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Study on Communication Support for Employees with ICT in Elderly Care

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Abstract. Information Communication Technology (ICT) and Robotic Technology (RT) are considered as important elements to make elderly-care sustainable. However, the development of these technologies and installation into elderly care services are not straightforward exercises. The issue becomes more difficult if one wants to apply these technologies to different countries, as differences in care practices, policies and cultures could hinder the acceptance.

To overcome these issues, the analysis of elderly care from the service system perspective is a promising approach. As part of "Meaningful Technology for Seniors: Safety, Comfort and Joy (METESE) - Models of Digital and Human Networks," a Japanese-Finnish collaborative project, this paper reports preliminary results on testing the acceptance of an SNS (Social Networking System) style information / knowledge sharing system for elderly care facilities in Japan and Finland.

Keywords: handover support system, elderly care, data analysis

1   Introduction

The impact of aging population is growing in many developed countries. The rate of population aging and the nursing care insurance payout of Japan have reached 25.0% and 9,600 billion yen in FY 2014, respectively [1][2]. Baby boomers will become latter-stage elderly (75 years old and older) in 2025, so that social burdens are anticipated to increase year-by-year. Most nursing care fields are suffering from the chronic shortage of human resources (inadequacy of human resources is 59.3%; the turnover rate is 16.5% in FY 2014 [3]). Securing reliable nursing care services is an important social subject. Improving productivity and designing a sustainable system is an urgent task.

  Information Communication Technology (ICT) and Robotic Technology (RT) are considered as important elements to make elderly-care sustainable. However, the development of these technologies and installation into elderly care services are not straightforward exercises. The issue becomes more difficult if one wants to apply these technologies to different countries, as differences in care practices, policies and cultures could hinder the acceptance.

One practical approach to overcome this issue is to study the applicability of a system that has been tested in a different country. This paper reports preliminary results of a study in which the acceptance of an SNS (Social Networking System) like system for elderly care developed in Japan was tested in Finland.

2 Background and Approach

2.1 Methodology

"Meaningful Technology for Seniors: Safety, Comfort and Joy (METESE) - Models of Digital and Human Networks" is a Japanese-Finnish collaborative project launched in 2015[4], and the aim is to explore integrative approaches to develop, implement and evaluate meaningful technologies for the elderly. The project put service system as its theoretical basis with emphasis on "multiple stakeholder interactions", "socio-technical nature" and "institutions".

As part of this project, this paper tested an SNS like information sharing system in Finland that was designed and evaluated for elderly care in Japan. The system is for employees in elderly care facilities and is designed to share awareness of the care receivers' daily conditions as explained in the following sections.

The reasons for choosing this system are based on the following hypothesis. Firstly, awareness itself could be subjective and SNS may be suitable for sharing subjective information and subjective feedback from other employees. We expect data analysis of this system will contribute to stakeholder interaction analysis of care givers and care receivers. Secondly, awareness sharing typically result in hand written memos, which is partially caused by the lack of socio-technological design in the service field. The system was developed using participatory design approaches to cope with this issue. It is expected that testing the system in different countries will provide new insights to us.

This paper reports preliminary results of two workshops in collaboration with two Finnish elderly care service providers. Evaluation results in a Japanese care facility are also described.

2.2 Information Sharing in Elderly Care Facilities

One important aspect of elderly care services is its strong connection to human life. To ensure the quality, sharing precise information about the care-receivers is very important. Fukuhara et al. [5] classified information about care-receivers into "personal information" and "task oriented information". Personal information comprise objective information regarding the care-receiver such as information specifying an individual (name and date of birth), and health information (weight, temperature, blood pressure, etc.). Usually, this information is recorded in electrical medical record as official information. Task oriented information includes knowhow of proper care

procedures, special notices, requests from the family, etc. for each care-receiver. This information is private, subjective and unofficial but important to assure good service.

Capturing task oriented information is intrinsically difficult. Employees have to pay attention to small changes of their care receiver's ADL (Activities of Daily Living) status. But most information is case dependent and related to atypical incidents and thus difficult to formalize.

This paper focuses on the issue of sharing care-receiver's task oriented information. Although this information is extremely important, it is usually shared by verbal communication (hand-written or oral) among the employees, especially at shift handover. The drawback of traditional verbal information sharing during handover briefing is that the information may not be shared among employees with non-adjacent shifts and miscommunication yields to raise of risks and low quality/productivity. The authors propose to use SNS (Social Networking System) like messaging system for sharing of non-routine task oriented information.

2.3   DANCE System

DANCE (Dynamic Action and kNowledge assistant for Collaborative sErvice fields) [5] was developed by a design practice known as 'Participatory Design' in an elderly care facility. The DANCE system is a messaging app that transmits hand-over information as a message. Users can send messages with text, photograph, movie file and emoji icons. They can also make a comment to each message with text, photograph, movie file and emoji too. One particular feature of DANCE is that every task oriented information is tagged with a care-receiver so that the messages can be sorted chronologically for each care-receiver in the "List of Residents". DANCE comprises a DANCE authentication server, data management server and can be used from a mobile app and internet browsers (Fig. 1). Table 1 presents some handover items.

Fig. 1. DANCE application

Table 1. Handover information attributes

Attribute name	Attribute value
Sent date	Sent date and time
To address	To all members, to a group, etc.
Care-receiver	To whom the message refers
Message Body	Description of handover information
Photograph	File attachment
Movie	File attachment
Read / Not read	List of employees who read the message
Importance	High, middle, low, N/A
Comment	Comments by other employees
Like!	# of employees pressed "Like!"

3 DANCE in Use

In this section, the authors report two preprimary use case analysis of DANCE. One is in Japan where the system is in real use for more than three years and the other is in Finland where the authors held two workshops to study the acceptance of DANCE in elderly care facilities.

3.1 DANCE in Japan

The DANCE system was introduced at Wakoen Long-Term Care Health Facility of Keiju Healthcare System, Tosenkai, a Social medical care corporation in Nanao-shi, Ishikawa, Japan. Wakoen consist of four care divisions (and one head-quarter office) of three inpatient houses (one house for dementia patients) and one visiting rehabilitation block. Nursing care facilities have total capacity of 190 patients comprising 150 inpatients and 40 outpatients for rehabilitation, with over 120 employees [5]. The four care divisions were grouped into three groups. Two inpatient divisions into one group (Group A); and the dementia house (Group B); and the visiting rehabilitation block (Group C); and the head quarter office group. Groups A and B provide services with overnight stays, while Group C provides day care services without an overnight stay.

Fukuda et al. [6][7] report that the number of monthly handovers and the message length distribution before and after the system installation (3 months before and 5 months after) was almost equal and that no dramatic changes were observed. Table 2 shows the rate of messages with photograph attachments in the first five months and in the entire three years (from Feb. 1, 2014 to Jan. 31, 2017).

The results suggest that using a SNS like system to share task oriented handover was accepted by the employee community successfully. One interesting point to mention is the raise of photo attachment ration.

Table 2. Rate of photographs in messages

	First five months	Three years total
Group A	19.4%	27.4%
Group B	6.4%	12.5%
Group C	5.7%	15.4%
Headquarters	15.45	13.2%
Total	13.9%	21.9%

3.2 DANCE WS in Finland

Two workshops were held in two different care facilities in Finland (Table3). After the workshop, the authors conducted interviews to the participants and the result are described below.

Table 3. Basic info about the two WS in Finland

	WS date	# of participants	ICT already in use	Type of facility
Case 1	2017 Jan	2 caregivers	PC based messaging system	Facility care
Case 2	2017 Jan	3 caregivers	Mobile messaging system w/out video and photo	Home care

Expected usage of DANCE: Participants in both cases expected to check chronological changes of the care-receivers, such as health condition and healing process in general or of specific injury, such as bedsore. Other expected use scenarios include, using for incident reports (e.g. fall down at WC), sharing places of one's belongings, and searching history (search the previous situation). Most of the scenarios are related to information sharing with other shifts by using photos.

Usage of video: A very interesting result is that participants in both cases proposed to use video to share happy situation of the customers / residents. Another video specific scenario is to share instruction video (e.g. kidney catheter, pain pump). Other scenarios include sharing information with video instead of photo (share body movement video with physical therapists). Concerns were also expressed related to privacy issues.

List of Resident Information: As described in section 2.2, a particular feature of DANCE is that every target information message is tagged with a care-receiver and users can access to messages of residents in chronological order in the "List of Residents" menu. Expectations such as managing medicine order, food restriction, chronological condition of care, were expressed.

Concerns: The strongest concern was privacy issue (e.g. getting permission to use the system), which was expressed in both cases. Other concerns seemed to stem out from the current system in use. For example, employees in the facility using PC-

based system had concern about what happens if they break their tablets (in the workshop, participant was asked to use the system with iPads). Another concern was if the system is accessible from PC. It shows that even if employees are familiar with ICT systems, introducing other type of terminals may become a psychological barrier. That is, engaging to use a new system may be challenging. Also concerns regarding overlapping with the current system was mentioned.

Others: Using of Emoji was expected to cheer up and create good mood among other caregivers, which was desirable especially for home care employees who rarely meet each other.

4 Discussion

The authors conducted a study on the acceptance of DANCE, an SNS like message sharing system, for better employee communication in Japanese and Finnish elderly care facilities and got positive feedback from both countries. The authors observed Japanese and Finnish care facilities share most of the expectation for the usage of DANCE system.

Expectation for taking photograph was high both in Japan and Finland. Table 2 shows that the image attachment rate is raising in every group (except the Headquarters). This indicates that employees are finding more and more occasions where attaching image is easier than describing the situation verbally. For example, the same idea of sharing information of personal belongings by pictures was discussed in Japan too and employees in the Japanese facility are actually using this image attachment feature in this way. One interesting comparison to mention is the need for "Urgency" indicator requested from both of the Finnish facilities. The Japanese facility requested this feature too and the "Importance" attribute indicates how urgent the message is. This feature was not in the latest version tested in Finland because of the following reason. After the system installation in Japan, this attribute was left unused. It turned out deciding the degree of urgency (high, low, medium) was difficult or confusing to some employees because all messages are "urgent" and "important" in some sense.

The authors are planning to pursue this study by gathering more data from other facilities in Japan, Finland and other countries.

Acknowledgment

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