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On-Site-Worker-Centered Design for Work Improvements

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ABSTRACT

This paper introduces a case study of a work improvement designed with care workers on site as well as discussions on their motivation toward the improvement. For service sustainability achieved through work improvements, not only user-centered but also service-provider-centered design is important. We conducted 17 co-creation workshops for a year to design a work improvement. Though the workers tried to design a solution to create safe and comfortable aisles between tables where wheelchairs would not hit the tables or chairs, the trial resulted in a failure to implement the solution. A review workshop, which was conducted to analyze why the workshops failed, revealed that the workers were too cautious to step forward, although they learned the importance of understanding users, paying more attention to users, and sharing information among each other.

Keywords: Work improvement, Care worker, Motivation, Co-design

INTRODUCTION

Work improvements are important but troublesome for workers on site because daily tasks must change to implement the improvements, which may cause confusion on site, and this is a cause of worry for workers. This paper introduces a case study of a work improvement designed with care workers on site. We conducted 17 co-creation workshops for a year in order to design a work improvement for sustainable service. Unfortunately, the workshops failed in designing one that care workers could accept. This paper reports the result of our review workshop, which was conducted to analyze why the work improvement designed through the 17 workshops was not implemented.

ISSUES ADDRESSED

In the nursing domain, work improvements are expected due to a labor shortage problem. For service sustainability achieved through work improvements, not only user-centered but also service-provider-centered design is important (Bodenheimer et al., 2014). For service-provider-centered design, care workers on site should join a design project from the early stage and should co-create a design that they can accept. However, a co-creation project done with on-site workers can face difficulties with designing successful work improvements because workers are busy with daily tasks and must also deal with the psychological burden of accepting and implementing the designed improvement. Workers do not passively accept the results of co-creation projects (Nielsen, 2013). Thus, workshop designers should effectively motivate them so that they can join a design project and decide to implement improvements. That is, those involved in the design project should focus on what changes from work improvements are feasible and appropriate in their workplace (Storkholm et al., 2019). As for motivation in service design, Bisset introduced differing levels of the motivation of a service user (Bisset et al., 2010). Bisset's framework is useful for understanding and analyzing each level of motivation, though the target of the framework is mainly service users, not service providers. For motivating on-site workers, study done from the viewpoint of a service providers is necessary. At the nursing facility where the third author of this paper serves as a director, he expected not only effective work improvements but also effects on staff education that lead to improvements to the organizational culture. This is because on-site care workers pay too much attention to their daily tasks and do not notice problems, or they do not try to improve their work even though they are aware of problems. As Batalden mentioned (Batalden et al., 1993), work improvements need to be continually implemented, for which workers' motivation is essential. Our case study provides a discussion on the motivation of on-site workers through experiences in workshops involving the design of work improvements.

WORK IMPROVEMENT WORKSHOPS

Workshop Overview

To design work improvements at the nursing facility, we conducted 17 co-creation workshops with care workers. The workshops were held every two weeks from July 2021 to August 2022 (suspended for 3 months due to covid-19). All on-site workers at the facility were targeted for participation in the workshops, and the average number of participants was 15.3, with an average age of 31. None of the participants had design workshop experience. Each workshop was held during working hours as part of the work, and all workers were requested to participate by the director of the facility. The workshop was held in a hall of the facility for 30 minutes just before the closing time, and no extension of time was allowed.

Workshop Flow

The workshops were designed on the basis of design thinking. Table 1 shows the contents and outputs of each workshop. They started with an explanation of the purpose of the project in the first workshop, and the participants then extracted problems regarding their work environment, decided on a problem to be solved, and tried and evaluated ideas devised to solve it. We repeated the stages of empathy, definition, ideation, prototyping, and test of design thinking. In the 4th to 6th workshops, to give the participants the experience of a small success, although it was not related to the main topic, we asked them to prototype a leaflet introducing the facility (Ihara et al., 2022). After that, in the 7th workshop, a questionnaire was conducted to ask them to answer the questions regarding the workshop experience such as their willingness to cooperate with the project, and the results were used to improve the design of subsequent workshops. In the 8th workshop, an issue with aisles in the hall was identified as a significant problem because wheelchairs hit chairs and tables in the hall. To solve this problem, in the 9th and 10th workshops, the idea of changing the layout of the tables to a hexagonal one throughout

Table 1. Contents and outputs of each workshop.

#	Stage	Contents	Outputs
1	-	Introduction and explanation of purpose of project	Rapport building
2	Empathize and define	Extraction of problems and strengths of work environment	Organized data for issue definition
3	Ideate and test	Selecting an issue, and creating and testing ideas to solve it	Decision to solve issue with aisles
4	-	Leaflet workshop: Empathize	Evaluation of current version of leaflet
5	-	Leaflet workshop: Define and ideate	Defined problems of current version of leaflet and ideas to solve them
6	-	Leaflet workshop: Prototype and test	Leaflet prototypes and evaluation results
7	-	Informed consent and questionnaires	Evaluation results on workshop design
8	Define	Identifying target aisle and problem	Detailed information on issue to solve
9	Ideate and test	Ideating to solve target issue and voting on favorite idea	Idea of table layout change
10	Ideate and test	Ideating for concrete table placement and voting on favorite idea	Idea of hexagonal table arrangement
11	Prototype	Creating concrete layout with paper prototypes	Idea of placing table slightly off hexagon
12	Test	Analyzing problems with hexagon layout	List of problems
13	Ideate and test	Ideating to solve problems	List of solutions to solve problems
14	Prototype	Trial and error of table placement in hall	List of lessons learned from trial and error
15	Test	Analyzing necessary preparations to implement layout change and confirmation of workers' acceptance	List of preparation tasks and consensus on implementation
16	Prototype and test	Trying rearrangement using designated test table	Workers' own successful experiences
17	Prototype and test	Determining specific table layouts and organizing solutions to solve problems	Table layouts and list of solutions

the hall was adopted (note that there exists long island tables that cause the problem of narrow aisles). The participants experienced both a paper prototyping (Figure 1) and trial and errors in the hall (Figure 2) regarding the table layout change. In the 12th, 13th, and 15th workshops, they analyzed possible problems and necessary preparations to implement the change. In the 17th workshop, they determined the table layouts with solutions for the possible problems; however, they decided not to implement the layout change.

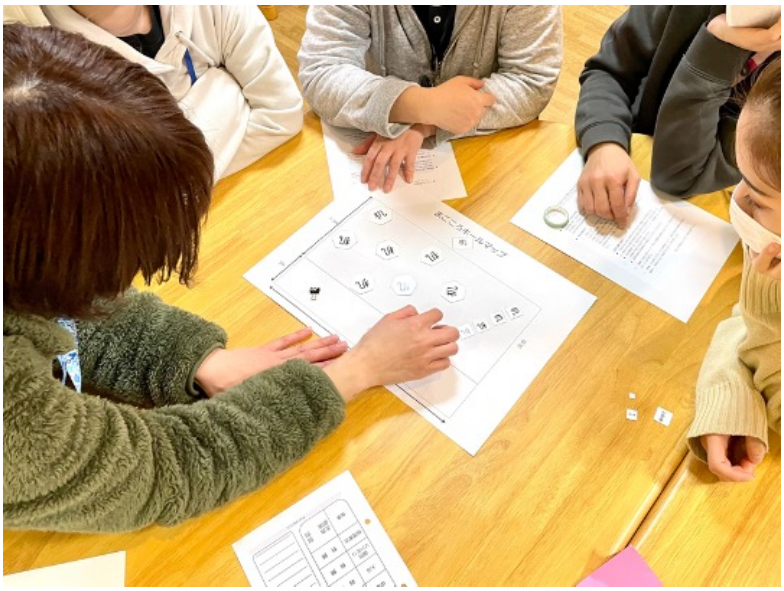

Figure 1: Paper prototyping of table layout change.

Figure 2: Trial and error of table layout change.

REVIEW WORKSHOP

After the 17 workshops were completed, a review workshop was conducted to investigate why the workers gave up on changing the table layout and how they changed their mindset through the workshop experience. In the review workshop, 13 participants answered for the following two questions using sticky notes.

Q1. What made you decide not to change the table layout finally? What do you think could have changed the layout?

Q2. What did you learn from the workshop experience? Write down changes in yourself, such as what you have learned and changes in your mind.

A sticky note with each participant's answer was posted on a board, and all participants voted for which sticky note they agreed with. Answers and voting results for Q1 and Q2 are shown in Table 2 and Table 3, respectively.

Table 2. Reasons table layout change was not adopted (answers to Q1).

Category	Answer	Vote
Disadvantage	Currently, there are more disadvantages than advantages.	9
Preparation	Lack of planning (need to notify patients early)	3
	Insufficient time for layout study	2
	Transition period required	1
	Insufficient time for table placement and patient briefing	0
Physical space	Size of hall should match number of tables.	0
	Lack of aisles and placement space for wheelchairs	0
	Change placement of rehabilitation equipment to create space for table	0
Patient care	Considerations to avoid patient confusion	2
	Confusion among patients who think their current seat is good	0
Detailed analysis	Number and condition of wheelchair users should be confirmed.	0
	Restrictions to decide seat due to compatibility between patients and wheelchair use	0
Process	Should consider patient's flow line before considering seating arrangement.	0
Necessity	Current table layout is enough.	0

DISCUSSION

According to the results in Table 2, workers were concerned about the disadvantages of changing the table layout and the lack of sufficient preparation. The facility director's expectations for the workshops were that each worker would become more aware of their work and recognize the importance of "trying" through trial and error, and that the workers would encourage each other to improve their work based on their own decision even if they make a few mistakes. The workshops were designed so that advance preparations could be made by identifying problems that could arise if the designed work improvement was implemented and so that the workers could think about solutions to the problems. However, the workers gave up on the implementation due to lack of preparations. Changing the overall table layout to widen

the aisles would have required modifying patient seating, which was decided based on various considerations such as wheelchair use and the flow line to the rehabilitation equipment. It is also necessary for the workers to give explanations to patients so as not to confuse them. It may have been necessary to design a workshop that could clearly convey the aim of the facility director to the participants who were concerned that "failure is a bad thing and should be avoided."

On the other hand, regarding worker education, the workshop experience was effective in terms of mindset and behavior in daily tasks (see Table 3). The participants learned the importance of understanding patients and paying more attention to them. In particular, many participants voted in agreement with the need for workers to share opinions among each other, suggesting that they learned various opinions from other participants at the workshop. At the workshop, we intentionally had more discussions in groups of about 5 people, and we posted the results of individual work on a whiteboard for voting. These workers work collaboratively day-to-day, and task skills can be learned through this. However, it is difficult for the knowledge and viewpoints of workers to be shared in busy daily work.

Table 3. What the workers have learned through workshop experiences (answers to Q2).

Category	Answer	Vote
Understanding patients	Being aware of patient behavior	2
	Understanding patient activity areas	1
	Knowing relationships between patients	1
	Knowing more about patients	0
	Knowing patient's movements	0
Attention	Securing a walkable flow line before guiding patient	3
	Now that I know where the problem is, I always pay attention to it and guide the patient.	1
	Carefully watching patient's movement	1
	Observing patient's movement and looking for any inconvenience or anxiety	0
	In narrow aisles, talking to sitting patients and putting away chairs	0
	Thinking more about better use of hall and wheelchairs when guiding patients to their seats	0
Information sharing among workers	Necessity of sharing opinions among workers to know what they miss	5
	It is important to know the other person's point of view and communicate one's own point of view.	0
	It was good to post other people's opinions on the board and vote.	0
Importance of trial	Discussions and exchange of information are necessary, but nothing will change if no action is taken.	0

In the workshops, the facility director expected work improvements to be made through worker independence, but in the Bisset framework, this corresponds to "autonomy," which is the highest level of intrinsic motivation. It is not easy for workers who are too used to routine work to suddenly reach the highest level. In fact, the effects of the workshops were limited to understanding the relationship between the content of improvements and the workers

themselves ("relatedness" in the Bisset framework) and the motivation of the workers' ability level ("competence"). As for the design of the workshops, it is necessary to gradually improve the level of motivation.

We think the intrinsic motivation could be enhanced by both the design of the work improvement workshops and the design of work style changes. As for the former, we included in the workshop design functions for extracting assumed problems during giving care services with the implemented solution and devising ideas for problem solving, but the effects were insufficient. In the future, workshop design should involve designing the interaction between workers and improvement content, in addition to having workers create work improvements themselves. In other words, it is expected that workers' autonomy will be enhanced by promoting a deeper understanding of both the advantages and disadvantages of work improvements and the effect that changes in worker behavior will have on the implementation of the improvements. As for the latter, work style changes depend on both behavior changes of workers and the design of the work environment (Lockton et al., 2010). Regarding the work environment, there is a workplace model called activity based working (ABW) that provides employees with different work environments for different types of work. ABW is generally considered unsuitable for nursing facilities, but from a functional point of view, these facilities have separate spaces for different purposes such as a place for bathing assistance and one for rehabilitation. However, a characteristic of nursing facilities is the presence of patients and the lines of movement between various dedicated spaces and patient seats. Since the flow lines in nursing facilities are complicated, the concept of public space design could be used as a reference. In addition, since both users and providers of a care service coexist in the same nursing facility space, the design of educational facilities such as schools could be a good reference. Workshops should be designed where participants are intrinsically motivated to create work improvements using those references. Furthermore, to utilize worker motivation to improve work, it is important to analyze workers' well-being and performance from the perspective of workplace resources (Nielsen et al., 2017). Finally, in terms of designing a co-creation project, it is important to consider various principles (von Thiele Schwarz et al., 2020) and intervene in nursing facilities as cooperative organizations.

CONCLUSION

This paper introduced the result of work improvement workshops conducted with care workers as well as discussions on their motivation toward the improvement. We believe that the contributions of this paper are as follows. First, we presented a case study analyzing work improvement workshops conducted with on-site care workers, although they resulted in failure. Second, we analyzed the motivation of the on-site care workers, who are important as service providers in the field, in order to improve the workshop design. Future work will include a better workshop design that raises the motivation level of the workers step by step and exploring how to effectively motivate workers to change their work style and workplace.

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