Design Thinking: A New Approach for OHS Professionals to Address Complex Problems

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Abstract. Design thinking (DT) provides innovative tools that may be applied to manage complex musculoskeletal or psychosocial problems at work. In this project researchers trained OHS professionals to apply DT tools. The training included organizing and facilitating three design sprint workshops of 3–4 h duration. The sprint workshops created solutions to complex psychosocial or musculoskeletal problem in a company. The researchers kept track of the progress by observing the workshops and conducting semi-structured interviews. Data was coded and analyzed in accordance with the template analysis method.

This paper evaluates the outcome of the design sprint workshop processes.

Design thinking tools enabled the OHS professionals to solve complex problems in a different way than they normally would. Two main differences stood out. The first was the DT approach was more participatory and the second that it created a deeper understanding of the problem, before any solutions were created. The sprint workshop process resulted in planned and tested solutions that the companies could subsequently implement.

Keywords: Design thinking · Interventions · Problem solving · Participatory methods · Creativity

1 Introduction

Certain occupational health and safety problems are hard to manage with conventional methods. This is often true for musculoskeletal and psychosocial problems as these are characterized by being difficult to measure and having interdependent causes [1]. We propose that design thinking provides innovative tools that can be applied to manage complex musculoskeletal or psychosocial problems.

Design thinking is a term for the way designers work, when translated to fields outside design [2]. In a Scandinavian context it sits within the field of participatory design, which is characterised by the user being a partner in a co-creation process [3]. The participatory design tradition is a good foundation for the work of occupational health and safety committees as workplace democracy is a core prerequisite [4] for their role.

The design sprint is the key method in DT and often illustrated as a double diamond (see Fig. 1) [5], where the diamonds represents a non-linear and user-centred

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problem-solving process iterating through divergent and convergent phases of exploring a problem, defining the problem and then finding and testing solutions via prototypes.

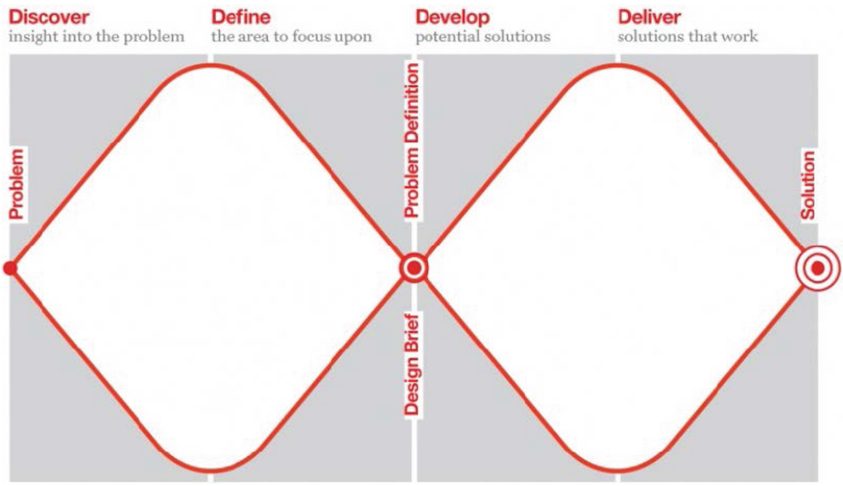

Fig. 1. The double diamond model from the British Design Council [5]

DT translated into fields such as health, where it was used to guide an innovation process by means of a series of compact workshops for a group of participants, based on rapid ethnography methods [6]. The project reported here has the similar aim to translate the DT approach to OHS management as a supplementary method.

The researchers trained OHS professionals to apply DT methods in four companies in a learning by doing process. Their task was to facilitate design sprints following the double diamond model, but centred on solving a complex work related musculoskeletal or psychosocial problem. This paper reports the preliminary evaluation of the outcome. The research question is:

- What characterizes the process of solving complex workplace problems with Design Thinking?

It is also relevant to pinpoint what is new and different about this approach, compared to how OSH professionals would normally do.

2 Methodology

The project design is a case study of four cases involving both internal and external OHS professionals and musculoskeletal and psychosocial work problems.

The researchers trained a small group of OHS professionals to apply DT tools and to organize and facilitate three design sprints. A design sprint within product and service companies takes a full week and follows the iterative double diamond process [7]. For

this study the professionals compressed the process into 2–3 workshops of 3–4 h duration. The sprints aimed to solve a complex psychosocial or musculoskeletal problem, identified by the company.

Case I) Two OHS professionals conducted a series of design sprint workshops to manage a musculoskeletal problem in their own workplace - a pharmaceutical company.

Case II) An OHS professional did the same as an external consultant for a package distribution center.

Case III) Two OHS professionals conducted a series of design sprint workshops to manage a psychosocial problem in their own workplace - a municipality service.

Case IV) An OHS professional did the same as an external consultant for another municipality service (Table 1).

Table 1. Distribution of cases

	Musculoskeletal problem	Psychosocial problem
Internal OHS professionals	Case I	Case III
External OHS professionals	Case II	Case IV

The researchers collected various forms of qualitative data as summarized in Table 2 below. For each case, the researchers has compiled a detailed case report based on observation notes, creations from the workshops, photos and materials from the companies.

Table 2. Data collection

Respondents	Interviews	Observations
7 OHS professionals	Before and after full training program At time of evaluation	Case I: 8,5 h of sprint activities Case II: 15 h of sprint activities
9 OHS committee representatives from 4 case companies	Before and after sprint At time of evaluation	Case III: 4 h of sprint activities Case IV: 10,5 h of sprint activities

The data was coded in the software program Atlas.ti and analyzed following template analysis [5].

3 Case Settings

This section will zoom in on case I and IV as they represent the span of cases well. Case I was facilitated by internal professionals and focused on musculoskeletal health while

case IV was focused on psychosocial health and facilitated by an external professional. Figures 2 and 3 outline the sprint process in each case.

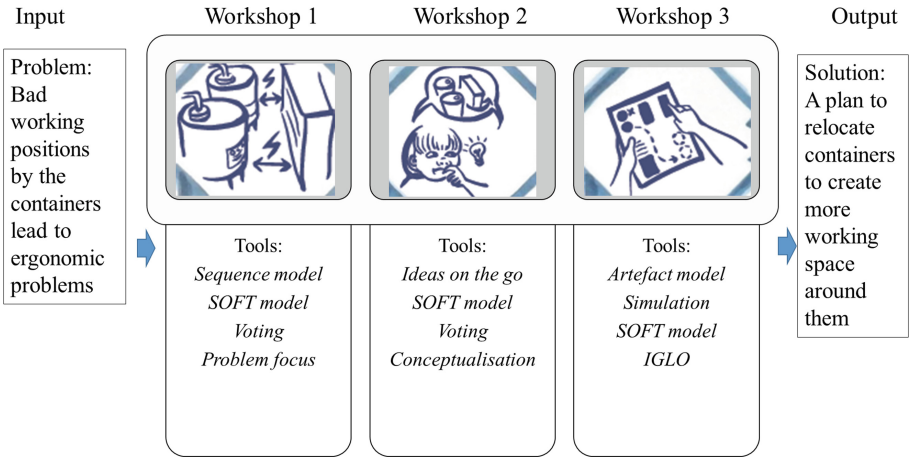

Fig. 2. Musculoskeletal problem sprint

In the first case two internal OHS professionals conducted a sprint to solve a long-standing musculoskeletal problem. The problem was vaguely defined as 'ergonomic issues in laboratory x'. The vagueness reflected that the OHS professionals only knew from annual risk assessments that there were a worrying number of complains and injuries connected to the work in one of their laboratories.

In an initial mapping of the area and problem, the work area surrounding two large containers was identified as the most problematic. The design sprint therefore focused on the work tasks connected to these containers.

The professionals planned and facilitated three workshops of 3–4 h duration. To participate they invited a group of directly affected employees with hands-on experience of the problem. They made sure to invite people representing the diversity of professions and experience within the workplace and the relevant manager. In the workshops, the ten participants applied DT methods in an iterative process following the double diamond model. By the end of the last workshop, they had developed and tested a solution to separate the containers. Subsequently the company followed the suggestion and moved the containers to a better position.

In case IV an external OSH professional was engaged to help a municipality health service address a problem of work pressure. This had been identified in their annual risk assessment and by the work authorities. The OHS committee obtained permission from their manager to engage an OHS professional and briefed him of the problem. Said professional planned and facilitated three workshops with the OSH committee members and their manager as participants; 5 in total. Thus the starting point was the vague knowledge that 'work pressure' had been selected as a problem in their risk assessment. In the course of the sprint, the participants realized that their collaboration interfaces were the best levers to improve their collaboration and thereby divide the work better,

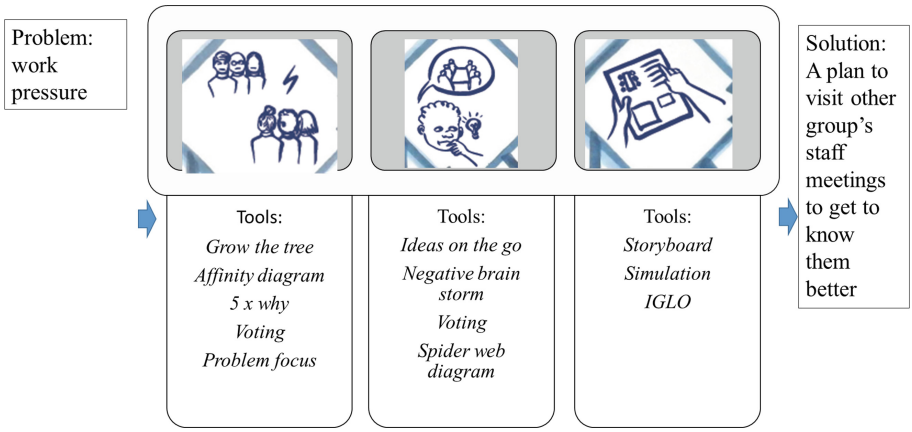

Fig. 3. Psychosocial problem sprint

which would lower the work pressure for those most affected. Also everyone would waste less time if the collaboration interfaces improved. So they drafted a plan to get to know the other teams and their tasks better. The municipality service has currently not carried out the plan, due to Covid 19 restrictions.

4 Results

One part of the data is self-reported from interviews with the professionals and OSH committee representatives, the other part is notes from the researchers' observations of the sprints. Both parts conveys information about the differences between a normal approach to solve a complex OHS problem and the design thinking approach.

4.1 Self-reported Differences

From the interviews the elements that stand out as different, in the design thinking approach were; the participatory element, the time spent, the engagement from the participants, the ownership to the solution and that the design thinking approach is more resource demanding.

The professionals described their normal procedure as 'by the book', meaning that they would normally follow the procedures that applies in their company. In the DT approach, they drew upon their own employees as experts in their specific problem.

A professional described the novelty in the design thinking approach this way:

'Normally we would have applied our company system in which we operate with only one cause, not interrelated causes, as we explored here. We also would likely have called upon an expert from outside instead of involving a group of our own employees. I would say the user participation is the difference.'

[Interview with professional in case I].

5 Observations

From the analysis of the observational data, the problem solving process stands out as the main difference.

In the sprints, the OHS problem was investigated as a design problem centred on defining the problem in the first diamond. The workshops illustrated very clearly the iterative nature, going back and forth in the double diamond. It was remarkable how the problem was framed and reframed by the participants during the process. In case IV, it started out as a matter of work pressure, then turned into a matter of imbalance between work requirements and personal resources, and then into how to ensure clear collaboration interfaces with other disciplines and collaboration partners.

Activities in the second diamond included developing many solution ideas. Creative tools like negative brainstorming facilitated this. Solution ideas were then tested by prototyping tools like storyboards, table-top simulation with LEGO and using simple mock-ups.

In both cases, the professionals and their participants managed to create tangible and simple solutions that were a good fit for their specific context.

In case I for example, the designed solution was to separate two containers to create better access for the ones working in their vicinity and avoid awkward positions.

6 Discussion

The main question is if the outcome of a design thinking sprint is worth the extra resources? The interviewed professionals stated that they spend more time on planning the sprints than they normally would for planning a process to manage a similar problem. But it was also a learning process for them and an unusual role to facilitate a sprint. Thus it is likely to get less time consuming with more practice. And even with the time it cost the interviewed company representatives stated that the created solutions were worth the extra resources.

The benefits included:

- The creative tools brought about new insights and ideas.
- The participating stakeholders took an active role. For example, the employees brought different context specific knowledge to the table and thus acted as experts of their own work situation. The participating managers were able to ensure that the created solutions were realistic.
- Fast feasibility evaluation of potential solutions by prototyping tools.
- Increased local ownership to solutions due to the participatory approach.

A limitation was that the participants in the sprints were not used to working creatively the way a designer would be; only few of the participants were able to draw a storyboard the way it was intended, for example.

7 Conclusion

We evaluated the design thinking approach as a method for OHS professionals to solve complex OHS problems in four real life cases. The professionals and their participants were able to find and test solutions that were feasible for their specific situations. However it is a new role for the professional as well as for the participants and requires training. The participants' engagement in creating the solution has the added benefit of ownership to the solution.

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