

WHEN DESIGNERS ARE NON-DESIGNERS: OPEN ENDEDNESS VS. STRUCTURE OF DESIGN TOOLS

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ABSTRACT

In this paper, we explore types of toolsets that are suitable for design thinking processes, when design teams consist of non-designers. We have conducted a series of workshops to experiment with open-ended, semi-structured and structured tools, using design thinking for libraries as a research case. Our results clearly indicate that semi-structured tools fare best regarding variety of outputs, breadth of ideas and engagement of participants.

KEYWORDS

Design thinking, team creativity, tools for design thinking.

1. INTRODUCTION

Design thinking (DT) provides a tremendous opportunity for designers and non-designers alike to create new and sustained creative and innovation-oriented practices. Design thinking has been advocated across many areas of business, e.g., (Brown, 2009; Lockwood, 2009; Martin, 2009) and has emerged as a desirable orientation towards innovation within many organizations. DT has been outlined as a co-design method in teams, often multidisciplinary and including users and other stakeholders. It has been framed as a process, both in the academic literature (Björgvinsson et al., 2012; Cross, 2011, 1982; Schön, 1983) and in the commercial design practice (IDEO, 2014). While framing of the process as a design practice may differ among authors, it can be described as a sequence of actions related to problem definition (understanding of the problem space, users and their needs), ideation, prototyping, and evaluation. These practices that are based on DT processes are supported through use of diverse methods, tools and techniques, frequently including design ethnography, different forms of mapping (affinity, mind, concept), brainstorming, visual representations of ideas (sketching, storyboarding), prototyping and evaluation techniques (ranging from rapid idea evaluation, to prototype testing).

The design thinking approach to innovation has been in focus within several different academic fields, design (Buchanan, 1992; Cross, 2011), service design (Polaine et al., 2013; Stickdorn and Schneider, 2012), management (Johansson-Sköldberg et al., 2013; Lockwood, 2009) and interaction design and HCI (Culén and Følstad, 2015; Finken et al., 2014) among others. However, findings from these diverse fields, especially when it comes to multidisciplinary teams, their creativity and tools that should support it, are still not fully explored. In particular, little research is drawn from fields such as psychology or creativity studies that address team compositions and tools that support design-thinking practices in organizations. The importance

of team composition and tools that the team works with grows when teams include non-professional designers or are even exclusively composed of non-designers.

In this paper, then, we focus on how to make tools that are suitable for DT processes when design teams consist of non-professional designers, supported by at least one researcher experienced in DT, and with at least one member with background in either design or art. As all authors are researchers engaged with design thinking and design thinking practices in the context of libraries, DT tool set design for libraries was chosen as a case for this paper. The paper describes reflections and lessons learned from three workshops that were conducted with four matched teams of participants. The teams included library employees, students in library and information sciences, graduate students in interaction and HCI design, researchers experienced in DT, designers or artists (not necessarily familiar with innovation through DT processes). At least one library employee on each team was familiar with DT, and at least one participant was a novice to DT. What is important to mention is that, in addition to findings from the literature on DT and team work, e.g., (Toh and Miller, 2015) that support similar choices, this team composition corresponds to how we commonly compose teams in our own innovation through DT library work.

Multiple toolkits, e.g., (“Design Kit”; “frog Collective Action Toolkit | frogdesign.com”; “Use our methods”) have been designed to support DT processes in organizational settings, where more frequently than not, novices to design thinking are part of the design team. Some of the toolkits were made specifically for supporting design thinking within libraries (“EN | Libdesign”; IDEO, 2014). While these toolkits on design thinking may be useful on occasions of starting a new project(s), they are not enough to create sustainable innovation and prototyping practices in the library (Pandey, 2015). In his paper, Pandey suggests that these toolkits are too abstract and too far removed from actual organizational work practices to be adoptable for sustained organizational innovation and to become a source of change in non-design practice (ibid.). Therefore, he argues that DT tools and methods need to be kept semi-structured by design, allowing for collaborative co-shaping, appropriation and improvisation during use by participants involved. Extending this line of argumentation, our concern was the level of open-endedness vs. structured guidance that the tools that we designed afforded during the DT process. However, as we consider tools to be inseparable from the group of people using them, we also were concerned with how concepts of openness to experience and conscientiousness, correlated to abilities of divergent and convergent thinking within the field of personality psychology, trying to use this research to make team compositions that support different styles of thinking. At the same time, the teams were to have approximately the same sets of skills and abilities. Their work, then, could be used to discuss how tools mediate interactions within teams and how are expected outcomes related to the use of more structured vs. more open tools when working with multidisciplinary teams.

Our paper contributes to better understanding of design thinking tools, when multidisciplinary teams composed of non-designers use them. In particular, open-endedness opposed to fully structured tools was explored. We also make a contribution by actively using the research from psychology and creativity studies. We believe that both fields have much to contribute in helping shape creative practices when working on design with non-designers. Findings indicate that semi-structured tools work best with respect to generating outputs, breadth of ideas and engagement of participants.

The paper is structured as follows: the next section provides a short background for this paper. Section 3 presents our case, including methods, participants and tools. Section 4 presents findings and discussion. Conclusion ends the paper.

2. BACKGROUND

Amabile (Amabile, 1983) conceptualized a framework for creativity, consisting of domain-relevant skills, creativity-relevant skills, and task motivation, which represent a set of necessary and sufficient components of creativity. These cognitive abilities, personality characteristics, and social factors were seen as contributors to creative process. In line with Amabile’s framework, recent research in psychology shows that there is increasing evidence suggesting that individual differences in creativity reflect particular combinations of thinking styles, affective dispositions, and motivational preferences, e.g., (Soroa et al., 2015). Some researches also addressed issues of creativity within design teams, e.g., Toh and Miller (Toh and Miller, 2015) who used personality traits and risks attitudes on creative concept selection to study creativity of engineering teams. Since (Costa and McCrae, 1992) introduced the five factor model (openness to

experience, conscientiousness, extraversion, agreeableness, and neuroticism) of basic personality traits, the model has been subject of discussion, refinement, attempts to quantify, correlate and measure diverse related characteristics. Some of this research has direct relevance for design thinking processes. For example, divergent and convergent thinking, both crucial to successful outcomes of design thinking, have been strongly correlated to openness to experience and conscientiousness, respectively (Kaufman et al., 2013; Kaufman, 2013; Mussel et al., 2011). Kaufman refines the concept of openness to experience, and looks at how its four facets (explicit cognitive ability, intellectual engagement, affective engagement, and aesthetic engagement) affect creative achievements.

Furthermore, recent discourses on creativity include not only balancing of spontaneous (divergent, open) and controlled (structured) processing of creative cognition (Mok, 2014), but also how creativity expresses itself in everyday life. In her paper (Tanggard, 2013), Tanggard goes beyond considering convergent and divergent thinking, anchoring creativity in social practice and suggesting that 1) creativity is an everyday phenomenon resulting in continual processes of “making the world” 2) there is a close relationship between human beings and material tools in the creativity process and 3) there is a close relationship between continuity and renewal, meaning that materials, tools, things, institutions, normative practices and “ways of doing” already in the world are taken as starting points for new creations. The second point that Tanggard makes was of a particular interest for this paper, as we wanted to deepen our understanding of how to work best with tools for DT and also how to design them for other non-designers to use as tools for sustained innovation practices, in line with Tanggard’s points 1) and 3). Similar findings have also been made by Pandey (Pandey, 2015), where the author states: *“for catalyzing sustained reflexive and collaborative transformation of work practices, design thinking practices need to be transformed into proto-practices, i.e., design methods novel to an organization need to be integrated with familiar elements from the context and the practice of the organizational communities involved”*. Pandey has explicitly studied prototyping practices in the library settings, and appropriated the sustainable practice design framework from (Kuijjer et al., 2008) with the DT approach to frame new practices that can take root at the library. Involving bodily performances, creating crisis of routines and generating a variety of performances are highlighted by both Pandey and Kuijjer et al. as means of configuring new practices and hence are also considered in this paper as tools that help creative processes. We describe the use of these factors in detail in the context of our case study in the following section.

3. DT IN LIBRARIES: INTERPLAY BETWEEN TOOLS AND PEOPLE

This section describes our case, which focuses on the use of design thinking in libraries, and presents our method to explore the relation between tools, group composition and both creative and new knowledge production related to the process. Recently, design thinking has become one of the important ways that libraries try to use to innovate their services and improve user experiences. Libraries are also in the process of re-evaluating their role in community lives, affected strongly by the recent advances of technology (Culén and Gasparini, 2015, 2014; IDEO, 2014). Therefore, libraries are, a very good case for methodological and work-practice related studies examining the implementation of design thinking as a way of fostering changes and establishing innovative practices that are not disruptive, but rather sustainable over time.

3.1 Method

In this research, we have used a workshop format to explore expected outcomes of DT processes when tools used for DT varied in the degree of open-endedness. Three workshops were carried out, the first one using the structured and semi-structured tool set, the second used completely open-ended tools, and the third workshop repeated a session with semi-structured tools, but used a different research facilitator and new participants. All workshops gave 15 minutes long introduction to DT, for participants who were not familiar with it; followed by 45 minutes of DT process work based on a given task.

The first workshop was run in two sessions. Two teams (5-6 participants per team, including facilitators) participated in each session, see Figure 1. The first session was facilitated by the research team one (RT1), while the second session was run by the research team 2 (RT2). The team with 5 participants had one facilitator, and the larger team two. Both research teams have long experience with DT, but are not trained as professional designers, exception being one of the researchers on RT2 who also has design background.



Figure 1. The participants of the first workshop. Method cards on the right, one card per team, were used to formulate a design brief: use the card, as a departure point of DT process, to create an online presentation of the method on the card

During the first 45 minutes session, both design teams were led by RT1 and both used *structured* tools inspired by (IDEO, 2014), see Figure 2. The method cards shown in Figure 1, right, were designed by some of the authors (Zbiejczuk Suchá et al., 2015). The cards were used as part of the design brief. The design teams were to use DT to find out how to best represent one of the method cards on some digital platform. After a break, the second 45 minutes session, facilitated by RT2, was carried out. This time, both teams used a *semi-structured* approach that incorporated diverse bodily performances, creating crises of routines and generating variety of performances. Subsequently, RT1 and RT2 facilitators joined for a reflection on actions and discussion of outcomes. RT2 facilitated the second workshop couple of weeks later. The workshop had a total of 6 participants, whose skills and background matched participants of the first workshop. The format of the workshop and the design brief were the same as for the first workshop (15 minutes long introduction in DT for novice team members, followed by a 45 minutes long design process). This time an *open* approach was used. Reflection and discussion of achieved results concluded the workshop. RT1 facilitated the third workshop, with total of five participants. This workshop took place at the same time as the second one, but they were not co-located. Everything was done in the same way as before, but the *semi-structured* approach was repeated in order to see how well it worked under different facilitation.

3.2 Participants

20 individuals in total, divided into four design teams, participated in the above-described workshops, and as specified in the Table 1. Two teams participated in two design sessions each, while the third and the fourth team had a single design session. Teams were matched by their background as follows: 1 participant on each team had art or design background (although some, at present, were pursuing different education), at least 1 was a library employee with prior experience from at least three DT workshops, at least 1 team member was a novice to DT and was either a library employee or a student, and finally, at least one (and at most 2) members were research facilitators. These background combinations were intentional, ensuring that each team would have a person skilled in divergent thinking, and a person skilled in convergent thinking. Since research facilitators were familiar with those who had previous experience with DT in libraries, their engagement level, motivation and cognitive skills observed during other workshops were also taken into account. Teams were to be as equal as possible regarding skills and personality traits, so that the differences in outcomes could be co-related with qualities of tools and, as little as possible, differences among teams.

3.3 Tools and Sessions

As mentioned, the main differentiator between sessions 1-3 was openness of tools and support they provided in creative processes. Session 4 was carried out to verify results from the first workshop.

What we call tools in this paper, are objects, such as method cards, verbal and written instructions to follow, canvases providing a way to organize input or ideas, visual tools, such as sketches, post-its and other things that influence productivity and creativity during the design process.

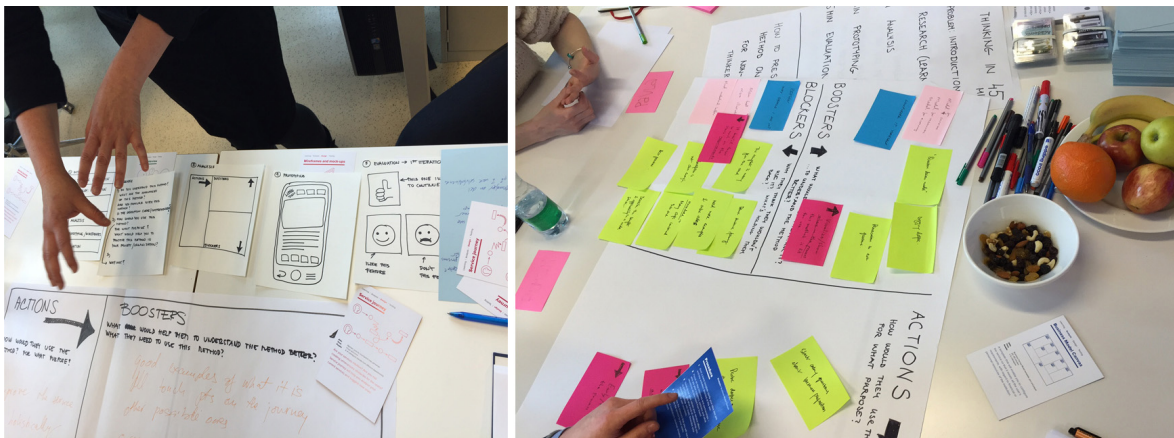


Figure 2. Guided work during the Session 1, with the tools inspired by IDEO: a set of method cards by LibDesign, an interview guide, boosters, blockers and actions map, a quick evaluation of generated ideas guide

A set of tools used in conjunction with different sessions is provided in Table 1.

Table 1. Summary of workshop sessions, approach and tools used

	Facilitators	Approach	Participant teams	Tools
1 st session Workshop 1	Research team RT1	Structured approach	T1 (5): 3 researchers, 1 novice student, 1 librarian. T2 (6): 3 researchers, 1 librarian, 2 novices	Focused sheet with research questions, post-its, markers, pre-designed canvas, cards
2 nd session Workshop 1	RT2	Semi-structured approach	T1 and T2, same as above	Post-its, whiteboard, index cards, markers, cards
3 rd session Workshop 2	RT2	Open approach	T3 (6) 3 researchers, 2 librarians, a novice student	Markers, paper, whiteboard, cards
4 th session Workshop 3	RT1	Semi-structured approach	T4 (5) 2 researchers, 1 librarian, master students (novice and some experience)	Post-its, whiteboard, index cards, markers, cards

Method cards (Zbieczuk Suchá et al., 2015) were given to each team in all sessions. The card set is to be digitized and the activity in all sessions focused on how to represent the method cards digitally. Each team got one card to work with. Participants were to use quick ethnography and interview someone outside the workshop on how they understand the method card. Are images clear? Are they self-explanatory? Is the text clear, do they understand the essence of the method? Workshop participants had 10 minutes to complete this task. As the workshop took place at the university, potential interviewees were sitting in their offices, just outside the workshop location. The team members could interview people in any constellation they found desirable, either individually, in pairs or the whole team, if that was preferred. After the interviews were done, the teams were to work on a canvas inspired by the Value Proposition Canvas (Osterwalder et al., 2014) with booster, blocker and action fields. This type of coding and categorizing could be labeled as a “structural coding” or “protocol coding” according to Saldaña (Saldaña, 2013). It is based on the categorization of data according to the pre-established system represented here by the canvas. This type of coding is appropriate for some disciplines with previously developed coding systems, something that was field-tested, but the pros and cons of its use in design thinking are still unexplored. After the use of Canvas, the teams shifted to prototyping.



Figure 3. Session 2 had much less structure. Each participant was to think of some ideas individually, then all were to cluster them, standing, moving, discussing – using the space also vertically

While the second session closely followed the structure of the first session, the tools and methods used were changed to a semi-structured format. Using the ethnographic data from session 1, the participants were taken through a series of rapid design exercises that used constructive materials like post-its, index cards, whiteboards and markers rather than pre-defined templates. The form and structure of the outcomes from these exercises was largely generative while the nature of content expected was briefly introduced at the beginning of each exercise as opposed to highly directed and regulated actions. In other words, participants were provided with materials for each exercise and ‘*what*’ outcomes they were expected to generate with these materials but not directed on ‘*how*’ they should generate these outcomes. This was in line with the notion of generative materials and semi-regulated actions used in conjunction with specially configured spaces (Pandey, 2015). Some functional constraints were also suggested as appropriate for each exercise. This helped in eliciting a variety of improvised performances from the workshop participants due to a crisis of routine that was triggered by an absence of a formal structured process directing each exercise. The first exercise started with identifying all possible insights and putting them on post-its, which were finally put up on a vertical surface, to stimulate bodily engagement, see Figure 3 and Figure 4, and a fuller range of movement from the participant’s side. Participants were asked to put only one insight on each post-it so they could be moved around and clustered, following the principles of open coding, into emergent categories corresponding to themes brought up by the informants. Using these themes as points of departure, each participant was asked to work individually using index cards and generate 6 or more possible solutions to the design brief under consideration. Most participants kept standing up while ideating so as to be able to move through the identified themes and notes from the previous exercise. The ideas generated during this exercise were also clustered collaboratively after discussions, highlighting possible explorations and directions that could be incorporated into the final concept. Finally, relevant ideas and themes explored and clustered were combined together into possible feature proposals for a digital platform, as in session 1.



Figure 4. Standing, sitting varying positions around work, and the room. Freely drawing, ideating.

4. DISCUSSION

In our work to prepare for the workshops, we have thought of the necessary and sufficient components of creativity given by (Amabile, 1983). Domain relevant skills were represented well by including librarians and researchers and students in information and library sciences. Creativity-relevant skills were taken care of by including people with art and design background, as well as interaction design researchers and practitioners. The task motivation, we hope, was provided by interest in innovation in the library at the first place, meeting between different disciplines and, perhaps, somewhat by a really good pizza. These task motivations were in part intrinsic (for some participant) and extrinsic only for others.

The outcomes of the first three sessions were really interesting, in terms of numbers and variety of ideas, broadness of ideas and engagement of participants. Although discussions during Session 1 were interesting, people have remained fixed to their seats and to instructions and canvas provided. The session gave some outputs and some paper prototypes were made, but it was clear that the output was constrained by the Canvas tool used. Session 2 provided most diverse ideas, the most interesting prototypes and has engaged people both mentally and physically.

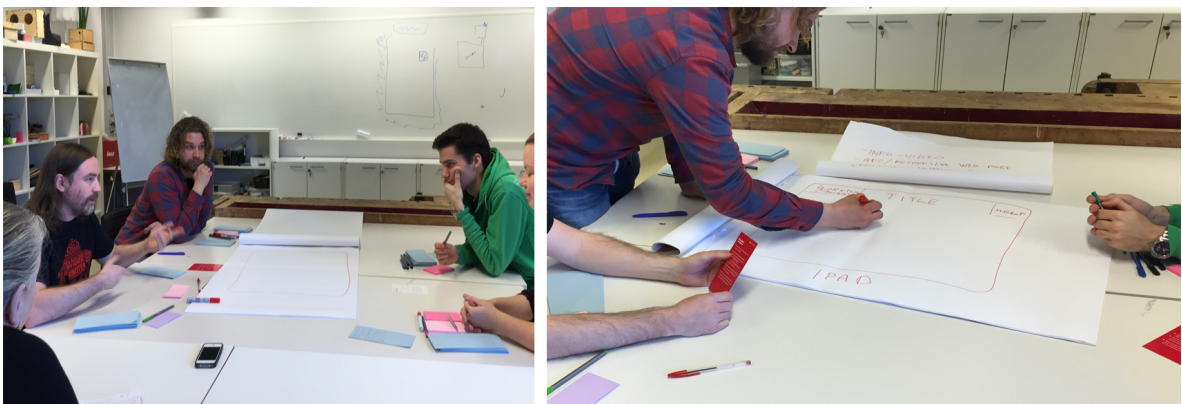


Figure 5. Session 3 did not use pre-made tools or instructions. Total lack of structure actually hindered creativity

Session 3 provided no particular instructions for participants on how to proceed after the quick ethnography session (instructed in the same way as in the workshop 1, lasting 10 minutes). The facilitator did not lead the ideation, but rather participated in line with others. The mini ethnography session was done in two groups. One group had two novices who had problems understanding the method card themselves. “How are we going to interview people, when we do not know what this is about ourselves?” one of them asked. In the end, the results of their interview corresponded to how they felt – their interviewee did not understand the sketches on the card, and in 10 minutes did not manage to make sense of it. The second group though, had interview findings that were about that we saw earlier. This example shows that one group did not have a proper motivation for mini ethnography. During ideation activities, many short stretches of silence broke discussions that were barely trickling. In spite of facilitators’ encouragements to freely use the space, write on the blackboard, use flip charts, only after direct prompts, one librarian with DT workshop experiences stood up and tried to use flipchart to put down the ideas. 45 minutes did not suffice to finish making a paper prototype. When the workshop ended, a short (3 minutes) paper prototyping session was introduced. A structure for prototyping (a drawing of an iPad), was provided, and the participants were asked to quickly sketch and interface for the method card they worked with. Suddenly, participants had many ideas and in less than 3 minutes, one reasonable paper prototype was made. This last exercise showed that the problem was not with the team, but with the openness of the process when all participants were non-designers. At least, a small guidance through the process was required. Figure 5 shows well the contrast between this session and the previous ones.

In Session 2, a researcher with design background led one of the design teams. This team performed better than the other one in terms of the range of ideas considered, and the ability to converge to solution that was subsequently prototyped. Both teams, though, outperformed results from Session 1 in terms of variety,

breadth of ideas. In order to make sure that results similar to those of the first workshop, if conducted with a matched team but with another facilitator team, were obtainable, workshop 3 was organized, see Figure 6.



Figure 6. Session 4. Semi-structured workshop. Verifying the 2nd session

Also in this workshop, engagement was excellent, and the ideation broad. These findings indicate that indeed semi-structured approach works well, confirming Pandey and Tanggaard assumptions (Pandey, 2015; Tanggaard, 2013). Thus, as predicted by (Toh and Miller, 2015) no structure does not work for non-designers, while a strict structure bounds them to only what is asked of them.

5. CONCLUSION

Whenever working with design thinking, one should consider the composition of design teams, as well as tools that are to be used in the process. Cross-disciplinary research may be challenging, but it also hides a lot of potential for design processes, as people often have different thinking styles and different affinities towards analysis or synthesis. In this paper, we focused on how tools, in terms of their open-endedness, influence the design process, when the attempt is made to keep design teams as similar as possible. Three workshops with matched teams were conducted. Both convergent and divergent thinking were represented in each team, as well as novel influences by including novices to DT. Semi-structured tools have given the best output.

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