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Conflicts in co-design: engaging with tangible artefacts in multi-stakeholder collaboration

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This article explores how engagement with tangible design artefacts can invite, and sustain focus on, the different professional perspectives that emerge in multi-stakeholder workshops. Multiple interests and intentions can pose challenges, especially in the initial phases of collaborative work. Existing design research emphasises the use of tangible artefacts as mediators for collaboration, but limited attention has been given to how they could be used to expose tensions and opposing perspectives as a way to enable movement beyond stuck conversation among stakeholders. We examine the design and use of two tangible artefacts for multi-stakeholder collaborative inquiry, demonstrating how interaction with them can encourage open and active confrontation of underlying and contradictory stakeholder interests and intentions. Since unspoken conflicts can undermine the early stages of collaborative inquiry, we propose that the use of tangible artefacts to explore taken-for-granted assumptions is crucial if stakeholders are to negotiate perspectives and co-create new meaning.

Keywords: Design research; collaborative inquiry; tangible artefacts; multi-stakeholder collaborations; conflicts

1. Introduction

In recent years, organisations have directed attention to new ways of increasing growth and success through innovation (Damanpour and Wischnevsky 2006; Galanakis 2006; Koc and Ceylan 2007; Bessant and Tidd 2011). Often, these organisations experience difficulties in facilitating innovation processes due to the necessity to collaborate and

communicate across disciplines, skills and functional and disciplinary boundaries. One research field that has brought particular attention to the collaborative nature of innovation processes in organisational contexts is participatory innovation (PIN) (Buur and Matthews 2008). This younger research field has increasingly focused on collaborative practices involving the exchange of perspectives across scientific and professional disciplines, groups, individuals and organisations. The research has highlighted that human interaction characterised by a co-existence of agreement and disagreement can appear productive in the creation of new meaning, particularly in multi-stakeholder workshops (Gottlieb et al. 2013; Sproedt and Larsen 2012; Larsen and Bogers 2014; Heape, Larsen, and Revsbæk 2015). Participatory innovation has emphasised that collaboratively dealing with divergent intentions and conflictual dialogues makes it possible – even necessary – for innovation to emerge; so, stakeholders seeking to collaborate should not avoid this (Buur and Larsen, 2010). Thus, the field of participatory innovation has raised questions that explore what such collaborative processes entail and how ongoing shifts in social dynamics between stakeholders influence the emergence of innovation. In order to better understand these social dynamics, participatory innovation scholars draw on complexity sciences, in particular the theory of complex responsive processes of human relating (Stacey et al. 2000; Stacey and Mowles 2016; Fonseca 2002), which draws heavily on social science in an attempt to better understand human interaction.

From the perspective of complex responsive processes, human interaction cannot be controlled or designed by an individual entity. Mowles (2015), citing Mannheim (1936), notes that conflictual events inevitably arise between individuals who are not settled into a routine together; he argues that instead of suppressing such disagreements, they should be explicitly presented and dealt with to enable

collaborative progress. Mowles (2015) suggests that conflict emerges as a natural and necessary consequence of adjusting to a group, and rather than attempting to resolve conflicts using standardised tools and techniques, we need to acknowledge that the continuous confrontation helps individuals to explore the challenges and opportunities at hand. Stacey (2012) introduces the notion of conflictual consensus as a dynamic tension that exposes differences between people and provokes reflection and action in organisations. In his view, acknowledging conflicts and avoiding extreme escalation can be productive in the negotiation of subsequent steps. Mouffe (1999) likewise insists that to deal with conflict, it is important to provide means for identifying clearly differentiated positions and reveal alternative perspectives that stakeholders can navigate within.

Moreover, design research, in which the field of participatory innovation was grounded, has demonstrated that there are some challenges inherent to the acknowledgement of conflicts, and specifically to the facilitation of workshops involving stakeholders with diverse interests, perspectives and agendas. Participants often naturally seek balance, coherence and closure to avoid unpleasant conflicts and opposition (Landegrebe 2012; Liberman and Garfinkel 2014). In a study of the challenges of creating hybrid spaces of communication in multi-participant settings, stakeholders were often overly eager to please the group; consequently, no new learning was initiated (Huybrechts, Dreessen, and Schepers 2012). Similarly, Landegrebe (2012) shows that stakeholders seek to obtain and maintain harmony and progressivity in collaborative work. Conversely, collaboration clashes between diverse agendas, competences, language and mental schemes (Lakoff and Johnson 2003) can lead to overt power struggles. We find that both extremes are threats to the emergence of innovation, as participants either avoid conflicts or are paralysed by them – missing an

opportunity to utilise stakeholders' diverse perspectives, skills and competencies to produce new meaning.

Recognising the importance of addressing conflicts in multi-stakeholder collaborations is not new. Indeed, conflicts have played a central role in design research. The field of participatory design (PD), which is acknowledged as one of the three pillars of participatory innovation, initially focused on balancing power ratios and ensuring equality (Ehn 1993). PD emerged as an acknowledgement of political conflicts emerging between employers and employees and aimed to give a voice to the weaker party (Greenbaum and Loi 2012; Kensing and Blomberg 1998). To deal with inequality, PD practice has focused on developing tools and methods for instigating dialogue and knowledge sharing across different groupings of people. In particular, PD has a long tradition of designing and involving tangible artefacts in workshop settings that have aimed to establish consensus and harmonious collaboration (Buur and Larsen 2010). However, some recent PD research has returned to a focus on differences and controversies as vital elements for participation (Grönvall, Malmborg, and Messeter 2016; Huybrechts et al. 2014; Yndigegn 2016).

Here, we are inspired by the involvement of tangible artefacts and interested in how engaging with tangible artefacts can invite expression and closer examination of the various perspectives that stakeholders bring to the initial phases of collaborative inquiry. We present two tangible artefacts that are designed for two different research cases: 'Positions, perspectives and priorities' (3P) and 'The tangible brief' (TB). We analyse several workshops involving 3P and TB, demonstrating how engagement with the artefacts created space for and legitimised conflicts and tensions between stakeholders – thus helping to drive progress. On that basis, we ask the following questions: *How can we understand the role that tangible artefacts play in the*

negotiation of opposing stakeholder perspectives? and *How does engagement with them enable the movement of positions within processes of innovation*?

We begin by examining how different design research traditions have involved tangible artefacts as means to negotiate multiple stakeholder perspectives in workshop contexts. In doing so, we position our work within established traditions to emphasise how they have inspired us. Subsequently, we present 3P and TB as well as research findings from both cases; and in the discussion, we highlight how stakeholders' engagement with 3P and TB can expose the underlying variety of intentions and interests, enabling movement beyond stuck conversations in multi-stakeholder collaboration.

1.1. Tangible artefacts in collaborative practices

The field of participatory innovation (Buur and Matthews 2008; Buur and Larsen 2010) is constructed from three pillars:

- *Participatory design* (Sanders and Stappers 2008; Simonsen and Robertsen 2013), which has grown out of interaction design, based on designers' desire to take end users seriously as partners in the development process.
- *Design anthropology* (DA) (Gunn, Otto, and Smith 2013; Gunn and Donovan 2012), which is concerned with building connections between people's past and present knowledge and understandings to imagine a possible future.
- *Lead user research* (von Hippel 2005), which sought to involve lead users who can contribute to organisational innovation by 'predicting' market needs.

In their own distinct way, all three fields have focused on enabling exchange of perspectives among multiple stakeholders – particularly designers and users. Through a long history of PD practices, researchers and designers have developed a tradition of

involving tangible artefacts that are intended to serve as mediating instruments in collaborative processes. This tradition was later adopted by DA, with a particular focus on the temporal perspective of use practice. While considerably influenced by these two traditions, participatory innovation has paid increasing attention to involving the artefacts in organisational contexts as means to involve stakeholders in discussing business-related themes that may be challenging them.

A wide range of research cases from within these three traditions has demonstrated that tangible artefacts acquire significance by providing a common ground for communication, making social relations possible and serving as mediating instruments in the transformation of meaning (Nafus and Anderson 2010, cited in Gunn and Donovan 2012, 7).

Within these research fields, tangible artefacts are typically designed for specific forms of interaction – provoking, challenging or contrasting stakeholder perspectives and assumptions. We are keen to explore how artefacts can be used to elicit reflection on different assumptions to enable the emergence of new understanding between stakeholders, by stimulating an exchange of perspectives, surfacing friction and provoking debate. Four approaches assist such collaborative processes: design games (Brandt 2006; Brandt and Messeter 2004; Brandt, Messeter, and Binder 2008), provotypes (Kjaersgaard and Boer 2015), tangible business models (Buur and Gudiksen 2012) and ethnographic provocations (Buur and Sitorus 2007).

These four types of tangible artefacts are employed commonly across practices of PIN, PD and DA, each inviting different forms of engagement and articulation among stakeholders.

Design games challenge perspectives by seeking to access different knowledges, competences and meanings. Game formats can be used to share

ethnographic findings, through materials such as photos and quotes, for the purpose of collaborative analysis and empathic understanding of a particular practice (Vaajakallio and Mattelmäki 2014). Engagement with such artefacts is characterised by an ability to enable perspective exchange through game-like formats that incorporate rules, a predefined structure, specific tasks and facilitation.

Provotypes, by contrast, uncompromisingly focus on the tensions and controversies emerging between stakeholders (Boer and Donovan 2012). This approach refers to critical design research, which aims to encourage debate and challenge people to step out of their comfort zone by introducing things that represent reality in a new and slightly provocative way (Dunne and Raby 2001). Stakeholders' engagement with these artefacts is focused on accentuating everyday themes to provoke responses and encourage debate.

Participatory innovation involves the concept of **tangible business models** to facilitate the exchange of stakeholder perspectives. It invites a wider spectrum of organisational stakeholders to contribute with new perspectives on business-related issues and to uncover new potentials (Buur 2012). This approach seeks to visualise business models to bring different professional perspectives into play in discussions revolving around business issues and logics.

Finally, **ethnographic provocation** has emerged as a method to investigate stakeholders' existing understandings and assumptions (Buur and Sitorus 2007). This can be done through edited video stories and storyboards from practice, which are then presented in provocative ways within organisations (ibid). This type of material is also used within DA as 'things to think and do things with', to evoke and elicit thoughts and to provide different stakeholders with reflective spaces to consider current and future possibilities within participatory settings (Gunn and Løgstrup 2014; Gunn, Otto, and

Smith 2013; Kilbourn 2013). Of central importance here is DA's focus on how artefacts can be involved to make implicit understandings explicit to question the 'taken-for-granted' assumptions, inspired by practices of ethnography, and to make many different understandings present (Gunn and Donovan 2012).

We have argued that conflicts are vital drivers for the emergence of novelty. By aligning with this understanding in our design of tangible artefacts for multi-stakeholder collaboration, we aim to assist such confrontation of emerging tensions and disagreements. While various design traditions have acknowledged the importance of negotiating perspectives, little attention has been given to how to stay and engage with the differing understandings, agendas and interests of stakeholders early in the collaborative process, and how tangible artefacts can be used to encourage this (Andersen 2016). Little research has examined how artefacts can be used explicitly to encourage the expression of opposing perspectives, helping participants to embrace the potentially conflicting nature of multi-stakeholder collaboration (ibid).

2. Research design

The paper utilises a qualitative research approach (Denzin and Lincoln 2005) in two different multi-stakeholder contexts instigating collaboration across academia and industry. We take a design anthropological approach (Gunn, Otto, and Smith 2013), through which we understand multi-stakeholder workshops, involving tangible artefacts, as temporary spaces for researchers and participants to create shared learning experiences. The workshops involve academic scholars and professionals across organisations, disciplines, functions and hierarchical levels to invite conversations about specific collaborative issues they are experiencing.

TB has been tested in four full-day workshops involving between 25 and 30 academic and organisational stakeholders. The workshops were organised in three parts:

introducing the background of 'the tangible brief', an active session of group work involving the tool, and group reflection on the use of the tool. Participants and researchers shared an active role in all three parts. Before the first pilot workshop and between the three others, a team of eight engineers and designers, as well as two managers from a product development company, were involved in the design of the TB to address their organisation's specific innovation challenges.

3P was used in one workshop involving 37 academic and organisational participants in an academic/industry sector partnership, the UserTEC project[1]. Through an iterative design process, the artefact was tested and evaluated with UserTEC project partners. Moreover, 3P design has been based on a theoretical and practical analysis of the communication challenges that occur in the early stages of multi-stakeholder collaborations, both generally and in the UserTEC project specifically (Andersen 2016).

Through fieldnotes, as well as audio and video recordings (Blomberg et al. 1993) of the workshops, we capture ways in which stakeholders engaged with the tangible artefacts to initiate conversations characterised by negotiation, conflicts and compromise. The UserTEC partners' engagement with the 3P artefact has been analysed bottom-up using interaction analysis (Jordan and Henderson 1995), to identify how engagement with 3P enables or restricts stakeholders to exchange and challenge each other's professional perspectives (for a full interaction analysis, see Andersen [2016]). Meanwhile, the empirical material from the engagement with TB has been analysed through a systemic review of field notes (Blomberg et al. 1993) from the workshops, where repetitive patterns characterised by conflictual situations between stakeholders have been identified.

[1] www.usertec.aau.dk

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3. Presenting the two tangible artefacts

The 3P and TB artefacts were both designed for engagement in the initial phases of each collaborative inquiry with our different project partners. This part of the process is often characterised by uncertainty, which can compromise the later stages of a project if left unaddressed. When designing each artefact, rather than aiming to identify solutions we focused on exploration and negotiation – the first two phases of inquiry described by Dewey (1938) as 'the indeterminate situation' and 'institution of a problem'. These phases are uncertain and messy; and the artefacts are deliberately intended to mediate conversations that recognise and embrace this messiness and uncertainty, rather than urgently seeking closure or reaching an impasse – both equally unproductive for collaborative inquiry. We aimed to help participants move beyond 'stuck conversations' by supporting stakeholders in collaboratively exploring new forms of representation, enactment and critique of current understandings and perspectives in order to arrive at alternative understandings.

3.1 The tangible brief

The way artefacts are designed influences the collaborative space we create, as well as its processes and outcomes. The 'tangible brief' (TB) was designed for a product development company seeking to enable cross-disciplinary collaboration across engineering and design disciplines in a technology development department. At the time of this research, the department management had recently introduced innovation procedures that required employees to create a two-page design brief for each new product idea. These briefs were then assessed by the management team, who would evaluate their investment potential. Instead of individual employees generating abstract ideas, this new approach required cross-disciplinary teams to collaborate for the first time. The TB was designed to support the process of cooperative negotiation now

required to create the two-page design briefs – encouraging joint exploration to consider the significance of a creative and iterative process when dealing with innovation (Mosleh 2017).

TB is an artefact consisting of four activities involving tangible materials that invite spontaneous discussion among the engaged stakeholders. The outputs of each activity are continuously negotiated as new directions emerge. Each addresses a central aspect of how teams work to discuss, challenge and reflect on new ideas in the collaborative development of design briefs. The four activity components take place in the following sequence:

- **Stakeholder involvement.** Participants are asked to consider which stakeholders to involve in the process of idea development, how important they are, and at what point in the process they need to be included (Figure 1).
- **Resource allocation.** Here, stakeholders indicate the resources needed for the idea to become reality – in terms of both capital and internal manpower (Figure 2).
- **Strategic positioning.** Stakeholders discuss how their idea meets the strategic aims of the organisation and visualise that in a ‘spider’s web’ (Figure 3).
- **Process overview.** Using cut-out wooden arrows and symbols, stakeholders are asked to visualise the active process of developing and implementing their idea (Figure 4).

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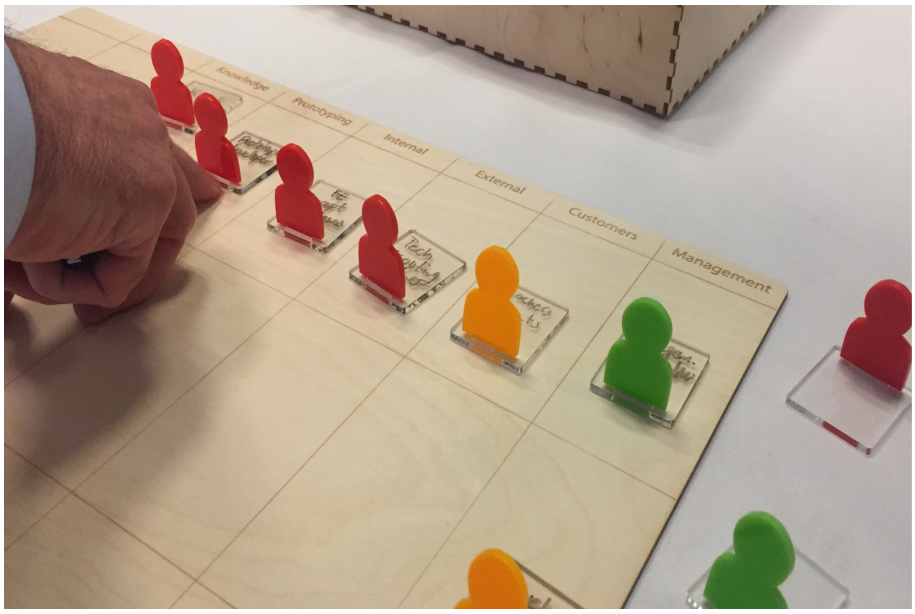

Figure 1: Stakeholder involvement

Figure 2: Resource allocation

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Figure 3: Strategic positioning

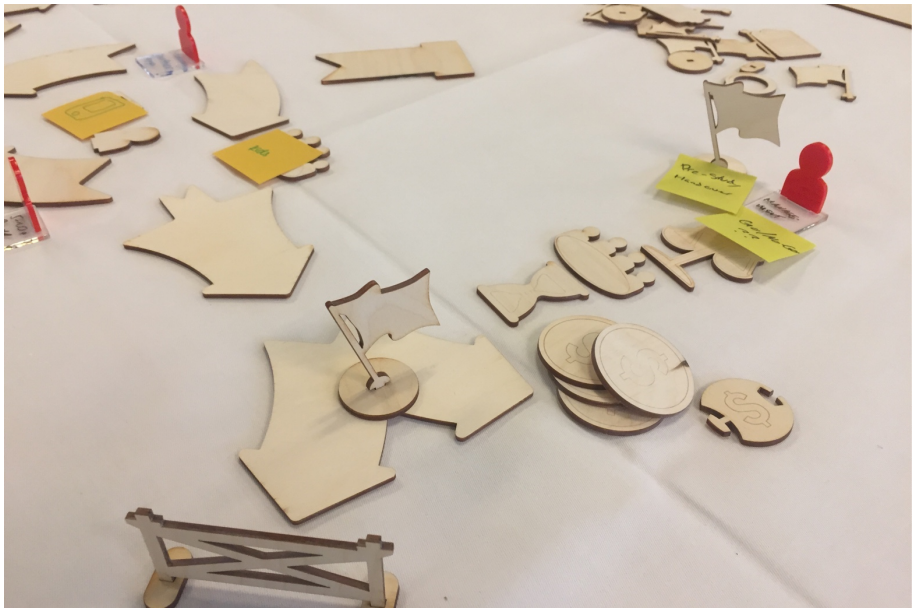

Figure 4: Process overview

As a complete process of idea exploration, engagement with the four components of the TB allows for discussion and negotiation of the development of potential product concepts. The physical attributes of TB materials are abstract, yet concrete; stakeholders are invited to manipulate them to explore various alternatives. While the use of the artefact aims to give employees creative freedom in developing

new ideas, it also supports them in finalising a clear two-page brief for evaluation by their management team.

3.2 The 3P: positions, perspectives and priorities

The 3P artefact was designed for a UserTEC partner meeting. The project is a collaboration between a transdisciplinary research theme, business partners, private and public organisations and is aimed at developing new knowledge on how to approach the future design of energy-efficient building technologies. The project partners had found it difficult making their various positions understood by other actors, let alone arriving at a shared formulation of the project challenge to direct and inform its resolution. 3P is designed to make opposing stakeholder perspectives visible through two formats: (1) dilemma themes and versus-narratives; and (2) colour-coded bricks and a game board. Together, these formats offer a visual scaffold for negotiating, clarifying and prioritising conflicting interests and values (Figure 5). The tool's different visual, tangible and narrative components are as follows:

- 'Versus-positions' – three conflicting dilemma themes for discussion
- 'Versus-narratives' – 18 triggers for conversation.
- A physical 'tool base', intended to frame and guide interactional conversation
- The '3D tower' – a physical space for mapping and prioritising
- 'Priority bricks'– six physical triangles for recording the main arguments of a group.

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Figure 5: The 3P tool

3.2.1 Making opposing stakeholder perspectives available for explicit negotiation

The material form of the 3P tool is designed to handle and display opposing conceptualisations of central dilemmas visually displayed in dichotomous positions. This offers a constructive way to assist participants in 'staying with the trouble' (Haraway 2014) by making dilemmas of opposition available for explicit attention, re-engagement and negotiation. The tool was designed to address 'hidden' diverging interests and agendas among UserTEC partners, which were identified from analyses of situated action and communication in former partner meetings (Andersen 2016). The tool can be used to make these 'hidden' oppositions apparent (Table 1) through 'versus-positions' that prompt discussion.

[INSERT TABLE 1 NEAR HERE]

For each of the three versus-positions, six versus-narratives were created based on the UserTEC partner's former statements about users and use. These were condensed

into brief statements/stories, presented visually on the game board as opposing outer poles. The triangle bricks on the border of the tool base (Figure 5) were used to capture the partners' main arguments in a discussion related to the opposing perspective within a versus-position. A 3D tower was placed at the centre (Figure 5) and participants were asked to stack the triangles in it, thus ranking their arguments (most important at the top) about which perspectives and positions to consider when designing energy-efficient building technologies in the future.

4. Research findings

We present findings from the two research cases, providing examples of how stakeholder engagement with 3P and TB facilitated an exchange of professional perspectives and enabled movement beyond stuck conversation.

4.1 Confronting conflicts by surfacing contradicting positions and perspectives

As the 'tangible brief' was designed to help employees create two-page design briefs for new product ideas, it mainly supported management's agenda of requiring employees to collaboratively define new product directions for the department. For many employees, this challenged their creative process, as up until then they had typically matured new ideas individually over longer periods of time. Through engaging with TB at the workshops, the employees started vocalising the challenges and conflicts they were experiencing with the new design brief procedure.

The stakeholders' perspectives clearly stood in opposition to each other at the workshops. The management team sought to increase transparency across the organisation by introducing the design brief procedures. As one manager explained: 'We cannot be fire-fighting across many projects all the time. We need transparency and faster results to create an impact on the market, but that requires innovation to be

facilitated in a certain way'. This met with strong antipathy from the employees, who felt their creative innovation processes stifled:

> Numbers and time are about efficiency, which has nothing to do with innovation. Management can evaluate resources, but we have the expertise to evaluate potential new ideas. And besides that, I do think the process needs transparency, because an idea does not pop up from one moment to another. It won't mature in a fixed design brief.

On several occasions, the workshops involving TB became a forum encouraging conversations about its role and use in the organisation. Specifically, employees were enabled to articulate the frustrations they were experiencing in collaboratively creating design briefs. One employee was clearly frustrated by the enforcement of the TB artefact:

> It has become a planning tool, and that will not help us in negotiating the importance of an organic innovation process. I need to understand how my managers make decisions about new product ideas, and making these briefs simply seems as a waste of time, because they are not leading anywhere.

The use of TB's tangible materials focuses explicit attention on the new work procedures that will affect the organisation's innovation processes in both the short and long term. Hence, the discussion around the artefact does not remain abstract; nor does it invite a conversation about an imaginary scenario when engaged with. It is abstract in the sense that the material qualities can be interpreted in a variety of ways, yet specific in that the overall theme and the framework of TB is designed to address an actual organisational challenge. Engagement with the artefact elicits an open yet guided conversation of themes that are relevant to every stakeholder in their everyday practice. Each participant in the new work procedures has their own limited perspective on what is involved in the creation of design briefs; exploring such themes through a tangible

and visual representation enables stakeholders to grasp an overview of the challenges involved, and actively involve each other in negotiating subsequent action.

4.1.1 Negotiating stakeholder perspectives by explicitly manifesting tensions

At the workshops, engagement with TB helped to confront tensions between the stakeholders in a way that is difficult to overlook: the tangible and visible nature of the artefact plays an important role here. It enables immersive engagement with an imagined environment, which creates a base for shared evaluation and discussions within diverse groups (Fröst and Warren 2000). Hence, we move beyond simply mapping information and instead invite a collaborative discovery and creation of new meaning. TB becomes an invitation to articulate tensions and frustrations that can otherwise go unnoticed, or unacknowledged, in everyday organisational life.

To illustrate how TB came to play a central role in the organisation: one employee would clear his calendar entirely when invited to workshops involving TB. He described these as his only outlet to articulate the frustrations he experienced in creating design briefs, using the artefact as a physical manifestation of the tensions between his and his managers' contradicting perspectives. Managers expected the tool to provide a framework for producing detailed design briefs, but employees viewed it as a controlling and limiting approach to the creative innovation process. Engaging with TB at one of the workshops enabled employees to directly confront the management team: it provided a legitimate medium for communicating their frustrations with the new design brief procedure, and for expressing concerns that creating design briefs was a pointless effort since the managers never gave the go-ahead for any of them. At the workshop, the employees asked the managers to engage in the development of the design briefs using TB to provide their employees with immediate feedback and final investment decisions.

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Here, the use of TB opens up meta-discussions and conflicts addressing the daily innovation practices within the organisation. TB's flexible design is characterised by a loose framework that allows for individual interpretation and thereby invites negotiation of its purpose, role and use in the organisation. It allows for wider negotiations of the organisation's innovation process and decision-making, rather than limiting discussion to the artefact's design details. As such, engagement with TB enabled the exchange of perspectives between managers and employees and eventually led to the decision that the department would abandon the design brief procedures and allow employees to proceed as they had previously. The use of TB had created space for a legitimate forum where perspectives could be exchanged and conflicts confronted. This led to a movement of positions, which effectively came to influence future innovation practices.

4.2 Confronting conflicts by reformulating positions and perspectives

Unlike TB's loose and flexible structure, 3P is designed with a specific intention: explicitly conveying hidden opposing agendas, interests and perspectives identified through analyses of former communications. As described earlier, these viewpoints are reformulated into versus-narratives that present opposing stakeholder views. Such versus-narratives can prompt participants to articulate their own viewpoints, interpretations and positions in the discussion; or can be used to juxtapose current positions in a way that invites an exploration of new understandings.

4.2.1 Juxtaposing stakeholder perspectives through versus-narratives

The versus-narratives visually presented through 3P serve as a conversational partner that participants can engage with – through moving, waving and pointing at the physical versus-narratives – to articulate their own positions (personal stories, professional interests or factual knowledge). The excerpt below illustrates how the stakeholders

discuss one of the overarching themes integrated in 3P: whether to learn from users (represented by yellow versus-narratives) or to educate users (orange). The stakeholders refer to the versus-narratives as a way to position and exchange their perspectives in the discussion.

> *Innovation manager*: I mean, personally I am much more over here [pointing at a yellow versus-narrative on the table]. I mean, from our point of view, we need to understand the users better to make better solutions for them. Trying to teach them.
>
> *Project leader of a philanthropic foundation*: We would probably be [points towards the orange versus-narratives] over here. But in another way.
>
> *Innovation manager*: This [points at a specific yellow versus-narrative] is what we do in my team…

Another example (below) shows how a whole line of reasoning and discussion emerges among four stakeholders in one group. The group is discussing the theme of technology adapting to users' everyday activities (designated by light green), versus users adapting to technical standards (dark green):

> *Researcher civil engineer*: **This is** okay, I think [picks a light green versus-narrative], a free choice that is good [puts the versus-narrative back down]…
>
> *Innovation manager*: To me**, this one** [points at another light green versus-narrative] still stands out a bit.
>
> *Project leader of a philanthropic foundation*: **There is a difference** between having someone else deciding what is smart, good or efficient, and then implying [hold his hands upon a dark green versus-narratives] …
>
> *Innovation manager*: Yeah, true; **so on these two** [points at two light green versus-narratives], the first ones it just happens, so if this one [points at a light green versus-narrative]…
>
> *Innovation manager*: But **this one actually** [points at a light green versus-narrative] is…
>
> *Researcher in sociology*: Yeah. **There is also this** [taps his fingers at a specific light green versus-narrative lying on the table]…

> *Project leader of a philanthropic foundation*: **But exactly that story** [points his hands towards a light green versus-narratives] also shows that it is not [turns his fingers to point towards the row of dark green versus-narratives] a black-and-white thing [points towards the row of light green versus-narratives]…

As indicated in bold text in the transcript, almost every utterance starts with directing attention towards a versus-narrative, where the stakeholders build on each other's statements. These deictic references to the versus-narratives help direct collective attention towards the nuances of the different perspectives. The excerpt ends with a partner stating how the theme discussed cannot be seen in black-and-white terms. This indicates a movement in positions, where other perspectives are taken into consideration and examined. This is also seen in several other instances, where the stakeholders realise and acknowledge that the theme must be considered: 'it is not a black-and-white thing', 'there is a difference between', 'there is a lot more happening' and 'it is more nuanced than that'.

Importantly, the versus-narratives are representations of previously expressed articulations from former UserTEC partner meetings. Thus, the perspectives that were not resolved in previous UserTEC workshops seem to be considered equally in this workshop. This occurs as the stakeholders incorporate and contrast the versus-narratives in the discussions.

Sometimes, versus-narratives could lead stakeholders to understand each other's professional challenges:

> *Project leader of production company*: Active users, passive users, I think. I don't know. But I think this is also [points back and forth between the orange and yellow versus-narratives] the fundamental problem of the challenge you guys are facing and running into, right? How much can we force upon people [points at innovation manager]?

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Based on our findings, 3P and its tangible elements are used as a means to exchange viewpoints. Stakeholders construct, underline and visually show (pointing, touching or rearranging) the versus-narratives to communicate their own positions in relation to the themes discussed. The examples show how engagement with the explicit polarisation of the versus-narratives led stakeholders to articulate arguments and counter-arguments and thereby consider perspectives they did not necessarily align with. Where the stakeholders in previous workshops did not discuss their contradicting perspectives and interests, the use of the 3P artefact explicitly provoked them to stay with and examine contradicting perspectives.

However, there are also limitations to this form of perspective exchange. If the versus-narratives do not align with some stakeholders' own perspectives, they cannot relate to them, so a novel viewpoint is unlikely to be elicited. We also observed cases where stakeholders were so eager to understand the facilitator's intention with the versus-narratives that they did not contribute their own interpretations. Thus, the artefact can be seen as an invitation to engagement that by no means guarantees any movements of position. How stakeholders choose to work with the artefact and each other is crucial to the success of perspective exchange and movement of stuck conversations.

5. Discussion: inviting the exchange of multiple voices in collaboration

We initiated our research with the questions: *How can we understand the role that tangible artefacts play in the negotiation of opposing stakeholder perspectives?* and *How does engagement with them enable the movement of positions within processes of innovation?*

We have noted how established design research traditions have used tangible artefacts to invite the exchange of professional perspectives in multi-stakeholder

collaboration through extreme provocation, fixed rules and structures, ethnographic material or visualisation of business models. Adding to these contributions, we have shown how the use of 3P and TB have highlighted opposing stakeholder interests and intentions, and how tangible artefacts may lead to a stronger focus on tensions and conflicts in collaborative inquiry. The design of 3P and TB, by concretely making visible abstract concepts, strategies and positions, invite stakeholders to physically engage with, manipulate, move and contrast their differing perspectives. This materialisation of otherwise unnoticed themes enables stakeholders to become attentive to differences in their perspectives, revealing underlying intentions and legitimising conflicting interests. We propose that engagement with 3P and TB does this by:

- Encouraging stakeholders to *stay with the difficulties* and destabilise what is taken for granted. By designing our artefacts for a particular context and challenge, we enable stakeholders to relate to the artefacts while at the same time utilising abstract materials that provoke reflections. We avoid designing the artefacts in a way that could easily be absorbed into everyday practices, or artefacts so conspicuously strange that they are likely to be rejected. Thus, 3P and TB capture a certain level of everyday reality due to their contextual sensitivity, but at the same time allow for collaborative exploration within frameworks to which stakeholders can attach new meanings. This encourages engagement with underlying conflicts and tensions, some of which already exist but have not been addressed or articulated previously. Hence, using 3P and TB helps tensions between stakeholders to be confronted in an explicit, visual and tangible way that cannot be ignored.
- *Explicitly and implicitly giving rise to discussions* that highlight the stakeholders' contradicting perspectives on a given theme. 3P works with

already identified opposing perspectives, and engagement with these invites stakeholders to actively address them. In contrast, engagement with TB gives rise to and legitimises tensions among stakeholders that have yet to be articulated. Hence, the use of 3P explicitly offers a representation of differences in interest, intentions and agendas through the versus-narratives, while the use of TB makes them visible through a longer process of engagement and negotiation of its use in the company. While engagement with 3P highlights contrasts to promote a more nuanced understanding of the collaborative problem space, engagement with TB uncovers conflicts that emphasise the need for active decision-making to connect management agendas with employee interests.

- *Providing time and space* for conflictual themes to either emerge or be explicitly represented can be a vital driver for both the exchange of views and the movement of positions.
- *Emphasising and enabling processes of interaction* rather than anticipating concrete outcomes. Involving the artefacts, we focus on the idea of externalising thoughts, ideas and perspectives without expecting them to result quickly in tangible outcomes, changes or innovations. As such, our artefacts have been designed to become drivers for an active and open confrontation of existent and emergent challenges in multi-stakeholder collaborations.
- Enabling *movement of positions* to move beyond stuck conversations. Using the TB artefact can help to provide an overview that enables stakeholders to grasp the organisational challenge in its entirety. They become conscious of underlying tensions that have escalated and are affecting their everyday practices, so they finally come to realise that action needs to be taken. By engaging with the 3P artefact, stakeholders have an opportunity to move beyond

their stuck conversations. This happens when they build on each other's perspectives by referring to the versus-narratives rather than guarding their own professional positions.

The confrontation of opposing stakeholder perspectives is vital for the emergence of innovation. Based on our findings, we argue that engaging with tangible artefacts has the potential to reveal important differences between stakeholder perspectives and provoke reflection on emerging challenges that can prompt subsequent action. Given that the start of any collaborative endeavour is characterised by uncertainty and disturbance (Dewey 1938), it is crucial to provide time and space for stakeholders to work through the difficulties. Staying with the difficulties encourages stakeholders to prioritise communicating and justifying perspectives, develop explanations for why they do or do not agree with them, elaborate on concepts and evaluate their understandings in light of the challenge they are experiencing.

Our argument for staying and engaging with tensions and conflicts has not been sensitised widely in the existing design research literature. The main focus of existing contributions is on what tangible artefacts can do for collaboration and exploration, leading to concrete design ideas. Lucero, Vaajakallio, and Dalsgaard (2012, 6, 7) refer to different types of artefacts and highlight their ability to 'allow ordinary people to express their ideas', 'inform and inspire the design process' and 'highlight specific characteristics or … direct specific types of design actions'. Likewise, Sanders and Stappers (2014) identify three different categories of design artefacts: probes, toolkits and prototypes. Although having different aims, all three categories provide abstract or concrete means for exploring design ideas with users or co-designers. The focus of these types of design artefacts is, generally, to shape the future with the users (Simonsen and Robertson 2013). Basballe, Halskov, and Hansen (2016) point out that much of the

relevant literature has focused on introducing a particular method to promote its effectiveness in involving users and the value it could add to a design process.

As mentioned in the Introduction, other artefacts have a mediating character (Vygotsky 1986) but do not bring explicit attention to the emerging conflicts and tensions in multi-stakeholder collaborations – instead, emphasising:

- Transferability of ethnographic findings from the field to understand specific practices (Vaajakallio and Mattelmäki 2014)
- Representations of business models to encourage discussion (Buur 2012)
- Provocation to challenge assumptions (Buur and Sitorus 2007)
- Providing reflective spaces (Gunn and Løgstrup 2014; Gunn, Otto, and Smith 2013).

5.1 Implications and further research

The focus on action orientation in the current design research literature often involves experiments with prototypes, mock-ups or 'toolmaking' for stakeholders to collaboratively configure materials and situations, with the end goal of creating future practices or products. Here, we argue that future research on artefact-mediated interaction between multiple stakeholders in the initial phases of collaborative inquiry should actively engage with tensions and conflicts as a focus point in its own right. This is significantly different from designing artefacts that support design action, represent already-existing frameworks that are to be discussed, or mediate conversations concerning use practices. Focusing on active engagement with tensions has several empirical and practical implications, and we suggest that there is a need to further explore how various tangible artefacts besides TB and 3P could be designed to support

dealing with potentially conflicting situations that are deeply rooted in organisational challenges or clashes between domain-specific interests.

In practical terms, this implies deliberately supporting engagement with conflictual situations in collaborative workshop settings, involving multiple stakeholders with different professional backgrounds, personal experiences, resources and interests. This is especially relevant in situations where:

- Stakeholders enter a project with different perceptions of the project goal and varying definitions of the problem(s) to be addressed
- Collaborative research or projects are in their initial phases of inquiry ('the indeterminate situation' and 'institution of a problem' [Dewey 1938])
- Problem formulation and exploration is the goal, rather than problem solving
- Stakeholders are not yet ready to take action but must create a foundation of understanding of each other's priorities, from which any negotiation of future actions must proceed.

To support such a research agenda, more empirical research is needed to understand the specificity, complexity and interplay of situations, peoples and artefacts and how these might hinder or support the exploration of tensions among stakeholders. Specifically, more research is needed to uncover how engagement with different tangible artefacts and formats might best aid the externalisation or reformulation of existing or emerging tensions, as well as juxtaposing perspectives in a way that enables movement beyond stuck conversations. This is especially important since participants in collaborative settings often avoid or are paralysed by conflicts (Landegrebe 2012; Liberman and Garfinkel 2014; Huybrechts, Dreessen, and Schepers 2012).

6. Conclusion

We have described how existing design research practices have used tangible artefacts in workshop settings to explore different stakeholder perspectives. We presented two research cases involving tangible 3P and TB artefacts and illustrated how their use explicitly and implicitly enabled an exchange of perspectives and confrontation of conflicts in a way that we believe

- encourages stakeholders to stay with the difficulties and destabilise what is taken for granted
- facilitates ongoing interaction
- enables the movement of positions beyond stuck conversations.

We propose that 3P and TB artefacts can be used to physicalise contradicting stakeholder perspectives in a way that allows these to be challenged, manipulated and explored – enabling new meaning to emerge. Optimising the practical value of such artefacts requires us to legitimise and focus attention on tensions and controversies in collaborative workshop settings.

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