

The importance of communication for the elderly has been highlighted in the field of psychology as well. Communication has been identified as an essential factor for improving the quality of life of elderly people.

For home-based care, a single elderly person is supported by experts from a large number of job categories as caregivers, including visiting doctors, visiting nurses, care workers, care managers, helpers, visiting bathing-service workers, visiting physical therapists, and visiting pharmacists. At present, caregivers often visit the homes of people who need care according to the schedule determined by the care plan, independently of other caregivers. The visiting caregivers then focus exclusively on carrying out their specific duties, according to the care plan. The frequency of visits depends on the job category, ranging from about once a month in the case of visiting doctors to once or twice a day in the case of helpers. In all cases, however, primary concern is the assigned task. Caregivers have little leeway for engaging in communication with the elderly.

In recent years, with the widespread adoption of the Internet, various systems and communication devices have been developed for impersonal observation. However, elderly people can have difficulty in utilizing ICT because they have trouble keeping up with advances in ICT. At the same, caregivers are often reluctant to utilize ICT. When it comes to communication with elderly people living alone, only human beings can do the job. However, it is not always possible to arrange for sufficient volunteers to address these needs. In addition, depending on the idiosyncrasies of the elderly person, not just anyone will be able to communicate with the elderly person.

3 Proposed Method

In this study, we propose the following: (1) introducing an ICT system for establishing communication without the elderly person having to do anything [1], and (2) then achieving communication to suit the elderly person by appropriately selecting communication topics.

To achieve (1), we have developed a conversation system to facilitate conversations between helpers and the elderly person via a communication television. However, in communication with elderly people, various differences emerge depending on the idiosyncrasies of the elderly person. For this reason, in relation to the communication topics in (2), we propose a method below for using the collective intelligence of caregivers to uncover suitable topics for communication.

3.1 Using Collective Intelligence to Uncover Communication Topics

In this paper, we propose a method for (1) bringing together suitably qualified experts from various fields [3, 4] to have a discussion, and then (2) refining the collective intelligence that emerges from the discussion in relation to the communication topics desired by the care recipients.

The health status of elderly people varies considerably from one person to the next, depending on the experiences they have had over the course of their lives. Often various factors then converge to bring about some health condition. Accordingly, it is extremely difficult for individual doctors or care experts to address these conditions on their own. This is why the expertise and wisdom of multiple medical and care experts is required when establishing communication themes appropriate to each situation. When

communicating with elderly people, providing topics of conversation that are close to their hearts is important. To accomplish this, it is necessary to decide topics by viewing the circumstances of the particular elderly person from multiple perspectives. To do this, it is necessary to produce a new collective intelligence, based on the expertise of a diverse range of people involved in medical treatment and care.

During this process, it is important for those involved in medical treatment and care not to shy away from differences of opinion. Each person engages with elderly people from their own standpoint, and so it is common for there to be differences of opinion among experts. When this happens, it is not desirable to give too much regard to authority or position. Collective intelligence may not emerge if people neglect their own unique points of view and agree with the opinions of others too easily. On the contrary, this can lead to a collective folly, which refers to a kind of knowledge where everyone consents to a conclusion at the time but it is clearly incorrect when considered afterward.

Next, we organize some of the terms used in this paper. ‘Collective knowledge’ often refers to the aggregate of the opinions and knowledge normally held by individuals. However, in this paper we consider a method of wisdom for first producing new ideas (‘collective intelligence’) by gathering and generalizing collective knowledge. We then propose an environment for promoting active communication by proceeding to the stage of ‘collective wisdom’, whereby collective intelligence has been consolidated at a higher level. In our considerations below, we define communication topics that are dependent on a particular situation as ‘collective knowledge’ and topics that do not depend on a particular situation as ‘collective wisdom’.

3.2 Conditions for the Emergence of Collective Intelligence

For collective intelligence to emerge, we believe that two conditions are required (Fig. 2), as described below.

An essential element when extracting collective intelligence is the concept of ‘setting’. Here we define ‘setting’ as consisting of (1) the diverse human resources gathered in a place and (2) the atmosphere there, including both the presence of respect for others between these people and an identification of the differences with respect to others. It is important to gather skilled people with differing ideas, while at the same time creating an atmosphere where these people can feel comfortable enough to express their opinions actively. There also needs to be a sense of tension between the people belonging to the setting.

A ‘setting’ is not a fixed thing. Depending on the type of collective intelligence that emerges in the ‘setting’, there may be instances where people who can contribute new ideas are sought out and included. It is also necessary to seek and utilize collective intelligence that has emerged in the past.

- Initiate interaction between the setting and collective intelligence

To produce collective intelligence, the first requirement is for each person to clarify, through a process of dialog, the differences between their own ideas (the thesis) and the ideas advocated by others (the antithesis). The next thing is for participants to continue their dialog until they clearly understand the ideas of the others. During this process, the

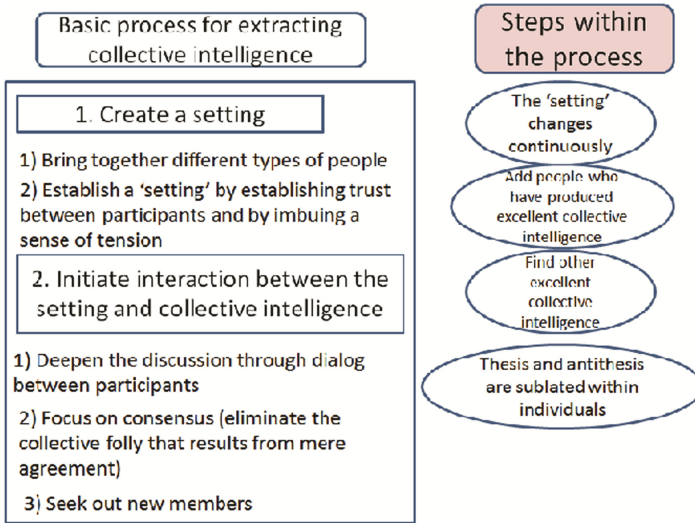


Fig. 2. Conditions for emergence of collective intelligence

facilitator finds areas of overlap between the participants' ideas. The facilitator then strives to arrive at consensus on these overlapping ideas. What is important here is that the result be consensus, not just agreement. As discussed earlier, the sole objective of 'agreement' is to avoid conflict. In contrast, 'consensus' is a realization that emerges through people's internal feelings and the relationships that they share with others. Agreement, in contrast, involves siding with another's position without clarifying one's own ideas. 'Collective folly' can emerge when decision-making is centered on agreement.

The process for forming collective knowledge is shown concretely below (Fig. 3). The facilitator first starts by forming a setting for discussion. In this setting, different types of participants gather. Next, they form the preconditions for the discussion based on each person's individual opinion. Unifying the preconditions makes it possible to prevent the discussion from being disrupted. Next, participants present their own expert opinions, and start discussing these opinions.

In this dialectic process, each individual continuously compares his or her own idea (thesis) to the ideas advocated by others (antithesis). From this process, the work of producing a higher-order synthesis is carried out. The type of collective intelligence that emerges in this 'setting' grows and changes into wisdom through a process of sincere discussion and dialog between participants.

When it comes to the fields of care and medical treatment, the care manager (or someone acting on his or her behalf) is in the best position to play a central role in bringing together the people involved, and encouraging dialog between them. At the same time, the care manager also adds new people to the discussion as needed according to the progress of the discussion. Through this kind of process, communication topics for people who need care are clarified. In the process of discussion, it is essential to share the information held by each individual person involved in providing care.

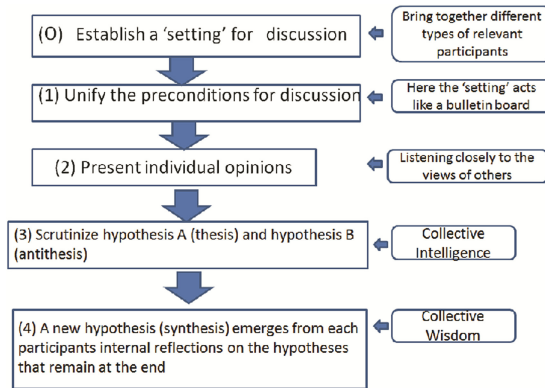


Fig. 3. Process of forming collective intelligence

4 Experiment in Creating Collective Intelligence Relating to Communication Activation for the Elderly

We consider the three measures listed below in relation to collective knowledge. We describe an ‘in situ’ discussion experiment that took place under these assumptions.

- Discussion is conducted between different types of experts.
- A ‘setting’ is established where collective intelligence can emerge.
- Through this ‘setting’, the process is advanced whereby collective intelligence emerges, and collective intelligence is formed from the outcomes of this process.

4.1 Overview of the Experiment

As an example of communication between the elderly and helpers, we created a prototype communication system using a television [2]. Elderly people converse with helpers, as necessary, through the television that they normally watch. We established a setting for a discussion between different experts on the assumption that this ICT device would be used. We then analyzed and generated conversation topics for communication with elderly people. The specific experimental conditions were as follows.

- Participants: Five individuals—a helper, a geriatric psychologist, a care device researcher, an ICT expert, and a facilitator
- Discussion time: about 2 h 30 min
- A system where the elderly person is not required to do anything but talk to a helper when necessary, and where the helper can unilaterally initiate conversation as appropriate.

4.2 Experimental Results

The results of the discussion were as follows.

- Total number of opinions expressed: 110
- Collective intelligence: 8 items
- Collective wisdom: 2 items

An example of the overall discussion is shown in Fig. 4. Eight items of [[Please confirm this change (it says “Two items of...” in the source)]] collective intelligence emerged from the views and expertise held by individual participants, and these were generalized to generate two items of [[Please confirm the addition]] collective wisdom in relation to communication with the elderly.

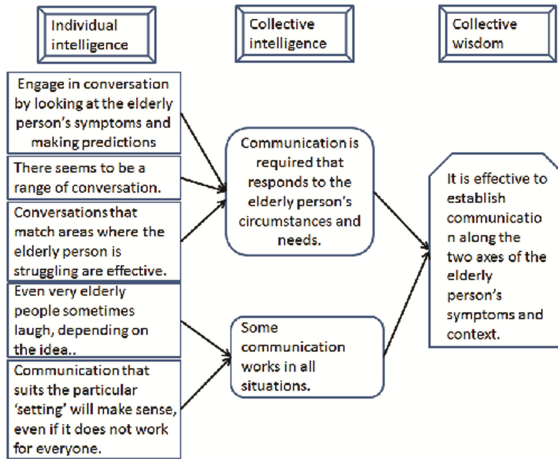


Fig. 4. Example experimental results

5 Discussion

In the process of summarizing the opinions of discussion participants via a questionnaire, we found that it was appropriate to distinguish two types of collective intelligence: collective knowledge and collective wisdom. The possibility of being able to achieve communication that is more versatile based on collective wisdom also became clear.

In this experiment, due to the theme of the discussion and the positions of the participants, the helper took a central role in expressing opinions on the actual situation in the field. The discussion then took the form of the other participants making comments on the expert opinion presented by the helper. The following comment was made by the cognitive psychologist. People’s psychological status can be in one of two states. The first is the psychology of ordinary life, whereas the other is the psychology of the extraordinary. The ‘psychology of the extraordinary’ is the state that emerges, for example, during a festival or when a special visitor comes. It may be necessary to pose communication topics in a way that takes into account these two states.

We also observed that there are two patterns in the situations where collective intelligence emerges. The first pattern is the case where the opinions of multiple participants focus on a particular theme. As a result, this is a case whereby collective knowledge

emerges after the details of this theme have been dissected and scrutinized from various angles. The other pattern is the case whereby a new idea emerges suddenly from several conversations between different experts. Both patterns can be regarded as cases where a higher-order idea emerges from an interaction between thesis and antithesis.

6 Conclusion

A lack of communication for elderly people, and those living alone in particular, is becoming more apparent, so here we considered ways to activate communication for elderly people living alone. A distinctive feature of our consideration has been the uncovering of communication themes by obtaining collective intelligence from discussions between multiple experts of different types. We found that this led to the generation of collective intelligence and collective wisdom accepted by the participants. At the same time, we also demonstrated the possibility that a debate within a clearly and realistically defined ‘setting’ can be effective in generating collective intelligence and collective wisdom.

In the future, we will continue to verify the effectiveness of the protocol by establishing ‘settings’ for discussion in different regions. At the same time, we will also consider ways of training facilitators for conducting discussions that are even more active. The debate in the experiment reported here took place face-to-face, but it can be difficult to bring various experts together at the same location. Accordingly, we also plan to conduct field work to consider discussions in virtual environments, such as voice chat and video conferencing [[We’ve used a generic description of Skype]].

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