Design Methods for Museum Media Innovation

Enhancing Museum User Negotiations by Discursive and Material Explorations of Controversies

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Introduction

Museums increasingly pursue digital innovation by collaborating closely with creative industries, cultural institutions, researchers, digital designers, museum users and the like. In this chapter, we analyse two collaborative design processes to understand how discursive and material design methods did enhance negotiations about the museum user. These enhanced negotiations informed the design of museum media, namely a digital platform for collecting user-generated content and digital exhibition apps.

One of the collaborative design processes took place at a Danish cultural history museum where museum employees, museum users, a digital designer and other professional partners were engaged in the development of a digital platform for collecting user-generated content. The other design process took place at a Danish art museum where a series of digital exhibition apps were developed in the collaboration between museum employees, employees from a digital design company and, to a smaller extent, museum users.

In both design processes, we encountered controversies regarding the understanding of museum users and how to design for them. These controversies unfolded in negotiations of use situations, who the target users were, and how to engage them. Through user negotiations we point to the way different understandings of designing for the user interact and are mutually refined in the course of a design process. We found that the user negotiations in the design processes were greatly enhanced by exploring controversies discursively and materially. Against this background, we come to the conclusion that collaborative design of museum media benefits greatly from design methods that explicitly explore controversies and their socio-material negotiations.

Controversies in museum studies and in design research

Controversies have previously been presented in relation to both museums and design as challenging grounds as well as productive means. Whereas the focus on controversies in museum studies has primarily regarded museum subject matters and museum knowledge creation, design research has emphasized controversies appearing in design processes as potentials for innovation development.

Controversies in museum studies

During the last decade, several studies (Cameron & Kelly 2010; Lynch 2013; Tøndborg 2013) have presented and discussed museums as forums for controversies, 'hot topics' and conflictual meaning exchanges. The purposes of unfolding controversies as part of museum practices seem to register with a range of different arguments. Foremost it is argued that the subject matters and knowledge creation of museums are often controversial in their own ends, tackling, for instance, colonial issues (Henningsen 2010; Lynch & Alberti 2010), abuse (Hamran & Lange 2013; Tinning 2013), fictional child pornography (Mortensen & Vestergaard 2011), World War II (Macdonald 2009; Nielsen & Ringskou 2013) and climate changes (Einsiedel & Einsiedel 2004; Cameron & Kelly 2010; Meyer 2010).

When presenting such issues, museums inevitably engage with knowledge creation related to identity or ethical, emotional, social or political issues that are most often open for contesting approaches, arguments and ways of practising. Such contestations and controversies are suggested as better revealed and emphasized than avoided and by-passed (Lynch & Alberti 2010). At the same time, controversies are presented as productive means for engaging audiences 'in formulating new knowledge; in contributing meaningfully to current debates to more effectively operate within an increasingly pluralistic society' (Cameron 2010: 53). Thus, controversies are seen as both preconditions and means for museum practices, something museums need to care for as well as something museums can work with while they develop their knowledge in relationships with the surrounding society.

As we will further describe later, the controversies dealt with in this chapter were related to more mundane topics than those described above, namely controversies regarding the understanding of museum users and how to design for them. These controversies were thus related to design issues unfolding in collaborative design processes taking place 'behind the scenes' (Macdonald 2002) of the museums studied, and the way they were dealt with impacted the museum media being developed.

Controversies in design research

Within design studies, controversies have previously been flagged as influential and noteworthy for the understanding of design development. During a design confer-

ence in 2008, Bruno Latour suggested that designers should orient themselves more towards the socio-material controversies that designed objects are part of (Bannon & Ehn 2013). By using the term socio-material, Latour emphasizes that objects are hybrids that bind multitudes of human and non-human, discursive and material, substances together and meanwhile '[trigger] new occasions to passionately differ and dispute' (Latour 2005: 5). Designed objects thus assemble and expose differences.

According to Latour, design processes should be planned in order to make visible how objects – rather than being matters of facts – are constructed by and construct diverse matters of concern, and thus call for attention towards diverse situations of use. Especially in the field of Participatory Design (PD), this approach has been embraced and at the same time recognized as an already ongoing practice, since PD processes have always evolved around diverse matters of concern (Telier 2011).

However, the thoughts of Latour regarding matters of concern and their discursive and material controversies, request for an explicit facilitation of controversial interests in the process within which an object is constructed (Bannon & Ehn 2013). Also, it calls for thinking of the design object as something that is able to handle, or co-exist with, controversial matters of concern. Thinking of design in this way leads to thinking of a design object not only as something heterogeneous (Mol 2002) responding to a variety of user situations, but also as something which centres around given discursive and material controversies. Importantly, the controversies should not necessarily be solved. Rather, they should be recognized, handled and configured for co-existence. This has been envisioned by reference to Chantal Mouffes 'agonistic' approach to understanding democracy, which emphasizes 'constructive controversies amongst "adversaries" who have opposing matters of concern but also accept other views as 'legitimate' (Telier et al. 2011: 187). In the framework of PD, such 'agonistic struggles' could be unfolded as 'passionate, imaginative and engaged' activities leading to 'creative innovations rather than rational decision-making processes' (Telier et al. 2011:187). In this way, PD embraces controversies as a means towards creative innovations. As in museum studies, controversies in design research are thus seen as preconditions, constructions and potential triggers of knowledge and innovation.

Controversies in museum design research

In relation to museums, researchers studying design have brought attention to the co-existence and consequential controversy of, for instance, different communities of practice (Hansen & Moussouri 2004; Lee 2004; Moussouri 2012), curriculum theory ideals (Lindauer 2005) and values (Davies 2011; Davies, Patona, & O'Sullivana 2013) in museum design processes. In line with this, Sharon Macdonald (2002) has advanced the idea that museum design controversies often orchestrate negotiations of the museum users and their needs. As Macdonald (2002) describes it, these negotiations often imply that museum employees and designers 'virtually' represent the users in the design process rather than the users being 'factually' part of these processes.

In her study of an exhibition design process, Macdonald (2002) displayed how the multifarious 'virtual constructions of the visitors' led to 'uncertainties' regarding the objectives and means in the exhibition work. Our design cases similarly exemplify the centrality of controversies and negotiations regarding the understanding of museum users in museum design processes, particularly negotiations on who the museum media users were to be and how to target them. We explore both the 'virtual' and 'factual' presence of users in order to be able to discuss and expand on these insights in relation to concrete museum design methods.

In this chapter, we further want to stress the importance of both discursive explorations of controversy as well as material explorations of controversy for negotiations regarding museum users. In this socio-material orientation (Latour 2005), a central point is to highlight the connection between discursive and material explorations and how these can be seen and used as concrete design methods for museum media innovation. Other studies have similarly stressed the relevance of physical experimentation in terms of design controversies, referring to, for instance, sketching, prototyping and/or material artefacts (e.g. Perry & Sanderson 1998; Henderson 1999; Brereton & McGarry 2000; Eckert 2001; Suchman, Trigg & Blomberg 2002; Lee 2004), but only few studies (e.g. Lowe & Stuedahl 2014; Stuedahl & Smørdal 2015) touch upon the connection between discursive and material explorations of controversies in a museum design context. This chapter seeks to do just that by showcasing analysis of two collaborative museum design processes and discussing how discursive and material explorations of controversy regarding the use situation were more or less explicitly used as design methods for enhancing museum user negotiations, resulting in museum media innovation.

Case descriptions

The first study concerned a new and small Danish cultural history museum, the Danish Museum of Rock Music.[1] A digital museum collection, exhibition and communication tool was developed collaboratively by a design group consisting of museum employees, museum users, a digital designer and other professional partners, such as a venue owner and a rock journalist. The digital platform had the working title *The Map of Danish Rock History* and was imagined as a tool for mapping and describing places of Danish rock music, such as music venues, festivals, youth clubs, etc. It was envisioned by the museum that the mapping consisted of digital content, such as collected or created pictures, videos, written stories, etc. These materials were to be uploaded by both users and museum employees. As a new museum pursuing collection and documentation of a popular cultural topic, The Danish Museum of Rock Music found the engagement of the public especially relevant, both on the digital platform and in the process of designing the digital platform. The collaborative development process was planned to engage all involved participants in ideation, conceptualiza-

tion, designing and prototyping of the digital platform over a period of two years. The outcome of the collaborative process consisted of a digital beta version of *The Map of Danish Rock History.*

The second study took place at a Danish art museum[2] where a series of digital exhibition apps were developed in the interplay between employees from different departments of the art museum (educators, curators, communication specialists, etc.), employees from a digital design company and, to a smaller extent, museum users. More particularly, the participants developed three apps for three different exhibitions of modern visual art with the aim 'to revolutionize the exhibition communication by replacing other media, for instance, screens, wall texts and pamphlets' and 'to expand the quality of both the off-site and the on-site experience that will increase the accessibility to the museum.'[3] The first two apps developed were intended for temporary exhibitions and the processes of developing them took approximately two months and four months, respectively. The third app was intended for the permanent exhibition and, since they were not pressured by exhibition deadlines, the participants chose to spend approximately eleven months developing it. Compared to the other case, museum users were not permanently part of the development group. Rather, they were involved in the three processes at particular instances. In the first process, museum users were invited to a test workshop, where they tested a prototype of the app being developed. In the latter two processes, museum users were invited to ideation workshops, before concrete ideas and prototypes were produced. Thus, the involvement of users was quite different in the two cases studied, as were the nature of the controversies being unfolded.

Methodically, the two cases were followed for more than a year by two different researchers, both using ethnographic methods, such as participation, observation, interviews and collection of materials (e.g., design sketches, drawings and maps). At the cultural history museum, the researcher had a very participatory role, engaging in the planning and facilitation of the design process, while the researcher at the art museum had a more observational role.[4]

In the following sections, the data from the two design processes is analysed; firstly, by focusing on discursive explorations of controversies in the two design processes and, secondly, by focusing on material explorations of controversies. Even though we see discursive and material explorations of controversies as highly interwoven socio-material configurations, we find this distinction useful for analytical purposes.

Discursive explorations of controversies
The controversy of factual versus experience-based knowledge: The Map of Danish Rock History

During the collaborative design process leading towards *The Map of Danish Rock History*, one controversy in particular was explicitly constituted. This controversy re-

garded whether the digital platform should be designed as a factual and encyclopaedic mapping or as a platform for mapping experiences of rock music.

The invited participants represented a broad range of potential contributors and users of the digital platform, such as three young rock fans, a former rock musician, a music venue owner, a rock journalist, a rock librarian, a local archivist, a digital designer and two museum employees (a history curator and a communication specialist). Initially, the group was urged to tell their own stories about places of rock music in Denmark. In this way, the design process was planned in order to explore user situations that were envisioned to be central to *The Map of Danish Rock History*, namely, to tell stories about the places of Danish rock history.

The stories presented at the workshops in the early stages of the design process had varied scopes. Some presented personal views on and memories of certain places. For instance, a young participant described how she waited for hours for the band to come while making her own band t-shirt and how she later got up on stage to sing with her idols. Other stories were more distanced from those telling them: a portrait of a certain cinema that was once used to record big Danish radio hits; an overview of activities related to rock music in a specific urban area during the 1960s. While the first story was told by a participant representing rock fans, the latter were told by participants representing rock journalists and local archivists, respectively.

Thus, the design process presented different matters of concern related to telling the stories of the places of Danish rock culture, and the digital platform was, on the one hand, articulated as factual and, on the other, as experience-based. But how these two approaches could co-exist was not explicitly discussed by the collaborating group at this point. In the early stages of the design process, such different approaches to how users of the digital platform should map and perceive the places of Danish rock culture and, thus, which users should do this, were able to co-exist peacefully (Mol 2002), although in a vague manner.

Later in the process, these two approaches gradually came to develop into more and more opposed approaches. For instance, the rock journalist articulated one approach favouring the perspective of a factual mapping:

> **Søren** (rock journalist): I would simply start by contacting your organization [addressing the venue owner, also a member of the Danish organization of music venues] and say, 'we need your help to put all venues in Denmark on the map, they all relate to your organization'. [...] This would make a starting point. And before the platform is launched, you obviously will have built some layers with stories like yours [the personal anecdotes], it will end with the specific anecdotes when the user has reached certain places on the map.[5]

While the approach of the rock journalist seemed practical and pragmatic it also seemed to have implications for the design by calling for a design to primarily facilitate contribution of content already created, for instance, archived pictures, video, audio and other documentation. Following these suggestions, the personal anecdotes could

then be attached to the material uploaded by the venues that, in this version, were seen as the prime contributors to the platform.

As this version of *The Map of Danish Rock History* was articulated – in particular by the rock journalist – other participants felt urged to challenge it. These participants were interested in giving the users' contributions of personal anecdotes a more central role in the digital mapping. They argued for experience-based knowledge as different from just providing additions to the factual documentations of the places of Danish rock. This could for instance be heard in an expression by Claus, who emphasized the personal perspective as a significant element to the future digital platform:

> **Claus** (venue owner): I think it's important to get the personal stories and the anecdotes because I learn best through anecdotes. If there is a teacher who has some good stories to some issues, some personal stories, then I get caught by it. Not when it is just some mechanical facts, I might almost say [laughs].

Thus, as a reaction to the suggestion of taking a practical starting point in the material already to be found at the venues, Claus (together with several other participants) argued that the personal stories and anecdotes about experiences with rock music should be essential to the *The Map of the Danish Rock History*. The approach of the rock journalist was found to be rather mechanical in its focus on factual documentation and archival material. Rather, the digital design should, in the view of those participants, be constructed in a manner to engage the user in storytelling and providing documentation of their own experiences with rock music. Contributing to the map should be more about personal storytelling than about presenting archival material.

At a later point, the rock journalist refined his version of *The Map of Danish Rock History* by considering the personal anecdotes as a more highly prioritized part of the mapping. Thus, he suggested re-articulating the anecdotes as something that should describe the unique characters of a certain place: A personal anecdote about an amazing concert should be part of the mapping only if it contributed to describe how the given location uniquely staged this experience. Several participants found this approach excluding. A participant representing the young rock fan said that she would not be able to generate content on the future digital platform if such criteria were used. The venue owner agreed and said that stories like those imagined by the rock journalist would demand an almost academic approach to the mapping. At the same time, the museum communication specialist, Lise, added: 'Music is about feelings and experiences', and, to sum this up, the venue owner, Claus, said: 'It is the live music experience, which should be central to the mapping, that's the central issue of places of rock music.'

The controversy thus brought with it an engagement from the participants to refine and innovate their versions of the use situation related to *The Map of Danish Rock History*. By relating and opposing the two approaches to the design of the digital platform, the group mutually refined their claims regarding the user of the digital platform. What started out as several stories about places of Danish rock culture de-

veloped into conceptual discussions on the design of the digital platform: Should the main priority and starting point of *The Map of Danish Rock History* be to encourage people from the venues to gather factual documentation or should it rather be centred around encouraging users to tell anecdotes about live music and thus be a matter of experiential knowledge?

This controversy helped to develop criteria for either approach to why users would be motivated to participate on the platform: the interest in creating and consuming factual portraits of rock places or the interest in being the contributors and users of personal anecdotes. By coming up with answers to such questions, the design participants gradually refined their visions and arguments for each approach. Refining visions happened because visions and ideas were challenged in a controversy between different matters of concern. This controversy was not necessarily a rational and logical opposition but, rather, it was the practised controversy of this situated collaborative design process. This might or might not have unfolded in other cases, with other design participants, activities and matters of concern. At the same time, it was seen that several participants especially supported a user situation in which they could imagine themselves taking part. Thus, the inclusion of 'factual users' (Macdonald 2002) in the process led to discursive contributions to the negotiations that somehow closely represented the users' matters of concern. Thus, the negotiations were not purely founded in the 'virtual constructions of users' (Macdonald 2002). Meanwhile, the matters of concern of the users – manifold as they were – took shape in the situation of the process just as much as they derived from the participants' relations and experiences with rock music in general.

A narrow versus a broad target group: The art museum case

In the case of the art museum, one controversy in particular was explicitly constituted in the collaborative design between the museum employees and the digital designers. This controversy was not directly related to different use situations, as was the case in the collaborative process leading to *The Map of Danish Rock History*. Rather, the participants in the art museum case were concerned about meta-level discussions on whether 'the target group' should be narrowly or broadly defined.

In contrast to the first case, opposing arguments in terms of the controversy did not co-exist peacefully in the beginning – it became evident at the very first meeting in the process. Before this meeting, the participants had had only minor discussions about the project. However, an application for funding had been written – mainly by museum employees – and, in this application, it was stated that the group would involve 'four focus groups that represent different audience categories: School classes, the museum members club, families and young people'. The involvement of a broad and multifaceted group of users was clearly visualized in the application for funding, thus sustaining an approach in terms of targeting a broad user group. The project was granted money based on this application but, at the very first meeting, the digital

designers from the design company strongly questioned the rationale of the broadly composed user group mentioned: 'But are they the target group you want to communicate to? Are they the end users as you define them?' as Julia, one of the designers, asked the museum employees. Contrastingly, her ideal was a more narrowly defined target group: 'We cannot make a digital solution that appeals to everybody so you have to dare to make a choice [...] and then we can work with another target group in the next project.'

Throughout the entire project, arguments for the one or the other approach were continually refined. In the process of developing the second app, arguments for a broadly defined target group stated that the museum was obliged by law to appeal to everybody and that the number of potential users of the museum was too small to target narrowly. In the process of developing the third app, it was further argued that the museum had a demographic commitment to appeal broadly and that target-group definition was anchored in a deterministic, functionalistic marketing logic with no room for unpretentiousness, playfulness and surprise. At the same time, arguments in favour of a narrowly defined target group stated that it was 'extremely important' to define a target group so that the solution would become intuitive and easy to use and, later on, that it was 'absolutely necessary' to make choices about target group. Thus, arguments for one or the other approach co-existed throughout the entire project, and the controversy was generally articulated more and more strongly.

While there seemed to be a tendency for the museum people to argue for a broadly defined target group and the digital designers for a narrowly defined target group, this dichotomy proved to be too simplistic. Arguments for one or the other approach could be found in both camps and the participants positioned themselves differently depending on specific situations. This contrasts the more clear-cut opposition between different groups (or people) in the process leading towards *The Map of Danish Rock History*. Furthermore, even though arguments for one or the other approach were continually refined throughout the process, arguments bridging the two sides were also introduced discursively in the processes of developing the second and the third app in the art museum case. For instance, in developing the second app, a curator from the museum hesitantly stated:

> **Maria** (curator, museum): I could imagine having a very specific target group as you [the digital designers] say, and I'm very open for that; well, I do want to talk about it, but you really have much more concrete experience in terms of which groups it might be beneficial to choose. In addition I would like if it was visible to a broad audience; that it exists and that they can participate if they feel like it even though they're not the target group.

Maria was clearly ambivalent about choosing a very specific target group, fearing that it might exclude. To answer this fear, the designers explained how they saw a target group as an elastic concept and, even though very specifically defined in the design situation, the actual design would often end up appealing more broadly than intended.

In this way, the designers also expressed ambivalence regarding the controversy. Later in the process of developing the second app, one of the digital designers introduced another example of arguments bridging the different positions. As mentioned earlier in the case description, the participants held ideation workshops with potential users before concrete ideas or prototypes were developed. At the ideation workshop with potential users in the process of developing the second app, the invited users talked about having different knowledge needs. Inspired by this, Julia suggested:

> **Julia** (designer, design company): One of the groups was particularly passionate about the different interest points or knowledge needs – that these vary. Maybe you could appropriate that in different ways in a solution so that we can actually appeal to more target groups because there are different ways to access the content. And more concretely, one of the groups talked about being interested in the details of the artwork; so that could perhaps be one way to engage with the artwork. While another could be interested in knowing more about the artist, and some would perhaps want a historical approach.

Here, Julia suggested a way to bridge the opposing arguments, outlining a new way to understand and approach the controversy. Thereby, the controversy did not just result in developing and refining opposing arguments but also in coming up with new, alternative understandings and ideas. In line with this, the matters of concern changed throughout the design process, and the workshops with potential users in particular seemed to have a strong significance here. While potential users took part in the collaborative design process leading to *The Map of Danish Rock History*, they were only involved at certain instances in the art museum case. Up to these instances, the potential users were imagined virtually in certain ways and meeting the 'real' or 'factual' users face to face tested and reconfigured these imaginations (Macdonald 2002). Thus, these instances were used to refine the opposing arguments but also led to new ones, as illustrated by Julia's solution-oriented suggestions above. Involving users thereby helped to enhance the central controversy on target groups that turned out to have a visible impact on the museum media being developed in the art museum case.

Material explorations of controversies

Physical experimentation and prototyping were carried out in both cases, however in quite dissimilar ways. As we will describe in the following, we found that these material efforts were highly interwoven in the more discursive aspects of the controversies and at the same time gave ways to explore the controversies in other manners.

Intertwining approaches in the 'Tour': The Map of Danish Rock History

Physical experimentation was conducted in the collaborative design process of *The Map of Danish Rock History*. For instance, mock-up activities were carried out by the entire design group at the end of the process. These paper-based mock-ups created by the design participants were envisioned as sketches of the digital platform that the digital designer should afterwards take into account. The mock-ups consisted of sketches of the interface of a 'place' on the map, and, by outlining a number of functions and subcategories, they also suggested what type of content should be generated to portray a place.
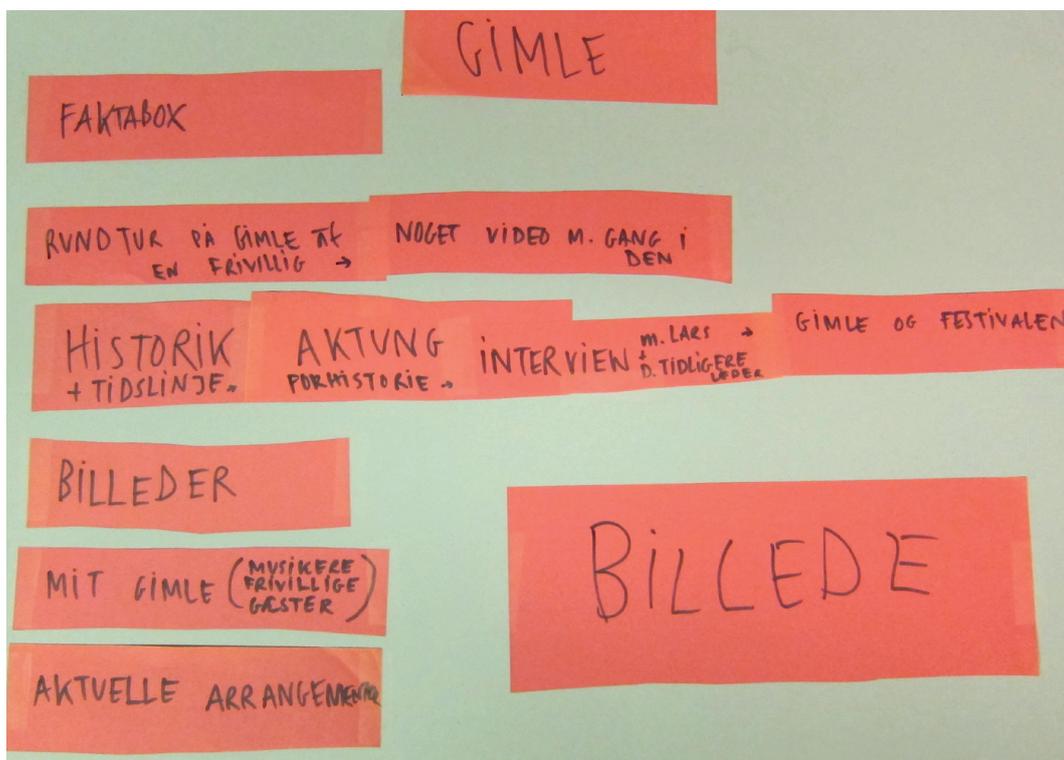
Image 1. Paper-based mock-up

Photograph of the paper-based mock-up created by one group in the third workshop leading to *The Map of Danish Rock History*. The mock-up displays the functions and subheadings by which the story of 'Gimle' – a venue in the Danish city of Roskilde – could be told.

The paper-based mock-ups were visually rather simple, as the example in Image 1 shows, but each component was accompanied by presentations given by the groups, which more thoroughly described each element and the content that was envisioned to belong to the elements. While the group at this point in the design process had not discursively resolved the controversy regarding a factual versus experience-based approach, it is interesting to examine how elements of the paper-based mock-ups suggested alternative versions of the co-existence of the two approaches. For instance, one group created a mock-up of a digital portrait of the

music venue Gimle with an element which they called 'Tour' [rundtur] (see Image 1). The group explained this element of content as a video-tour that presented the characteristics of the place and audio-visually guided viewers around at the venue. The contributor of this video-tour was envisioned to be a volunteer, or a former volunteer, at Gimle. The group argued that volunteers had a strong role in this particular place and should, therefore, be the voices through which its story was best told. As a suggested element of the content on the map, the video-tour entailed a vision of merging together the factual portrait of a place and the experience-based approach. In 'Tour', the volunteer could contribute with their personal approach to the factual information while the factual information became the historical hinges of the personal experience. This element could thus constitute the two approaches as mutually dependent and interrelated: Just as the personal anecdote would gain strength by being situated in the midst of a factual portrait of a place, the factual information would be exemplified and underpinned by the personal anecdote. 'Tour' suggests that the user is valued as both contributor of facts and as contributor of anecdotes in telling the stories of the places of Danish rock history, just as it valued these two user types in a mutually beneficial intertwining.

The 'Tour' can be viewed as a rather simple and obvious suggestion about how to present a place on *The Map of Danish Rock History*, but it tells stories about controversy and digital design innovation. It shows how issues that could not be discursively negotiated and solved can take on new articulations when more concretely materialized in prototyping. The prototype developed another route by which to deal with the controversy of the user negotiations, or even make this controversy productive, since oppositions created new perspectives rather than constraints and exclusion when materially unfolded in the design prototypes. In 'Tour', the significance of both approaches as well as their mutually beneficial relationship was articulated. Meanwhile, it could be suggested that the foregoing discursive controversy regarding a factual versus an experience-based approach helped shape and refine both versions of the digital platform in ways that made arguments for either side more elaborated and qualified before entering a material form. In this way, the discursive and material versions of the controversy were interwoven and mutually dependent.

'Hedging one's bets without causing confusion': The art museum case

As in the first case, the participants in the art museum case made sketches and prototypes throughout the process. Furthermore, the first two apps developed serve as particularly interesting examples of material experiments that worked as resources for exploring the controversy of a narrow versus a broad target group.

For the first app, museum users were invited to a test workshop where they tested a prototype of the app being developed. The users here were characterized as part of two of the four focus groups mentioned in the application for funding: 'the members club' and 'young people'. Both groups were asked to test a simple, digital PDF proto-

type of the app being developed. Julia, the digital designer who conducted the test, described the workshop as 'problematic' since it ignored the idea of targeting a specific user group. Furthermore, neither the members club participants nor the young people saw themselves as the target groups for the tested prototype: As Julia commented, the members club participants were, on average, 75 years old and, even though they were rather positive about getting extra information in front of the artworks, the format of an app was not intuitive and easy for them to use. The young people also liked the idea about getting more information, but only factual information. They did not like the interpretational framework in which the app encapsulated the artwork, since they wanted to experience it for themselves. Thus, they were not at all likely to use such an offer at a museum.

The group did not have the time to fundamentally change the design of the app, since it had to be launched at an exhibition opening not long after. Also, the workshop made it clear that the two user groups were too different to develop the chosen solution format in a way that would appeal to them both. Furthermore, Emma, the project manager from the museum concluded that these user groups simply 'didn't relate to the medium'. Thus, the materiality of the prototype test showed that the broad target group manifested in the application for funding was problematic in relation to the solution being developed. Instead of trying to design for these user groups, the participants therefore chose to redefine the target group, focusing on one target group: 'the creative segment 25–35 year olds who are well educated and crazy about new gadgets'.

Redefining the target group at this point did not, however, prevent the finished app from being 'too complex', the group concluded later. Therefore, when initiating the development of the next app, the participants involved in the first app process were very concerned about defining a target group from the beginning. For instance, Emma stressed this point to newcomers in the group at the first meeting of the second process:

> **Emma** (project manager, museum): We have experienced that a very specific target group has to be chosen, to whom it should appeal. So maybe that should determine the content of the app, be it high school students or fashionistas: who do we want to choose as a target group? Because, we can't appeal to all of them.

This statement highlights a shared, material experience developed in the group at this point, favouring arguments for a narrowly defined target group. And, indeed, the group did decide at this meeting on a very narrow target group for the second app, namely what was termed 'the Cover girl segment', meaning young women who read the Danish fashion magazine *Cover*. However, the ideal of a broadly defined target group did still exist, which was strongly manifested not long after. Thus, in this project, the museum organized a user workshop before concrete ideas or prototypes were developed and the invited participants surprisingly proved to be a much more diverse group of users than would fit the definition of 'the *Cover* girl'. At a meeting following the user workshop, Julia, the digital designer, noted this, to which Emma,

the project manager, explained: 'There were two of those [*Cover* girls], but that was because we wanted it to be broader than we first discussed.' This further resulted in a more broadly defined target group, namely 'iPhone users between 25 and 35 years old'.

Interestingly, the second app proved to be particularly popular with children and families with children and not the chosen target group. This was deemed to be a success by the digital designers who used this fact to highlight that target-group definition should be seen as an elastic exercise. However, the group once again seemed to agree that the app was 'too complex', thus sustaining the arguments for a narrowly defined target group:

> **Julia** (designer, design company): It is simply absolutely necessary that we make some decisions about what we want, who the target group is and how we communicate to that target group. That might be the most important thing.
>
> **Maya** (educator assistant, museum): But still, that was exactly what we tried to do with the first app. In the beginning, it was really basic, but then a lot more was put into it when we first got started. It's extremely difficult.
>
> **Benjamin** (creative director, design company): Well, it's bloody difficult.
>
> **Emma** (project manager, museum): But it's much simpler than the first app.

By evaluating and comparing the material explorations (the two apps), the participants collectively recognized that designing for a specific target group was easier said than done, pointing to an ambivalence in terms of different matters of concern related to the controversy. This ambivalence was, for instance, vividly portrayed at an evaluation of the second app by a group of museum employees, in which it was praised for being 'inclusive in terms of children and families' but at the same time criticized for 'not appealing to all target groups'.

While these kinds of opposing arguments indeed co-existed throughout the process of the art museum case, and were tested and refined in relation to the concrete products developed, a bridging position actually became defining for the final solution: the third app. The idea to appeal to not just one specific target group, but to different groups or knowledge needs (mentioned by Julia in the second process) was further explored in the third process. Here, the material experience of the group from the two first apps was very much taken into account. As pointed out earlier, the user test in the first process showed that the solution format (the mobile app) did not appeal to both user groups invited. Also, the participants largely agreed that the two first mobile apps were too complex. Thus, it seemed, the co-existing different matters of concern could not be accommodated in this kind of solution. Instead of trying to resolve the controversy, the digital designers suggested another format for the final app, namely a stationary iPad solution that could better accommodate differentiation. This format, with the larger screen of an iPad, left room for complexity in relation to giving different access points to different target groups (see the sketch in Image 2). As Julia said, when presenting one of the ideas for the final app, 'It's a way to try to

avoid having to talk about a specific target group; maybe we could actually address different visitor combinations in this solution. [...] So that might be a way to hedge one's bets without causing confusion.'
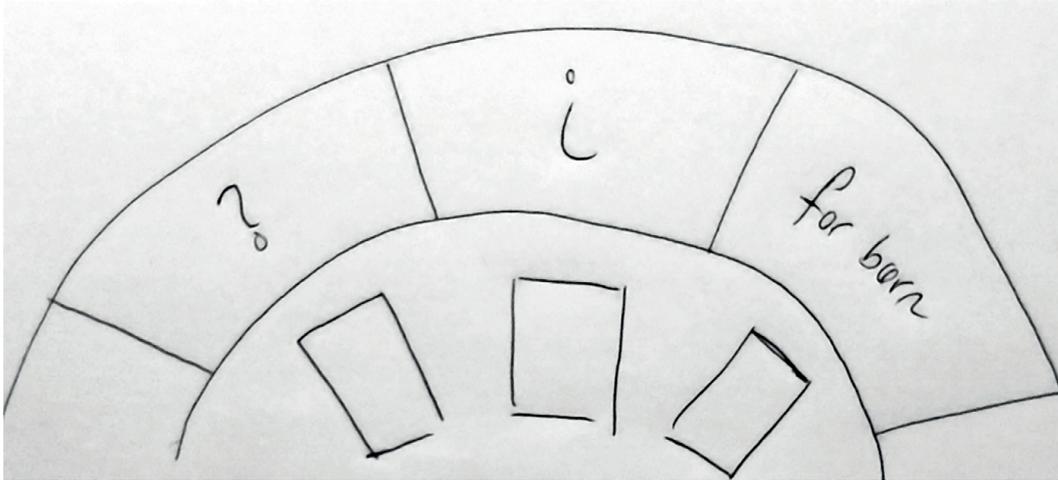
Image 2. Paper sketch

A sketch proposed by the digital designers in the third process of the art museum case (drawn by the researcher). 'For børn' means 'for children', 'i' means 'information' and '?' means 'questions'. The three squares in the lower part of the sketch are meant to be additional access points appealing to different interests (of different target groups).

Thus, the material explorations of the prototype in the first process and the two first apps developed demonstrated that the mobile app format would not be able to contain the co-existence of the two opposing approaches. Instead, a new solution format was chosen in which both approaches could be valued and in which they could be closely intertwined. In that way, the stationary iPad solution became another route – a material route – by which to deal with controversy and make controversy productive.

Conclusion

In this chapter, we have scrutinized two collaborative design processes in terms of how discursive and material design methods enhanced negotiations regarding divergent understandings of museum users and how to design for them. As exemplified in the analysis, such enhanced negotiations greatly informed the innovative design of museum media in both cases, despite their differences. Even though the goal of the processes was similar – to develop museum media – the participants and their activities were quite dissimilar, as were the controversial issues and the ways these were explored in the design processes.

In both cases, negotiations of how to understand museum users were central for the controversies in focus. But they were central in dissimilar ways: In the case of the

rock museum, the controversy was centred around use situations, while the controversy in the art museum case was centred around meta-level discussions on how to define target groups. As stipulated earlier, this difference might have occurred due to the different ways of involving users in the two cases. Thus, the two cases exemplified two dissimilar design strategies in terms of Macdonald's (2002) concepts of factual versus virtual users: In the rock museum case, the presence of factual users was prioritized throughout the process; in the art museum case, the users were mainly virtually constructed by the museum and design professionals, yet tested in relation to factual users at certain instances.

This difference in design strategies may also explain why the controversy of factual versus experience-based knowledge co-existed peacefully at the beginning of the rock museum case as opposed to the art museum case, where arguments for targeting a narrowly and a broadly defined target group were strongly present as opposite approaches from the very first meeting. In the art museum case, exploring this controversy discursively from the beginning was a deliberate design strategy and, throughout the process, this exploration ensured a high degree of attention to how the users were virtually constructed. When factual users were involved, these constructions were challenged and new ideas arose. In the rock museum case, the users were not such an abstract and professionally articulated concept. Rather, they were concrete design participants in the process. They were not encouraged to be explicit about their understanding of the use situation and generally tended to implicitly support a future use situation in which they could imagine themselves taking part. This, of course, was as much an act of virtually constructing the end user as in the case of the art museum, even though this construction of the user might be argued to have the benefit of being more 'factual' and anchored in concrete user needs or interests. Thus, in the rock museum case the design strategy was to start out by not explicitly emphasizing negotiations of different user types, but rather to let the sketches of different use situations evolve and co-exist vaguely. In this way, the factual users could start out by contributing with dissimilar imaginings of the use situations of the digital design object without having to deal with the more overall conflicting matters of concern regarding different user types which were latent in the design process. To sum up, our studies suggest that involving both factual and virtual users in the negotiations of end users can and should be done in a variety of ways. Nonetheless, it is important to be attentive to how dissimilar design strategies have different implications for the user negotiations in design processes and the material outcomes they lead to.

Based on our studies, we furthermore argue that material explorations of controversies became particularly central for enhancing negotiations regarding the understanding of museum users and how to design for them. Thus, materialization in mock-ups, prototypes and products gave other ways to explore the controversies by challenging, refining and evolving the matters of concern in the design processes of both cases. Actually, the emergence of the controversies could be argued to be less dependent on the types of participants taking part in the processes and more on the

introduction of the materiality of the concrete use situation. For instance, we found that negotiations of use elaborated in more discursive forms could contain a certain amount of virtuality despite the involvement of factual users, as in the rock museum case. These discursive forms maintained the different positions instead of evolving and dynamically developing them. On the other hand, when materialized in, for instance, a material mock-up, the design idea could be articulated by synthesizing different positions. Since the material experimentation regarding this aspect of the design of *The Map of Danish Rock History* was not introduced until a later stage, this design process unfolded as 'virtual' and somewhat stalled, despite the fact that this collaborative design process had been imagined as concrete, factual and dynamic due to its active and thorough involvement of users. On the other hand, in the art museum case, materiality was introduced early on and thereby catalysed an alteration of the different arguments regarding the virtually constructed users.

As illustrated in Figure 1, two different continuums are worth noticing for an understanding of the way user negotiations informed the collaborative design of museum media in the two cases:
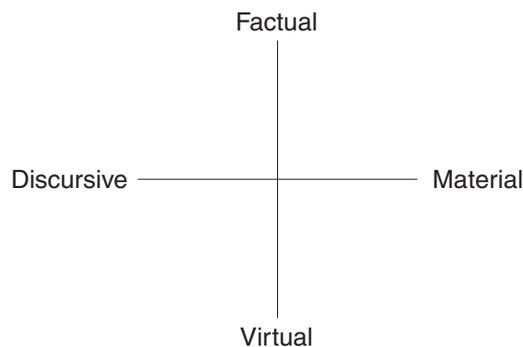
Figure 1.   Diagram of user negotiations

Comment: Points to be attentive to when planning and managing the development of museum media. The continuum of users ('factual' versus 'virtual') is inspired by Macdonald (2002).

The rock museum case could be characterized by particularly the upper-left elements in the figure, as implementing 'factual users' in mainly 'discursive explorations'. Contrastingly, the art museum case could be characterized by particularly the lower right elements, as implementing the 'virtual users' combined with a great amount of 'material exploration'. As we have described in this chapter, we found that the most innovative re-articulations of the controversies were triggered by materiality: Thus, when it came to parameters towards creative and dynamic innovation alongside different matters of concern, it could be suggested that the 'factualness' of users proved less productive compared to materiality of the design process and its ability to introduce the actual use-situation early in the process. However, we have also noticed that the discursive negotiations were often interwoven with and highly influenced the material experimentations and their routes towards alterations in the controversies.

Negotiations and controversy have earlier been presented as drivers towards creative innovation in museums (Telier et al. 2011). We can support this, and we add that the ways controversies about users and use situations are dealt with, in interplay between virtual and factual representations of users, and between discursive and material design activities, are significant for the ability of controversies to actually drive, enrich and dynamically evolve design processes. In museum media innovation we therefore encourage museum designers to be attentive to how museum users may be involved and take part in the negotiation, discursively and materially, when planning and managing processes of developing museum media.

Notes

1. The museum was renamed Ragnarock in January 2016.
2. The name of the art museum and participants in the case will not be disclosed due to ethical considerations and since it has no importance for the conclusions presented.
3. Excerpts from the application for funding written before the project was formally initiated.
4. See Olesen (2015) and Knudsen (2015) for more elaborate analyses and reflections on the methods used.
5. All citations are translated from Danish and all names are pseudonyms.

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