Resourcing in Co - Design

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Abstract: This paper introduces the concept of 'resourcing' to describe the fundamental activity of negotiating the use of what is available for co-design. Even though resourcing is an ever-present undertaking in all co-designing, no theoretical concept has thus far addressed the constitutive practices in collaborative design processes. We define the concept of resourcing on the basis of pragmatist process theories and complexity theory perspectives of social life, which enable us to explicate the gap between managerial thinking that understands resources as objective entities to be planned and controlled, and the actual unfolding of co-design in complex responsive conversation. Through the analysis of three co-design events we illustrate how the different response sensitivities of co-designers can diversify and enrich resourcing. The analyses also reveal that resourcing is a dynamically evolving process that changes in response to what emerges in the complex interplay of intentions between people involved in co-design.

Keywords: Resourcing; co-design; design facilitation; complex responsive processes

1. Introduction

A deeply rooted belief in design management is that success is largely the result of managerial excellence in the planning and use of resources in productive and innovative ways, e.g. (Hamel & Prahalad, 1989; Prahalad & Hamel, 1990). Traditionally, management literature has seen resources as objective entities, such as people, facilities, money, and materials, which can be used, mobilised, allocated, or deployed for some operative roles, (Hamel & Prahalad, 1989; Oakley, 1984). This thinking has led to a managerial practice where resources and capabilities are identified, developed, protected, and deployed "in a way that provides the firm with a sustainable competitive advantage and, thereby, a superior return on capital" (Amit & Schoemaker, 1993, p. 33). This form of thinking entails that resources exist independently of those who *consider* these as resources.

Co-design has a long-standing tradition of using a wide range of tools and materials to enable users and other stakeholders to collaborate with designers with the goal of creating new products and services that better fit user needs, e.g. (Agger Eriksen, 2012; Bødker & Buur, 2002; Sanders & Westerlund, 2011; Ylirisku & Vaajakallio, 2007). There is a significant uncertainty connected with 'deploying' resources (like field observations, user peronas, mockups) in collaborative endeavours, as materials prepared for an event may not come into play as expected, and conversations around them may shift in ways not anticipated. In co-design events the available materials are subject to processes of sensemaking and sensegiving (Weick, Sutcliffe, & Obstfeld, 2005). When the materials are adopted into these processes, their meanings and values are collaboratively negotiated, and they may be used as resources in unexpected ways. Therefore, we define resourc*ing* as the negotiated use of what is available for co-design. This stands in contrast to the objectivist view of resources in which they are assumed to have an independent identity. According to G. H. Mead,

> "Although external objects are there independent of the experiencing individual, nevertheless they possess certain characteristics by virtue of their relations to his experiencing or to his mind, which they would not possess otherwise or apart from those relations. These characteristics are their meanings for him, or in general, for us." (Mead, 1934:131n)

Whether something becomes 'a resource' is thus shaped by those relating to it. Materials, when applied for unexpected purposes, may reveal novel and valuable characteristics that are only revealed as new purposes emerge. For example, a potato can be used to replace a car's condenser, which is not apparent until someone does it (www.mirror.co.uk, 2015). A potato is seen as a resource very differently by the chef and by the gifted electrician whose car fails to start. Different qualities of the potato are responded to, and thus *signified-in-use* differently by people with different professional sensitivities and expertise. The perception of the available potato therefore differs between the chef and the electrician, and the potato *functions as a different resource* for cooking than for car fixing. The potato is *resourced* differently by these different professionals, and once made visible to others, the novel view (of the potato) becomes available for everyone else as a possible way of making use of a potato, or of resourcing a potato.

Resourcing reflects people's ability to notice, to make use of, and thus to signify aspects of what is available to them in specific situations of creating, accomplishing, or constructing something (together with others). It hence reflects what we have termed people's 'response sensitivities'. Resourcing involves the act of *signifying* something that is available *as useful*, and it may happen through talk, bodily gesturing, and by taking something into use. For example, when participants in a co-design session are creating a mock-up of an idea, they resource the available materials in their construction, and by doing so, they *signify these materials as resources*.

Resourcing also reflects the interplay of intentions (Stacey 2011) of those involved as they implicitly and simultaneously negotiate both their participation and the 'what' that they are creating together. The process is dynamically evolving, not only because of the emergent

forms that are created, but because the back-talk of the materials (Schön, 1983) may cause co-designers to re-frame their intent and, therefore, re-shape what is resourced in some later incident. This has implications for how the facilitation of co-design, should be understood.

We portray co-design facilitation as an enabling practice aimed at setting up proper conditions for co-designing and ensuring productive co-design processes. It is at the same time social, material, and conceptual, embedded in locally occurring and continuously negotiated resourcing happening in unfolding participation. Through the analysis of three co-design incidents, we explicate aspects that co-design facilitators need to attend to: 1) participants' different response sensitivities matter for what they design and how they argue, 2) the dynamically evolving interplay of intentions between the participants changes (the identity) what is resourced, and 3) the physical materiality of resourcing can challenge the flow of ideation in the negotiation between participants.

2. From resources to resourcing

Our argument to shift the vocabulary from 'resources' to 'resourcing' begins with a critique of the traditional resource-based view of management. Wernerfelt (1984, p. 172) defined resources in a very broad manner as *"anything which could be thought of as a strength or weakness of a given firm*." He (ibid.) also proposed a more formal definition of resources, based on the work by Caves (1980), as "*those (tangible and intangible) assets which are tied semi-permanently to the firm in a given moment*." Wernerfelt's examples were brand names, in-house knowledge of technology, employment of skilled personnel, trade contacts, machinery, efficient procedures, and capital. Grant (1991), extending Wernerfelt's concept, identified six categories of resources: "*financial resources, physical resources, human resources, technological resources, reputation, and organizational resources.*" For Grant (1991) resources were "*the enablers of a firm's capabilities, which in turn enable achieving a competitive advantage in the market*". This view underlines the role of management in recognising and exploiting resources as well as identifying resource gaps and then filling these.

Seeing resources in an objective way was also adopted in *design management* vocabulary, and 'resourcing' was conceptualised as an activity for middle managers to ensure that necessary resources were available for designers to work with. Design management involves approving costs and providing designers with facilities, equipment, and environment to work in. It includes providing access to appropriate specialists in R&D and to external advisors and specialists. Contracting external consultants, agreeing on budget, and ensuring the appropriate individual and organisational facilities that would enable the consultants to undertake the work that they were contracted to do were also part of making the objective resources available (Davies-Cooper & Press, 1995).

The concept of 'resource' has, nevertheless, turned increasingly ambiguous in design management literature. Lockwood (2004) recognised *design as a resource*, and identified

design as a *strategic resource*, meaning that design management is integrated with the corporate management, as well as a *business resource*, i.e. that design functions as a means of reaching business objectives. The proliferation of *design thinking* as a strategic asset sees design similarly as a resource (Brown, 2008, 2009; Cooper & Junginger, 2009). The notion of design thinking is a blurred concept, and it is sometimes associated closely with sensemaking (Rylander, 2009).

According to Weick et al. (2005), sensemaking is about organising a flux of initially chaotic experiences, noticing and bracketing off those signs that matter, labelling these, and reflecting in retrospect as well as in prospect. The process is sociomaterial (Carlile, Nicolini, Langley, & Tsoukas, 2013), and its study needs to address context, flux, and temporality (Langley & Tsoukas, 2010). Guided by the theory of complex responsive processes of relating (Stacey, 2011), which accounts for the complex dynamics and emergence in organisations and portrays human interaction in its processual and responsive nature, we draw on the works of G.H. Mead (1934) as well as (Elias, 1991). They are both pivotal to Stacey's (2011) account of complex responsive processes in collaboration. According to Mead (ibid.), any object gains its meaning from the response of the organism to the characteristics of the object. Hence, the response sensitivity of an individual towards an object and to his or her environment, based on his or her culturally-mediated and personal history of interactions, shapes the meaning of the object and the environment in the continual relationship to the individual:

> "What we term meaning of the object is found, specifically, in the organized attitude of response on the part of the organism to the characters and the things" (Mead 1934:131)

Mead's (1934) process ontological worldview reminds us of the world-constituting dynamics of the relationship between the organism and its environment, which is what we here conceive of as the 'response sensitivities' of the involved. Our personal response sensitivities influence which aspects of a situation will appear significant, important, and interesting to us having bearing on what we choose to resource for what we are doing. And, in addition to individual response sensitivities, the dynamically evolving interplay of intentions (Elias, 1991; Stacey, 2011) influences what becomes resourced and how. When co-designing is seen as a complex process of relating, it makes sense to speak of resourcing as the negotiated use of what is available for co-design.

3. Resourcing in interaction

We investigate resourcing in three co-design events facilitated by authors one and two. The events were documented on video during design workshops and later analysed using interaction analysis (Jordan & Henderson, 1995). We use the notion of response sensitivity to explain why different participants noticed different aspects of the available materials. The first example illustrates that response sensitivities are dynamic and develop during the course of involvement in co-designing. The second co-design example shows how the dynamically evolving interplay of intentions changes what the participants will resource. The

last example depicts challenging subtleties related to the negotiation of resourcing with physical props in co-designing.

3.1 Response sensitivities in resourcing

The first example investigates the role of a surprising field video in resourcing. It stems from a project on Sustainable Energy for De-Mining Operations in Angola. The project goal was to develop a sustainable energy generator that can replace noisy and fault-prone diesel units in camps in developing countries. The team brought together a relief aid coordinator from a non-governmental organisation (NGO), energy specialists from one university, designers from another (the second author's) university, and engineers from four small manufacturers of alternative energy sources, like solar panels and fuel cells. The project was organised as a participatory innovation effort (Buur & Matthews, 2008), albeit with the core dilemma that the distance between de-miners ('users') in Angola and development engineers in Denmark was as large in kilometres as in perspective.

The designers edited a set of eight short videos in the hope that they could facilitate a more grounded discussion of solutions, even before the team had the opportunity to do field studies in Africa. Each video provided concrete background for crucial requirements decisions: User operation, maintenance, transport, instructions, etc. They were compiled from footage shot by a TV photographer, who had visited demining camps in Congo a few years earlier. These were called 'video specs' to indicate to the engineering team members that they could be seen as 'specs', albeit presented as video rather than text (Buur et al., 2010). The designers then undertook to organise a co-design workshop. At this event, which was the second time the team met together, the company representatives each presented their technologies first. Then the designers organised two 1-hour design sessions where the participants worked in two groups to develop first ideas for the sustainable energy generator. Each group had 6-7 members in a mix of company engineers (PV, LN, MO, PH, JLB), energy researchers (LR) and designers (JP). The following conversation was recorded after the participants had watched a video called 'Daily Struggle,' where people were carrying packs on their heads:

> JP: Then a string of people could carry it.
>
> LR: So maybe we should include an indent in the bottom side of the box – to carry it on your head!
>
> PV: But then suddenly we are not talking about one big box with everything inside, but a number of smaller ones.

The surprising observation that people are transporting equipment to locations by carrying it on their head triggered this group to reconsider the concept of 'one big box' they initially preferred, and to think of a modular system instead, Figure 1. Similarly, the other group sketched an energy generator as a boat with wheels in response to having seen transport along flooded roads. And, after a motorbike transport and bicycle-packing video was shown, the group also sketched a portable motorcycle generator. We observe that the field video

challenged the response sensitivities of the members as it influenced what they began to work on, i.e. transport becomes an issue. They also resourced the video images into their design work.
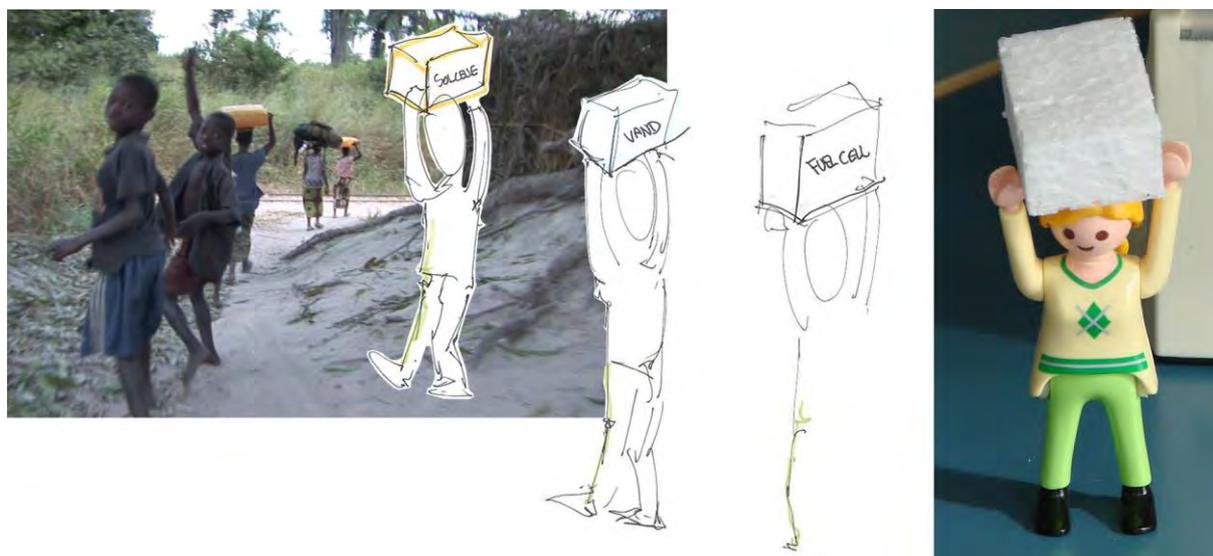
Figure 1   Video is resourced in the co-design event: The participants sketch ideas and make scale models of a sustainable energy generator for de-mining camps after having seen surprising field videos. Rather than 'one big box' transported by truck, they start to consider small modules portable by people.

A later incident illustrates how such an observation from a video spec challenges the negotiation in a group. The video *Pack me Up* showed a range of scenes, bordering on the grotesque, of how much you can pack in a boat, on a truck, on a motorbike, or on a bicycle in a developing country ('dimensional requirements'). In our recordings, this group discusses the dimensions of the solar panels with the marketing manager LN from the solar panel manufacturer – who incidentally arrives late and has not seen the videos:

> JP (while cutting a cardboard 'solar panel' in two pieces): Do you work with folded solar panels?
>
> LN: No, you can't do that. It's tempered glass. They are completely impossible to fold.
>
> LR: Yes, but can't you break it down into smaller elements? For instance 0,5 x 1 meter? (…)
>
> LN: What is wrong with a 1 x 2 meter solar panel? How big is the container you've planned?
>
> PV: Well, maybe there isn't going to be a container…
>
> MO: We've seen examples where there are no roads!

LN's assumption about a container for transport is challenged by the surprising observation that the team has made in the video spec. JP's initial question about folded solar panels is triggered by the observation of the versatile packing styles, and PV and MO are using what

they have learned from the video spec to develop an argument against the need for a container.

In terms of resourcing the participants select particular surprising, yet recognizable, incidents in the video specs (i.e. people carrying things on their head, people packing simple means of transport), and then respond to these in what they produce. Their response sensitivities are influenced by what the participants already know and assume about the reality that their design addresses, and these assumptions are being informed, challenged and alternated by the activities displayed in the video specs.

3.2 Resourcing as continuous responding

The second example illustrates resourcing as a process of constructing through negotiation where material traces of previous conversations play an important role. It stems from a two-year project on the Future of Multi-Channel Map Services for Outdoor Use. The project team consists of 9 people with different professional backgrounds and roles. Our investigation covers the interactions between (GM) the responsible manager of the project and a geo-spatial information systems researcher, (DF) an interaction designer and concept design researcher (the first author), and (SE) a geo-spatial information systems researcher and software engineer.

The project team is gathered to crystallise the 'design concept' for a multi-channel map service. The incident takes place one and a half year after project kick-off and the participants of the co-design event have worked together in the project for more than a year. The following incident takes DF and the SE into a disagreement about a notion of 'core'.

DF   'Map service' now means that we have **one service**. As we are now talking about the design of a multichannel service. I would see that in some way we have **one core**. (holds his hands up in a ball shape)

SE   Since this goes into web application and mobile phone application **we cannot** in any way **use the same core**.

GM   Let's back up a little. This, well, the use of terminologies. This is totally terrible as depending on the point of view the exact same word may mean quite different things. But I think, what we may here adopt as a way to think about this map service is some kind of a service where the end user, in the same way as you buy the phone carrier plan. And then you also check (makes a gesture in the air as if to draw a check mark) which options you will turn on with it. Shall you turn the iPhone option on. Shall you take the web option. And shall you take the multitouch option. And shall you also take the map printing option. So in a way it is the **service now** what the end **user** in a way **experiences** in this connection.

SE   Yes.

DF's statement on 'one core' can be interpreted as an intention to bring the team together around 'one service' concept, i.e. to simplify the concept. His intention seems in line with the aim of the project stated in the original project plan: To develop a new concept for a multi-

channel map service for outdoor use. SE, with his software background, cannot see how *technically* all the applications can be thought of as using the 'same core'. His intention seems focused on implementing a prototype.

GM suggests seeing the service in terms of user experience, and this changes the conversation. As the responsible manager he is apparently working to keep the process productive. Introducing the idea of seeing the service in terms of user experience, GM refers to an understanding of mobile phone carrier plans. All the team members have mobile phones and they know how these plans work. GM also shares an understanding of the different technical parts of the planned service, namely the 'iPhone option,' 'Web option,' 'Multitouch option,' and 'Map printing option,' and he articulates these in terms of how the user experiences the service. By drawing the analogy GM relies on the participants' abilities to associate with their own experiences and make these 'resourceable', i.e. noticed, articulated and relevant for further conversations.

Later, DF writes on the flip chart: 'visually same,' 'same data sets,' 'same symbols,' and 'map contents.' This provokes a response from GM.

> GM   Visually same is actually nothing. Data sets, servers and interfaces clearly belong to the core. But visual appearance of contents and user interface are matters of implementing things in certain way. **What do we mean by the word core?**

> DF   Well, one possible way to try to see the issue. So, well, we have here a user. We have here a computing engineer. Then we have this geoperson. (Draws three stick figures on the flip chart, see Figure 2)

Figure 2. DF draws three 'stick figures' on the flipchart with the labels 'user,' 'software engineer,' and 'geoperson' (left) and later points at the chart when asking GM to elaborate how he sees the service in terms of these figures (right).

In response to GM's question, DF uses the person figures to explain the emerging conception of the multi-channel service now in terms of how someone experiences it. Later, when the team discusses the example of Google Maps as a multi-channel service, DF points

at these figures on the flip chart, faces GM and asks him to describe how he would define the Google example through the perspectives of the stick figures.

GM   Well, definitely you get, well, the same maps. And these maps have, um, partly the same appearance, partly the same interfaces back there. The same map projections are utilised through and through.

In this exchange, terms that refer to the perspectives (the three different 'persons') and the visualisations that have emerged before, are refined and resourced for further work. We observe a continuous process of responding, refining, and resourcing grounded in the initial articulation that make the intentions of the co-designers available to the others to interpret. In terms of co-design facilitation the active labelling of what is noticed, and the drawing on previous examples appear to serve the continuous attuning between the involved and the responsive progress of choosing what becomes resourced in the project.

3.3 The subtly negotiated nature of resourcing

The last example will look at collaborative use of materials for mockup building. It will show how subtle negotiations between participants can make or break the resourcing of design materials. We are back in the workshop in the demining project case. During the sketching session it became clear that a major trade-off between power, size and weight of the sustainable energy generator was necessary: To design a combination of energy devices (like solar panels) of sufficient size to provide the required energy level, yet still easily transportable in difficult terrain. In planning the workshop the designers anticipated that the groups would want to discuss quantitative requirements: Dimensions, weight, etc. We had prepared cardboard pieces in scale 20:1 of solar panels, batteries, fuel cells etc. These materials were placed at the centre of each team table in what we thought would be easy reach for all, Figure 3.

Figure 3. Scale materials turn into resources in the co-design activity – albeit with some difficulties. PH (middle right) suggests an idea, but while JLB on the left tries to 'build' it, the other members move on to talk about different ideas, as talk is faster than building.

We then asked the two groups to build a model to scale of their favourite generator concept. While the video specs were resourced without the usefulness being questioned, the building material had a more troublesome resourcing trajectory with the members. We will use the following transcript to demonstrate the complex responsive nature of resourcing.

> PH: Would it make sense to combine the two ideas (points to board with sketches)… to… does the modular concept combine with the trailer concept? Meaning that you can somehow have a… a fixed platform, but you can transport it in modules?
>
> JLB: So your solar panel stack looks like this (picks up a stack of cardboard 'solar panels')
>
> PH: Yes
>
> JLB: and you make a… (starts spreading out the 'panels' in his hands, then pauses)
>
> PH: Just like a… kind of…
>
> PH: Have you seen the Donald Duck, where they flip out the eh… van … chk chk chk (gestures with his hands that something is unfolding)
>
> (laughter from others)

The participants talk about various ideas, until PH suggests that one might combine the 'trailer' (one box) concept with the 'modular' concept. JLB picks up on this idea and begins building, but then turns silent – most likely because of the Schönian (1983) 'backtalk': The physical material makes it clear that he hasn't formed the idea sufficiently to demonstrate it with 3D materials just yet. PH fills in the break with another flash of inspiration from a cartoon movie that draws laughter from all (except JLB, who's still struggling with his model). Other participants suggest other ideas, and soon JLB gives up on the building. We observe that talk is simply easier and less committal for suggesting ideas quickly. While JLB meets strong supportive response from PH when starting to build, the relations shift when he pauses to think, and conversation moves into other directions. The subtle local interactions between the participants seem to discourage JLB from completing his building intent. While the facilitators made the materials available to participants, in this instance they don't seem to turn into resources, as they are too 'slow' to keep up with the shifting relations between the members. Later both groups do get down to building their concepts as 3D scale models, but in both groups we observe difficulties in transiting from talking to building. This example demonstrates that facilitation intentions will inevitably be met with responses from the participants in a way where resourcing cannot be fully planned or anticipated.

4. Discussion

The three co-design incidents presented above illustrate resourcing from the point of view of co-design facilitation. The first incident showed how a field video challenged the presumptions of the co-designers. It involved "*acts of noticing and bracketing*" in *"reliance on presumptions to guide action"* that are characteristic to sensemaking (Weick et al., 2005, p. 413). When designers resource artefacts, such as field study videos, the meaning of the

artefacts for the project is modified on the basis of how the artefacts are brought into the conversation, e.g. as examples of user practices that the design project should serve. Surprises turn into possible resources for design, once the co-designers articulate their responses triggered by the artefacts. The surprises happen only for the particular individuals involved in this process. If the co-design event would have involved the people displayed in the video, they most likely would not have experienced similar surprises, and thus, they would not be able to produce similar expressions upon their experienced surprise relating to the fact that people actually transport things by carrying them. Hence, it is the combination of the materials, the people, and the conversations grounded in the material that matter for the progress.

The second incident showed how the interplay of intentions (Stacey, 2011) unfolded in interaction. The three different intentions of the co-designers could be interpreted on the basis of what they articulated as 'to simplify the concept,' 'to implement a prototype,' and 'to keep the process productive.' In addition to resolving the conflict, the active articulation of experiences, user perspectives, and images enabled others to express what they found related. In terms of co-design facilitation the active labelling of what was noticed, and the drawing in of previous examples, appeared to serve the progress as well as the continuous and responsive attuning between the involved. The incident also highlighted what happens when co-design brings people with different response sensitivities together. When they become exposed to what the others in the situation find relevant, it becomes possible for each of them to take the attitude of the others toward the collective doing (Mead, 1934). Hence, as a team, they are enabled by a wider range of response sensitivities (see also Hoever, van Knippenberg, van Ginkel, & Barkema, 2012).

The third incident showed interactions where the physical materials appeared to interfere with the flow of co-designing through talk. This appears to challenge the reliance on tangible materials for co-design facilitation – as tangibles are said to enable 'everyday people' to express their needs and thoughts (Sanders, 2006). Co-design facilitators often use different kinds of tools for guiding attention, structuring presumptions, supporting generation of ideas, etc. It could be argued that these models help design facilitators to attune co-designers' response-sensitivities in project-relevant manner. However, the process of resourcing physical materials through tangible manipulation appears to develop slower than the resourcing of experiences and thoughts through talk. Nevertheless, the permanence of the physical material may be a key reason why the co-designers later overcome their initial hesitation and returned to expressing their thinking with the tangible materials.

5. Conclusions

We introduced the concept of resourcing to deepen the analyses of co-design interactions. The focus was on how co-designers make use of what is available, and hence, how these are turned into resources. The analysed incidents showed how co-designers rely on their response sensitivities to select particular materials and experiences and then integrate these into their articulation while contributing to the ongoing co-designing. These sensitivities

appear to be partly based on the co-designers' expectations to the project at hand, on what they already know and assume about the intended context of their designs. These assumptions may be challenged by the activities and negotiations that take place during co-designing.

With the concept of resourcing we render design facilitation integral to the unfolding action of co-designing. Facilitation is not something that can be completely planned ahead outside of the interactions, and objectively implemented according to plan. Clearly it is impossible to foresee what will be used as resources in a co-design event due to the complex forms of collaborative response sensitivities and emergent materials. Perhaps the most important consequence of our concept of 'resourcing' is that facilitators need to reconsider their role in the co-design event – from one of managing to one of participating.

> "From a complex responsive processes perspective, the practice of effective leadership and management is that of participating skilfully in interaction with others in reflective and imaginative ways" (Stacey 2010:xi)

The concept of resourcing opens several important new research avenues. The quality of bringing together different stakeholders to co-design relies on the facilitator's and participants' ability to diversify the resourcing by drawing on the variation in response sensitivities of the different participants. Facilitators need to develop a sense of when to explore the diversity of resourcing and when to condense emergent issues, and they need sensitivity for both the inclusion and exclusion dynamics of the flux. Furthermore, the question of how facilitators can better prepare 'better relevance' for an emerging topic is an interesting research avenue to explore further.

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