Toward User-driven Product / Activity Design for Health-care Services

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Abstract. This paper proposes User-driven Product / Activity Design (UPAD) that is a concept of a user-driven approach to design service processes and information systems for health-care services. In addition, the authors introduce a current activity to realize a concrete methodology for it.

Introduction

The aging population in Japan is growing at a high pace: the population ratio of 65 years and over was 22.8% in 2009 and is estimated to be 31.8% in 2030, and the expanding government expenditure for social security (about 94 trillion yen in 2008FY) is a serious problem (Kojima, 2011). When focusing on each nursing care service for elderly people, the work environment is severe and the workloads of care workers and nurses are heavy. To sustain and strengthen a social infrastructure of health-care and nursing care with limited financial and human resources, the overall efficiency of them is an important issue.

The implementation of information systems to support service processes is an effective approach to improve the quality and efficiency of them. However, human-to-human services in nursing care facilities are difficult to analyze, which becomes an obstacle to the development of a suitable system to the service field and the smooth implementation of it. The participatory design approach (Greenbaum and Kyng, 1991) is effective to design an information system

suitable to the target service field. Meanwhile, it is not necessarily cost-efficient to apply this approach to each facility.

To tackle this issue, the authors attempt to develop a user-driven approach to design an information system for health-care and nursing care services and their service processes. The authors call this design concept "User-driven Product / Activity Design (UPAD)." The authors introduce the ongoing activities based on the proposed concept in the nursing care facility for elderly people.

Concept of User-driven Product / Activity Design

The concept of UPAD contains the following three features.

User-driven, continuous design activity

One of the common problems of the participatory design approach is considerable cost for both participants and designers (Pilemalm and Timpka, 2007). Therefore, it is preferable that the continuous and efficient design cycle could be realized without the continuous participation of designers in the field, especially for the dissemination of the participatory design approach with limited human resources. UPAD promotes continuous improvement of products and activities based on the autonomy of a user community. Such a community based approach to improve certain activities can be seen in Total Quality Control or Management (Ishikawa, 1985). In this design concept, designers mainly focus on encouraging autonomous design activities of a user community with a small amount of interventions.

Simultaneous design of products and activities

The installation of a new information system into a service field often requires and even forces employees to change their activities, which makes it difficult to adapt it to the service field. To avoid this situation, the proposed concept aims at the simultaneous design of products, or information systems and activities of employees and customers. Through autonomous design activities by employees, their reluctance to change the way of working would be decreased.

Design based on subjective and objective data

In this design concept, it is encouraged to gather both subjective and objective data on service fields to improve the efficiency of the aforementioned design process. The understanding of subjective aspects of employees and customers is of course important to extract the requirements for an information system and fit it to a service field. Meanwhile, the objective analysis of service processes is also effective to understand the current status of their services. In addition, various

engineering methods and technologies to observe and analyze human activities have been developed recently (for example, Pentland (2007)). Though the implementation of such technologies should be carefully applied based on the users' autonomy, they make it easier to analyze activities of employees and customers and to describe them objectively. By combining such subjective and objective data, the understanding of services within the user community gets clearer and the communication between users and external engineers who actually develop information systems can be smoother which results in helping reducing the number of prototypes and the cost for prototyping.

Project for Developing the UPAD Methodology

To formalize the UPAD approach as a concrete methodology, the authors are actually developing systems with users in several health-care and nursing care service fields. In this paper, the authors introduce a project in the nursing-care facility named 'Wakoen'. Currently, the authors mainly focus on the facilitation of a user community and the attempt to find out further requirements for UPAD.

(1)　Initial exploration and analysis

　　As an initial exploration, the authors conducted the qualitative field research in the facility. As a result, it was clarified that the employees worked with different backgrounds and roles and they must collaborate in providing nursing care services for various residents. According to such nature of this work, there was a need for sharing information related to not only medical and physical conditions of patients but also their daily-life information for nursing care. The fluent information sharing among employees would encourage their teamwork and improve their service quality, and even promote the trust with patients.

　　In addition, the authors found that the service processes tended to vary dynamically depending on the situation and characteristics of employees and patients. To clarify the dynamics of these service processes more objectively, the time and motion study based on the task classification of nursing care services (Miwa et al., 2012) was performed. From the acquired data, the difference of workflows among employees and the time for each task were observed in a quantitative manner.

(2)　Facilitation of a user community

　　Next, the authors started with facilitating a community to improve their service processes. By showing the result of the initial analysis, the employees started considering how to improve their service processes by themselves and determined to improve the efficiency and the quality of information sharing and handover to the next persons in charge.

(3)　Prototyping

　　According to their discussion, the authors developed a prototype of the information sharing software for mobile devices. The user community is testing it

in an actual service at each division in the facility in parallel to the continuous improvement of the prototype based on the feedback. In addition, the educational effect by sharing findings in the nursing care service was expected within the user community. The role of the system is being developed by the user community.

Conclusion and Future Works

In this paper, the authors proposed the concept of User-driven Product / Acitvity Design and one of the projects for developing a concrete methodology of this design concept.

The attempt to formalize UPAD is still ongoing. The authors plan to develop a computer-aided design tool for UPAD to support the design activity by the user community. This design tool would provide functions to analyze and visualize service processes by users themselves and to communicate about the specification of the system to be implemented with external engineers. As a part of this system, the authors are planning a new information management technology to gather and store information on service environment and processes in an explicit manner. This technology would be useful for the future update of the system and furthermore for knowledge sharing with the other service facilities to provide infrastructural support for the overall nursing care service industry.

Acknowledgments

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