Participatory Interaction Design for the Healthcare Service Field

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Abstract. Innovative service operations in the healthcare field should be cooperative and proactive. However, this is often difficult because separate providers have different ideas and backgrounds and little information of others' practices. For example, we found that workers in a care facility share one notebook for communication and have no incentive to improve the workflow. We also observed that most point-of-care system PDAs in a hospital were not being used to record and share information by the nurses, mainly because the system interface impeded their workflow. In addition, members of a dance sports circle, who want to improve their health, are inactive because of a lack of support. Such healthcare communities should be encouraged to be proactive and collaborate in solving problems. Participatory interaction design is important for this purpose, and so an activity methodology combined with technical systems should be developed. This paper proposes three steps towards participatory interaction design and describes a prototype of the methodology.

Keywords: Participatory interaction design, service engineering, nursing-care service, collaborative system development.

1 Introduction

The national burden of long-term care insurance costs in Japan during FY 2009 rose to 7.7 trillion yen, underscoring a continuously rising trend [1]. It is important to reduce this burden by improving healthcare service productivity and fostering a health-conscious community.

The profitability of many care services is less than 5%. Moreover, healthcare workers bear a large workload. Thus, improving productivity while maintaining the quality of service is an urgent task. Nursing-care services comprise care facility services, visiting services, and assistive device services. This paper examines facility services, because their features are similar to those encountered by nurses in hospitals. Many people from different backgrounds and serving in different roles must

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collaborate to provide nursing-care services for various residents and patients. For these reasons, service processes vary widely depending on the workplace community characteristics related to employees, patients, and the environment. Furthermore, it is difficult to collaborate effectively and gain patients' trust, both of which can greatly improve service productivity.

Given the nature of this work, there is clearly a need for good teamwork among various employees, the sharing of information related to the medical and physical condition of patients and users (especially to ensure a comfortable service process), and for each employee to maintain a high skill level. Indeed, fine-grained services like these are important to foster trust in patients and users. Without trust, user and patient satisfaction will decrease, irrespective of the quality of the service that is offered.

A business analysis of helpers in a care service facility was conducted with the cooperation of an assisted-living paid nursing home in the city of Osaka, Hirano Super Court (SC Hirano). The results, reported herein, indicate that 58% of the helpers' time was spent on work that was not directly related to nursing, and 30% of their time was spent recording and sharing information, especially computer work such as transcription and calculation. Such indirect work does not engender long-term care insurance points. Moreover, it is not directly related to the value of the care received. Therefore, research is being conducted to support the creation and visualization of work records.

To this end, attention is being devoted to the introduction of IT infrastructure to promote cooperation and alignment among employees. This should promote the development of a technological interface to facilitate an efficient workflow and limit the increase in data input work, which is not directly related to care.

This proposal encourages the active participation of employees in real-world environments to develop a system that can be expected to embed itself into the employees' natural workflow (Participatory Interaction Design). In addition, employees should be able to share knowledge in the workplace, using technology to record information whenever a task is completed (point-of-care recording). In the latter case, an input system that enables the ready sharing of necessary workplace-related knowledge should be realized, thereby creating a systematic information database that can be shared among workers.

The situation is similar in mutual-support communities, such as dance circles. Members want to improve their health condition, but some require more support from others instead of trying to change the situation proactively. The members have a varying ability to support the community, and have the potential to find a more adequate solution to activate their fellow members.

Participatory interaction design is important for this purpose, and so an activity methodology combined with technical systems should be investigated. Three steps towards participatory interaction design are proposed, and prototypes for the steps are described herein.

2 Participatory Interaction Design for the Healthcare Service Field

2.1 Characteristics of the Healthcare Service Field

There are various healthcare services, such as hospitals, nursing care homes, home help, gymnasia, and civic circle activities. These services are gradually beginning to collaborate, connecting the entire local community to enhance social capital. There are three main characteristics of such healthcare services:

- Collaboration by various professionals, such as doctors, nurses, and care workers.
- High skill levels and a broad range of knowledge, such as medical, nursing, daily support, biomechanical, education, community management, and legal knowledge.
- Customization, because each individual is different in body, character, health condition, and so on.

The value added will be measured both physically and psychologically, as shown in Figure 1. This relates to not only customers, but also employees because employee satisfaction will influence customer subjectivity.

Therefore, a community spirit between employees and customers should be fostered. This will allow mutual understanding among employees and between employees and customers, leading to the realization of a natural workflow using new IT systems shown in Figure 2. In turn, this will help each worker to share their experience and intuition, and achieve the aims of the service field.

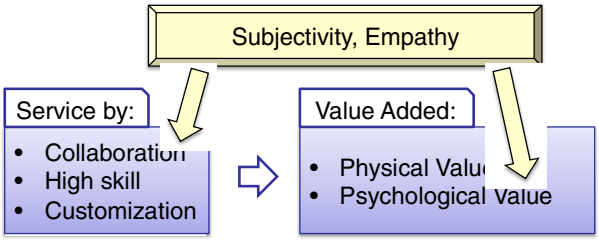

Fig. 1. Characteristics of healthcare services

Fig. 2. Tool for workplace should be developed based on the community

2.2 Participatory Interaction Design

Various system development methodologies have been proposed. Engineering design [2] provides systematic solutions for a given product specification on the condition that the needs are clear. Contextual design [3] and scenario-based design [4] enable system designers to fully understand the users and their environment, but the users do not participate in the design process. System development based on a business process model [5] is efficient for process innovation, but this is also a top-down approach with no responsible participation.

To properly embed new technology into the workflow, we should consider the subjective situation of each employee. This varies among employees, even though the experience is similar, because different characters and health conditions will influence each individual's point of view and reaction. These subjective situations are somewhat restricted, with little information about the whole service field. Inter-subjective is defined as common subjective of each members related to the service field. And the inter-subjective world tends to be small in busy workplaces because the members do not have enough time to share others' subjective. An objective view of the workplace situation can be obtained by a time-and-motion study or position/action sensor data from each employee.

In this report, participatory interaction design for the healthcare service field is proposed. This aims to encourage service field members to develop a better service process by themselves and lead the development of improved IT systems.

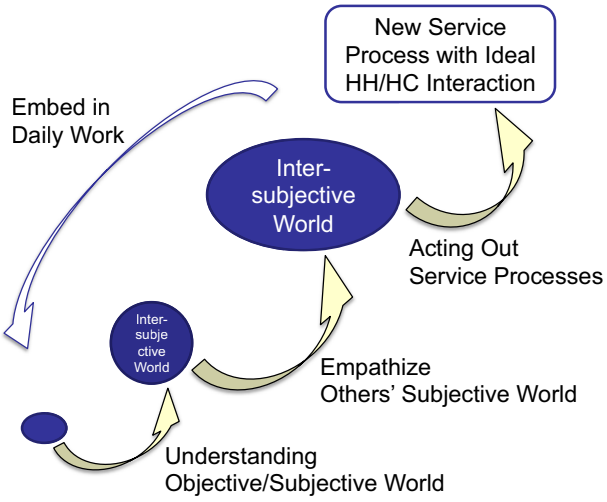

Fig. 3. Participatory interaction design

The following three steps, shown in Figure 3, are used for participatory interaction design:

- *Understanding the Objective/Subjective World.*

If employees are aware of their own actions and those of others, they are often enlightened and begin to improve the workflow. This changes their subjective world,

and makes the inter-subjective world larger. By reflecting on their subjective world, employees notice subconscious thoughts and knowledge that will modify the subjective world.

・*Empathize with Others' Subjective Worlds.*

Usually, employees do not have time to express their own subjective world and cannot know others' subjective worlds. If they have the chance to empathize with others' subjective worlds, their inter-subjective world will grow.

・*Acting Out Service Processes.*

Finally, in order to modify employees' behavior and elicit new service processes with ideal human–human or human–computer interaction, service processes should be acted out. This will allow employees to consider other workers' or customers' subjective worlds in the service process, and encourage them to change their behavior to improve the process and use the new IT system proactively.

3 Examples of Each Step

3.1 Understanding the Objective/Subjective World

The characteristics of nursing and the healthcare sector include diverse needs, numerous interruptions, and the necessity of working with others. Moreover, patients receiving the same service often require a process that is unique to their circumstances.

Therefore, it has been difficult to define an appropriate action classification code. The construction of an easily described work process code was proposed [6], and this led to the modeling and analysis of complex nursing processes. Furthermore, the total time required for each operation and process model was obtained. Another example, which shows the contents of hand-over notes, is illustrated in Figure 4. This shows that 66% of hand-over information concerned residents or their families.

These results were presented to employees and employers. Their knowledge and opinions were assessed through discussions of the current state of affairs in the business via a collaborative model.

3.2 Empathize with others' Subjective Worlds

Some complaints related to the teamwork assistance system were found to result from user community malfunctions rather than system configuration problems. User communities are usually extremely busy, and have no opportunities for mutual understanding and discussion of their service mission.

Therefore, as a second step, we held a workshop in which employees could mutually express their subjective world related to the workplace experience. The first workshop was the Zuzie workshop [7], which helped attendees to express their own ideas and those of others. Nurses do not usually express themselves, but they were encouraged to express their feelings and opinions, and found that this, and an insight

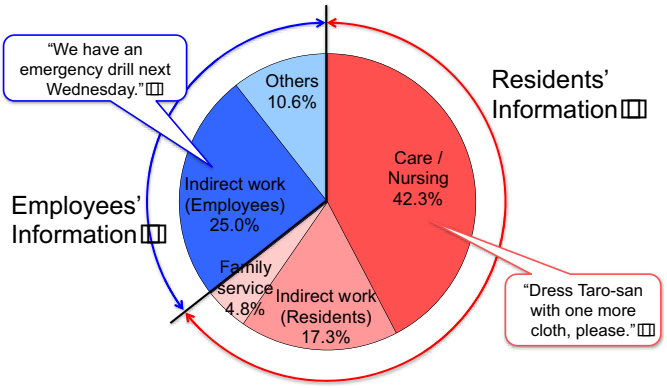

Fig. 4. Contents of hand-over notes

.Fig. 5. Scenes from a reflection, expression, and reconstruction workshop

into others' subjective worlds, was exciting. Participants were also asked to categorize their feelings on each work process and express their own desires, mission, reasons for miscommunication, and so on. Thus, their inter-subjective worlds grew.

4 Conclusion

In this study, the authors proposed the concept of participatory interaction design and showed some examples of the steps necessary for its implementation. In future research, the authors will refine and validate each step by developing an actual system. Embedding the proposed method in the service field will also be studied.

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