Odenplan – a media façade design process

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ABSTRACT
In this paper we present an example of how to work with the challenges inherent in media façade design processes. We base the paper on our experiences from the creation of a series of design proposals for a media façade on the Odenplan subway station in Stockholm, Sweden. We approach the question of how to design for media façades by discussing how we have structured our design process to address specific sets of challenges outlined in previous literature in the field of media architecture. In our view, such research is valuable in that it helps establish common ground for researchers and practitioners in a developing field by building a repertoire of approaches, as well as highlight important issues that need to be addressed in this emergent field.

Categories and Subject Descriptors
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Design, Human Factors

Keywords
Media façades, design process, experiences from designing

1. INTRODUCTION
As the design of interactive technology evolves there is a growing interest in urban informatics [16]. Media façades are part of this developing area, and in recent years different media façades have entered public life, supplemented by a number of studies into understanding how these affect civic life ([4], [10], [41]). For researchers and practitioners in the field of media architecture, the many examples of media façades and the studies of their impact and potentials can help establish what Schön [36] calls a *repertoire* for designers to draw upon when creating new media architecture as well as for evaluating already existing concepts.

In the past, we have worked on a number of media façade projects, ranging from to small-scale, transitory installations to large-scale displays permanently integrated into prominent buildings [9]. In our work with the Odenplan media façade, we have drawn upon these insights in order to orchestrate a design process that addresses the particular complexities that this type of interactive architecture encompasses.

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Such studies can be supplemented with research into the design process that leads to the creation of interactive media façades, and what specific challenges are important to address. In this paper, we offer an account of a design process in which we developed proposals for a media façade for the metro station Odenplan in Stockholm, Sweden. Our focus here is not to discuss the specific design proposals for the façade in themselves. Rather, we wish to provide practitioners and researchers with a detailed example of how we approached a subset of the challenges identified by Halskov and Dalsgaard [8], in a specific design workshop.

We hope our contribution can provide researchers and practitioners with input as to how to design media façades, which may serve as springboard for further research and as a starting point for discussing these challenges within the community of practitioners. When returning to the discussion of our findings, we will elaborate further on what specific experiences we find useful to bring into new research and design projects.

In what follows, we first briefly touch upon our underlying approach to the design case, followed by a brief discussion of related work. This will lead to a condensed description of the important design challenges, before going into depth with the design case. Finally we will discuss our experiences and draw a short conclusion.

1.1 Approach
In our work with the Odenplan case, we approached the project with two aims: We wanted to examine the different aspects in the underlying design process from a design research perspective as well as contribute to the Odenplan subway station with an interesting and relevant media facade, designed with the specific context, building and future use in mind. We thus wanted to generate insights which enabled us as designers to generate ideas and concepts for the particular design case, leading to the final media façade, *and* examine design methods and the process as whole, as a way of contributing to the field of media façades and beyond, on a more general and theoretical basis. We consider our approach research-through-design, (e.g. [2], [27], [43]) where real projects and creation of interactive concepts drive our research, while at the same time we use our research insights actively in our design work.

During the project, we documented each step of the process using a locally developed tool called *Process Reflection Tool* [7], in which each member of the team can create notes, upload resources (in example pictures, video, sketches) and reflect on the overall process. At the central workshop in the Odenplan project, we used Project Reflection Tool extensively to capture each step. Furthermore, part of the workshop was recorded on video in order to capture the ideation phase. This enabled us to work consistently as designers in the process, as well as return to the documentation, notes and video in the role of researchers, and re-examine the unfolding process based on our initial research questions.

2. RELATED WORK

From a practitioner's point of view, Vande Moere and Wouters [41] argue for taking three perspectives into account when analysing the context for implementing a media façade: *The environment*, *the content,* and *the carrier*. Following four case studies, they discuss important aspects of each element. In relation to the environment, they call for an increased awareness of the social-cultural context and the fact that context changes over time. The authors argue for a detailed analysis of the social-cultural context, and involving inhabitants in the development of the content, preferable *prior* to the design of both the media façade and the content. Furthermore, they point out that this new development within the field of media façades should focus on making practitioners, architects and urban designers aware of the challenges and complexity of this hybrid media. This is echoed by Fatah gen. Schieck [15], who argues for a more sustainable approach to the implementation of urban screens, while listing a set of key issues in the implementation of screens in the urban space. The author places a special emphasis on understanding the relationship between the built environment and stakeholder involvement as a criteria for the success of content. Finally Fatah gen. Schieck highlights the potential in seeing the screens as a tool for engagement with the community rather than (just) a sender/receiver.

In relation to our contribution, the Vande Moere and Wouters [41] call for new methods and tools in relation to creating content, and ensure the continuity throughout the lifespan of the façade. We recognize this need for methods and tools, in that the design of a media façade requires ways of working with very large systems and environments, that in some ways challenges does not easily lend itself to traditional design methods, such as for instance mockups [13] or prototypes [31], while still capturing the lifesize scale that is vital in designing media façades. As will be clear below, we have tried to tackle these challenges through the appropriation of a series of approaches during a design workshop.

Similarly, Diniz et al. [10] have proposed a framework for interactive media media façades, that offers ways of analysing the role of the display, who the users are, where the users are, and how interaction is created. The key elements discussed by Diniz et al. [8] echo many of the considerations implicit in our process. Furthermore Brynskov et al. [4] has conducted an extended analysis of interaction patterns in and around the media façade *Aarhus by Light*. They highlight three aspects of the interaction: *initiation*, how people engage the installation at first, i.e. pass and notice or walk-up-and-use; *interaction style*, from basic exploration, over embodied engagement, to unintended use; and *relation* - individual, group, family etc. These aspects resemble some of the perspectives from Diniz et al. [10], and are basic factors present in our considerations throughout the design process. Brynskov et al. [4] observed that the main part of users entered into social relations of some sort through interaction – either as part of a group or new relations with strangers. To us this is a key observation to keep in mind when designing interactive installations for an urban setting, in the sense that we are designing for the existing situation and movements in the urban space, and should therefore offer something that will emphasize social settings and interaction in relation to the media architecture.

3. DESIGN CHALLENGES

In their work with the design, development and production of media façades for urban settings, Dalsgaard and Halskov [8] have identified eight key challenges for the particular area of urban interaction and HCI. Each of the challenges are present in various development projects within diverse areas and domains, and we find them highly relevant, and prominent in our work with media architecture. In figure 1, we have reproduced a short description of these challenges. The list captures and describes the central point of each challenge. For a more thorough account and discussion, see the original publication.

Each of these challenges is present throughout the work with media façades and its entire lifespan, but they are also more prominent in specific phases of the design and development. While stakeholder alignment is more dominating in the beginning of the project and when final decisions regarding cost, design and content are to be made, physical integration and robustness are more relevant challenges when actually building the installation. Similarly, the challenges of content, situations and (un)intended use are highly relevant in the concept generation and ideational phases of the process. While each of them can dominate at specific points in the process, they are, as Dalsgaard and Halskov [8] describes, also intertwined in practice.

1. New interfaces: urban settings prompt new forms of interfaces or alternative assemblies and uses of existing ones

2. Integration into physical structures and surroundings: New installations and systems must be integrated into existing physical surroundings.

3. Increased demands for robustness and stability: Shifting light and weather conditions over which designers often have little or no influence must be taken into account.

4. Developing content to suit the medium: The content has to fit the format of the display and the kinds of interaction intended to be supported.

5. Aligning stakeholders and balancing interests: Exploring, negotiating, transforming, and balancing stakeholder interests can be critical to the success of a system.

6. Diversity of situations: A very wide variety of situations occur and overlap in the city - how does the media façade fit into the assemblage of situations in a given location?

7. Transforming social relations: The introduction of new technologies can cause disruptions and transform social relations and protocols.

8. Emerging and unforeseen use of places and systems: Media façades will likely be used, perceived and appropriated in different ways than designers intend.

Figure 1 - Dalsgaard and Halskovs challenges for designing media façades.

To us, lists of challenges such as the one in Figure 1 have the potential to act in what Rogers [34] calls a generative role. Rather than present an exhaustive picture of what challenges specific practitioners will encounter, they act as heuristic tools that allows us as researchers and practitioners to reflect and learn from others. This way of using the list of challenges mirrors that of Grudin [20] who identifies challenges for developers of CSCW software, or Bødker [6] who discuss the challenges of moving from what she calls "second wave HCI" to "third wave HCI". As such, this paper can be seen as an example of using such sets of challenges

for research purposes, in order to create generate new insights by building on previous work.

4. Case: Odenplan

In the following we describe the Odenplan media façade design process. We first touch upon the background of the project and give a brief overview of the process, before going fully into details with the main workshop, where a series of experiments created the foundation for the three final design concepts for the media façade.

Figure 2 - The imagined future Odenplan building

Odenplan is a projected new metro station in Stockholm, Sweden, see figure 2. The entry building is designed by Danish architects 3XN and is meant to be light, open and with a low footprint on the Odenplan plaza in Vasastan, in the centre of Stockholm. 3XN approached us, wanting suggestions for a potential media façade for the metro station, either for the roof inside or somewhere outside. The concepts we came up with concepts would then later be further developed in collaboration with 3XN for a presentation for the city architect of Stockholm, who will make the final call.

The initial design brief was quite constrained, in the sense that we could only work on specific parts of the building, and not change the current structure and we had no control over surfaces, light design and little room for technical integration. These conditions were partly due to our late involvement with the project, meaning the main features and the lightning designs and interior was already decided upon. Furthermore the project developer had set strict constraints on the interior layout, such as lightning, ease of access and a high focus on not disturbing the flow leading to and from the metro platform underground.

4.1 Process

In the following we present a brief account of the overall steps in the design process prior to the key workshop. As indicated by figure 4, the process is comprised of several events leading up to the design workshop, and some succeeding events.

In mid April 2012, we had a meeting with the primary architects, 3XN, on the project. They approached us with the intention of discussing the design and integration of a media façade on the Odenplan metro station. After a brief introduction to the project we were presented with their initial ideas, the scale model of the metro station, and different samples of materials planned for the interior and exterior of the building. The main focus of the meeting from our perspective was to uncover the conditions and requirements in the project, meaning the aforementioned constraints as well as questions of major milestones as well as what stakeholders should be considered and what technologies were feasible. Furthermore we set out the frame for our collaboration.

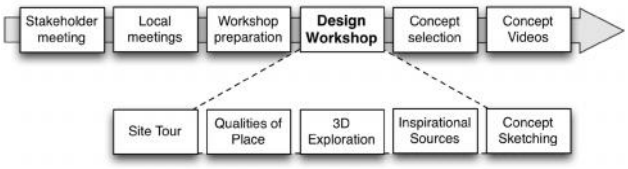

Figure 3 - Process overview

We agreed on a parallel process, where we produced a series of concepts for the metro station and presented these to 3XN, before seeking final approval from the Stockholm city architect.

Following these initial meetings we established a local design group, consisting of design researchers with an interest in the specific case and media façades in general. In a series of local meetings we gathered relevant information, such a 3D/CAD drawings and technical constraints, identified design openings, considered virtual prototyping tools, and planned the process according to the project milestones. An important outcome of one of the first meetings was the decision to work with the outside stairs of the metro, as the primary part of the media façade. This required a change in the stair lighting, and 3XN agreed on the choice and approved our request to change the specification of the LED lights in the stairs, to suit our technical needs.

4.2 Design workshop

Prior to the main design workshop, each step was carefully discussed and planned during a preparation meeting, see figure 2. While planning the workshop, we discussed methodological approaches in relation to the relevant challenges faced at Odenplan. Each step in the workshop was carefully planned to broadly address the specific challenges and provide a better understanding of the particular domain, context, usage and situations possibly unfolding around the metro station.

	Site Tour	Qualities of Place	3D Exploration	Inspirational Sources	Concept Sketching
1. New Interfaces	x	Planned	Planned	Planned	Planned
2. Integration into physical structure	x	x	Planned	x	Planned
3. Robustness and stability	x	x	x	x	x
4. Developing content to façade	x	x	Planned	x	Planned
5. Aligning stakeholders	x	x	x	x	x
6. Diversity of situations	Planned	Planned	x	x	Emergent
7. Transforming social relations	Planned	Emergent	x	Planned	Emergent
8. Emerging and unforeseen use	x	Planned	x	Planned	Emergent

Figure 4 - Relationship between challenges and workshop phases

As shown in figure 4, each part of the workshop aimed at addressing a subset of the eight challenges, while other challenges emerged as part of the individual phases, the discussion and the unfolding events. Two challenges were not touched upon during the workshop, as they seem more present when working with hardware and implementation (3) or when negotiating with stakeholders on crucial design requirements (5).

Figure 4 gives an overview of the relationship between the challenges and the steps in the workshop, and we return to this relationship between each challenge, the phases of the workshop, as well as their relation to the design insights in the final discussion. The workshop conducted as a full day activity to avoid interruptions from other activities, to establish continuity between the individual phases, and to ensure the retention of impressions and design insights throughout the workshop. We, the authors, participated as designers with a few extra participants, all design researchers from our research lab, CAVI [21].

In the following we describe each phase within the workshop thoroughly. We will introduce the approach used and present the explicit considerations behind the choice of method, describe what happened and highlight the design insights from each step.

4.2.1 Site tour

The workshop was initiated with a *Site Tour*. A Site Tour lets the workshop participants go to the site they are designing for or to a site that resembles the same characteristics as the design site - either in physical shape or in the actions or situations taking place. The purpose is to make the participants aware of site-specific elements through a bodily, sensual and emotional experience of the particular site. Along with impressions created through the bodily presence of the participants, stories or information connected to the specific site can be introduced. This specific approach was aimed at addressing the challenges of understanding the existing situation and social relations, as well as bringing the experiences of the particular site into the present situation with the designers.

The idea of being there and engaging oneself with, understanding and analysing the potentials of a particular site relates to Paul Dourish's concept of *Embodied Interaction* [12], and to Klemmer et. al [26] who underlines how our physical bodies play a central role in shaping human *experience* in the world, *understanding* of the world and *interactions* in the world. Specifically about walking Ochoa argues that "the physical walk allows the mental walk, stimulating the thought and making possible the contact of the body, as element of measure, with the space" [33].

Further, design methods such as *Bthere or Be Square* [14], and *The Design Space Explorer* [9] encourage the facilitation of design on-location in order to better understand the unique context of the design. These methods have their focus on how to maintain the analytical outcome of being at a site, by capturing it either on physical maps or in a table. The Site Tour's focus on bodily experience was inspired by Laursen [28] who argues that being on-location and sensing the distinctive site's specific characteristics is important when gathering inspiration for designs. By introducing the designer to the site through their own bodies the Site Tour, strives to make the knowing that emerges from embodied engagement enrich the design process and the end results which in line with Wilde et al. [42] can become an important part of the design process. Furthermore Anderson [1] argues for conversations taking place while walking for generating a 'collage of collaborative knowledge'.

The purpose of the Site Tour was to give us an embodied experience of a site that resembles the same characteristics as the integrated stairways at the new Odenplan building. The stairways at the Odenplan building is characterized by tall curved steps broken by a number of steps of medium height at the middle. A stairway close to our research laboratory holds the same physical characteristics and was chosen as site for the Site Tour.

Figure 5 - Site Tour, sitting on stairs

At the stairways, the facilitating designer, asked us to take a seat on the stairs, one by one and as if we did not know each other. We positioned ourselves on the tall steps and with great space between us, see figure 5. Then we were asked to take a seat as a group. The group had a non-verbal negotiation and then sat down – again on the tall steps in three rows. The facilitating designer had prepared a short talk about good places to sit in urban space, stairways and secondary seating inspired by architect Jan Gehl's work on well-functioning city areas and 'sitting landscapes' [17]. The purpose of the talk was to make the stay at the stairway meaningful to the participants not only as an embodied experience, but also by introducing a common vocabulary to articulate the experience and understanding of the site in the following events in the workshop.

The Site Tour was the first of five events during the workshop and the focus was particularly on the qualities and constraints connected to a stairway area and its use as sitting area. It made the participants reflect on architectural elements such as the difference between the tall and the middle height step. Also the introduced terms such as 'secondary seating' and 'the edge effect' was used as a common reference frame throughout the workshop.

Also social elements of stairs as sitting areas, resting/waiting and meeting space at the city square came to the participants' attention and was further supported by the spatial properties discussions later in the workshop. The physical experience of being on the stairs was most clearly seen as the participants discussed the 3D model of the building in the panorama cinema where the above-mentioned elements enriched the participants understanding of the virtual models. The coupling of real life and 3D perspective thus enriched the understanding of the design site.

4.2.2 Qualities of Place

The next part of the workshop was called *Qualities of Place*, and aimed at helping us re-consider forms and uses of stairs. This relates to the challenges of the diversity of situations, as well as unforeseen and emerging patterns of use of stairs, apart from sitting on them. We found pictures of different uses and forms of stairs, which we discussed. We specifically focused on evocative images, meaning images of uncommon forms or uses of stairs thereby helping designers relate to both the existing use of stairs, in the domain as well as enabled them to see it as an alternative interface – a media façade. The discussion ended in a series of immediate design insights that we could use as inspiration as well as a broadened conception of what stairs could be.

The rationale behind this part of the workshop were the idea of using the images as generative metaphors [35], encouraging

alternative ways of seeing-as [36] in order to broaden our conceptions of stairs. Thus the purpose was not the generation of specific ideas, but rather opening up the design space, by identifying specific qualities of stairs as places, that we'd like to use later in the workshop when sketching ideas. Building on the physical experience of the Site Tour, this phase first equipped us as designers with new ways of seeing-as for the rest of the workshop, as well as discuss qualities that we found interesting. Thus, the rationale for discussing different forms and uses of stairs in this phase was not for narrowing down specific ideas, but rather seeding the ground for the next phases in the workshop.

This approach is influenced by other work in using images as sources of inspiration in order to open up the design space, such as for instance Mood Boards. While we did not address this during the workshop, the images were intended for what Lucero [30] calls paradoxing, the research into conflicting alternatives. To this we would like to add, that where Lucero primarily focus on the selection and exploration between different alternatives as the main role of paradoxing, we actually aimed at placing ourselves in a paradoxical situation, which we could then later attempt to resolve in differing ways for the rest of the workshop.

We were seated around a meeting table while two of us showed different images as well as explained the motivation for inclusion. The entire phase took roughly thirty minutes, and consisted of 14 images being shown. As each image was shown we would discuss and elaborate on what thoughts and ideas the stairs brought to mind. A common structure to this discussion was an initial sense of puzzlement at the image, followed by a short discussion that explicated any doubts and let participants exchange views on the image, thus underlining the use of the images as paradoxing [30]. For instance, images of three young rappers on stairs lead the participants to see stairs *as* [36] a stage, rather than a transit area, which was our initial understanding. This expanded perception was the result of a brief discussion, where we agreed that this could be a potentially interesting path to take for the Odenplan building. In another example, we used an image of a parliament to see the stairs as a potential site for discussion or making statements. Both are examples of the generative role of the images, serving to expand our potential design space, which we utilized later in order to narrow down finished ideas.

In summary, the experiment in itself was very simple, but also functioned quite well, in that we, the participants, were able to discuss a series of interesting qualities, which we would like to consider for use later in the workshop. Furthermore, we all carried an expanded sense of what the Odenplan stairs could be used for.

For us, this phase highlights the value of opening up the design space through concrete examples that can then be used as shared points of reference throughout the rest of the design process. It is not enough to merely point out that "stairs can be something else than just for walking or sitting on" – we all know that, but having concrete examples of what that "something else" could be, had a good effect in our workshop. It was added to the common vocabulary for the day in the same way the Site Tour gave us a common frame of reference. We did encounter a challenge too, in that our gains from this workshop was perhaps not carried over into the next phases as well as we would have liked.

4.2.3 3D exploration

Following the exploration of the qualities of place, we moved onto a more concrete exploration of the yet unbuilt architectural structure through a 3D exploration of the metro station. The rationale for this phase was to establish an understanding of the spatial issues we were addressing by simultaneously exploring and discussing a virtual model, and our intention was to get a general sense of scale, and of how the building and our potential interactive elements would be perceived by people depending on where they were in relation to the building. Furthermore, it would enable us to be aware of the future structure, the possibility of integrating or placing technology and sensors, without obstructing the use of the space or the façade. This in turn, would help us gain a thorough understanding of the façade in relation to the future content. Instead of having set up a specific path or series of views, an open 3D exploration would enable us to explore issues and opportunities in an on-going dialogue. Our use of the 3D cinema in this manner is inspired by Kjems' work on virtual reality in urban planning [25], and Nielsen's research into 3D in spatial design [32], among others.

Figure 7 - 3D Exploration, discussing future use

Some of the specific questions we hoped to address were the following: How does the structure appear from different angles, how is it situated in relation to the surrounding urban area, including both buildings, spaces and infrastructure such as traffic lanes, how does it present itself for people with various movement trajectories in the space. In the terminology of Gedenryd [18], the 3D exploration phase can be construed as a so-called situating strategy, a move made to bring the future situation alive in the design situation: "… these techniques re-create the various parts of this situation that do not yet exist... the designer has to create her own working materials; before the world can become a part of cognition, the designer has to create it." [18:157].

The 3D exploration was carried out in a dedicated 3D cinema in our research lab. Drawing upon a 3D model of the metro station and blueprints of the building in the urban plan that we had received from the architects, we imported and refined the model in Unity3D [29], a 3D game engine. Unity enables users to set up a series of physics parameters (e.g. making surfaces solid so that you cannot move through them) so that the model can subsequently be explored in free-form walkthrough modes. One of the benefits of this approach is that it is quite straightforward to navigate through the model, once the physical parameters have been established, and thus all participants could take control to point out specific areas of interest during the exploration. In the model, we had mapped out a series of lights that corresponded to a specific placement and distribution of LEDs on the basis of talks with the architects and a supplier of interactive LEDs. This allowed us to not only explore the raw 3D model, but also to see

how different intensities, colours, patterns and transitions of the LEDs would appear from various points of view.

During the exploration, all participants except for the person controlling the camera movements around the 3D space stood in front of the wall-sized display and were free to move around to point out specific features for discussion. In our exploration, we navigated the metro station and surroundings with a particular focus viewing angles, perspectives and movement vectors related to the stairs in which we intended to integrate the LED arrays. In the initial phases, we moved around the plaza surrounding the metro station to get an impression of the scale of the building in relation to the urban landscape, and to get a better understanding of how people in the plaza would move about. We then moved closer to the building, exploring it outside and inside, and finally we focused on the stairs, viewing them from different angles outside of the building, moving past them, and moving onto the stairs in order to explore different points of view for people sitting or standing on the stairs.

Whereas the earlier phases of the process had been relatively abstract and conceptually oriented, the 3D exploration phase prompted a much more concrete focus on the specific architectural form, for better or worse. This focus led to a number of insights that were crucial in the subsequent design process. First, our exploration of the 3D model revealed a major difference in how people seated on the stairs perceive of the LEDs, compared to passers-by or people seated in front of the stairs in the plaza. This emphasised the need to consider how to design different modes of interaction for different sweetspots - or potentially to create modes of interaction that do not favour one privileged sweetspot, but rather appeals to people regardless of where they are positioned. Second, it became clear that there was a need to develop subtle modes of expression, both in terms of colours and light intensities, as well as in the dynamics of the visuals. By trying out a series of different clips displayed on the simulated LEDs in the mode, it became clear that a display of this type could very easily become too tacky and busy. This can overpower the form and expression of the physical architecture, and while this can be an interesting strategy in certain situations, we also knew that the architectural firm we collaborated with were unlikely to accept an installation that did not have a good fit with their overall vision.

Taking a step back from the specific project findings, the 3D exploration proved to work well for understanding viewing angles, perspectives and movement vectors. One of the main challenges in projects of this nature is to get a sense of the scale and architectural form as perceived in a human scale, and the use of the 3D cinema offered a level of immersion that was on a different order of magnitude than our previous explorations of the building via physical scale models or 3D renderings on traditional displays.

4.2.4 Inspirational sources

For the subsequent part of the workshop we consciously worked with sources of inspiration as resources for stimulating the generation of design ideas. This is not directly related to a specific challenge in terms of working with the media façade, but more a way of rethinking the potential role of and interaction with the façade. With that in mind, we included this phase in the workshop to address the work with media façade as a new or alternative interface, as well as trying to discuss the impact on the existing usage in the future design and the potential in emergent and unforeseen use as a design quality. The approach taken is rooted in Schön's [37] design theory according to which a designer rather than looking for standard solutions sees the situation as something already present in his/her repertoire of paradigm cases, examples, and previous situations. Several other researchers, including Sanders [38] and Halskov & Dalsgaard [22] have specifically argued that inspiration plays a prominent role in experience design.

We have in previous projects applied the inspiration card workshop technique intended for the early stages of a design process during which professional designers and their collaborators develop potential future designs [23]. The original design technique is a semi-structured process based on creating and combining technology cards and domain cards. In the case of the Odenplan project we did not conduct a full-scale inspiration card workshop but confined ourselves to taking advantage of the potential of consciously bringing sources of inspiration into the process. In that way the approach also addressed the challenge of creating content for the unique interface, and even explore potential uses of the stairs and façade.

For the preparation of the workshop one of us selected three cases: Body Movies, Blinkenlight and Love Doodles. The three sources of inspiration were chosen on the basis that they offered people a participatory role in shaping an experience.

Rafael Lozano-Hemmer's Body Movies [5], a media architecture classic, transforms public space with projections on a buildings façade measuring between 400 and 1,800 square meters. Photographic portraits are projected onto the façade, but the portraits only appear inside the projected shadows of the passers-by, whose silhouettes can measure between two and twenty-five metres depending on how close or far away, they are from powerful light sources positioned on the ground. But as discussed by Dalsgaard and Halskov [8] people were more interested in playfully engaging in shadow play with each other rather than using it to uncover portraits, which where the original intentions by the artist.

Blinkenlights, a well-known media architecture installation, is a setup in which the windows of a building on the Alexanderplatz in Berlin constituted the individual pixels of a huge, low-resolution display, to which people could upload animations to be displayed on the building's façade, or on which users could play Pong using their mobile phone [3].

Love Doodles is an interactive installation developed for ARoS, a Danish art museum [29]. Museums visitors is offered the opportunity to be part of a mosaic of images by writing or drawing on a glass plate with a regular whiteboard pen, positioning oneself in relation to the drawing, and then pushing a button making a image of the users with an overlay of the drawing appear on the mosaic.

For the workshop each of the sources of inspiration was presented by showing a short snippet of video. Body Movies and Blinkenlights were both familiar to all workshop participants and required only little introduction whereas Love Doodles required more careful introduction.

The inspiration materials helped the us shape the overall direction of the design process by agreeing on and making explicit four qualities of what to design for: 1) an open interactive installation with the potential for emergent and unforeseen use; 2) social and playful interaction where people not only interact with the media architecture but also relate to each others; 3) the opportunity to leave trace; 4) simplicity.

4.2.5 Concept sketching

The final phase was the concluding concept generation. By including a mix of techniques, we sought to combine and include the elements and insights from the prior steps, as part of the concept generation. Several of the preceding elements were included directly in this phase while others had a more subtle role by acting as common points of reference throughout the session. The explicit aim of the final step was to develop the possibilities in the display as a new interface, the featured content and interaction, if any. The approach to the concept generation was a combination of sketching each concept and verbally explaining the constituents, e.g. interaction with or content for the façade.

The input and inspiration from the previous steps in the workshop, helped the designers in building a shared virtual world. Goodman [19] describes different ways of visioning and creating virtual worlds, through the use of different compositions, weighting, ordering, deletion and supplementation. As described earlier, the previous steps provided the designers with a series of shared experiences, metaphors and a vocabulary – a shared understanding of the overall situation designing for – which in turn serves as the materials of the situation in a Schönian sense, available for creating new compositions. Schön [36] describes the sketchpad and the act of drawing, as such a (shared) virtual world, which offers a medium for experiments, without invoking actual changes. The different components and elements of the situation, the seeing-as, can be rearranged, ordered and supplemented in such a way, that the designers are able to envision different designs and concepts for the particular domain.

Sketching serves several functions in design, especially within generative group sessions. Sketches are a way of communicating ideas and concepts. Van der Lugt [40] describes how sketches can enhance access to ideas and act as a collective graphic memory, and Dix and Gongora [11] describes how drawings on the most basic level can be *informal* and communicate the shape and experience of a building or idea. Furthermore, Dix and Gongora argue that sketching can act both as *formational*, *transformational* and even *transcendental* – sketches can help designers seeing ideas more clearly, using the external representation as a way of gaining a new understanding of the problem or situation, or even seeing the elements of a drawing as something entirely different. In a group setting, van der Lugt [40] describes this, not only as an individual relationship between the designer and the sketching, but also as existing on the group level, where the act of sketching can stimulate the designers to re-interpret each other's ideas. According to Dix and Gongora, any externalisation, for instance, verbal descriptions, images, names etc., can serve the functions described above, making the relation between the verbal explanations and sketches a key relation, where only the sketches are preserved.

The setup for the final part of the workshop was comprised of a whiteboard as the primary sketching surface, a projector superimposing the 3D model on top of the whiteboard, and a camera for documenting each concept. A second display in the background enabled us to display the inspirational sources throughout the session, keeping them available as common points of reference and allowing them to continue to inspire us. During the workshop the participants could change both the inspirational sources in the background, as well as the viewing angle and position of the 3D rendering of the model.

During the session, we took turn sketching different ideas, while explaining each element, the overall concept and possible interaction. This was done in rapid succession, only interrupted by the documentation of each concept. Some of the sketches were very simple in form and concept, while others prompted questions and supplements from the group. Throughout the session, we often changed perspective on the superimposed image of the 3D model – shifting from at frontal view, over a view from the side of the stairs, to a view from above. Similarly the secondary display was used to recall elements from the previous steps, and for using images as a means of explaining certain features of a concept.

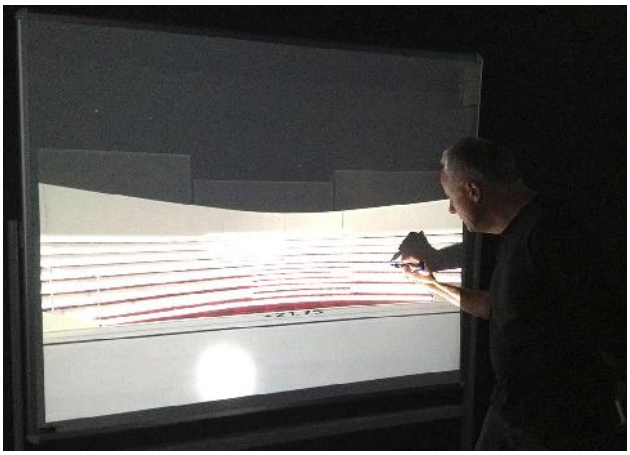

Figure 10 - Sketching on the 3D projections

The final phase of the workshop was aimed at creating a setting where we could generate a series of design concepts for the media façade placed on the stairs of the metro station. Furthermore, the intention with the setup was to facilitate a more direct and decisive role for the inspiration and insights from the previous steps in the workshop. The final session was very productive in terms of quantity, as we created 12 concepts in 45 minutes.

While the explicit aims (see figure 4) were fulfilled, in the sense that we produced concepts to the façade as well as discussing the interface and integration, several discussions emerged in relation to each concept. In the case of the stairs as a façade for passers-by, we discussed whether people would be intimidated by the disruption of the stairs as a place for waiting and socialising, or whether ideas with a high degree of interaction could facilitate emerging and unforeseen use.

While it is hard to draw a direct line between each concept and the sources of inspiration, our impressions are that each of the steps did contribute to the final outcome. It can be difficult to assess whether this was due to the initial steps alone, the inclusion of the inspirational sources directly into the final setup, or a combination. The only previous step not included directly in the final phase – the site tour – still played a role in several of the concepts where we worked with the relationship between the distance between the individuals, their placement on the stairs, and the media façade. This could indicate that the insights from the previous steps linger on in our shared experience.

4.3 Final concepts

Subsequent to the ideation workshop, we met to discuss the twelve concepts in relation to the different themes, interaction styles and the prospects of creating a series of video prototypes for the final presentation for 3XN, the architectural firm we collaborated with. We had previously decided to create three concept videos, aiming at simplicity and ease of communication in order to show what can be done with an LED media façade.

During the time between the workshop and this meeting, a few new concepts ideas emerged and were presented briefly. Following a discussion of each concept, we categorized and grouped these in terms of the interaction style and content. Several concepts fell under each of these groupings, and we decided to produce three different videos, illustrating each of the main themes: one presenting visual effects on the façade, and two showing different levels of interaction with the façade.

The three concepts were not merely chosen due to our individual judgment of the overall quality, but weighed against our assessment of their communicative qualities and the ability to reflect the broadness possibilities with the Odenplan media façade. Furthermore, we discussed how the stakeholders would receive the concepts. We wanted to show both simple and clear concepts, as well as the more inventive.

Each of the concepts was presented in a video to 3XN produced using the same 3D model as used in the workshop, and aiming at showing the core visuals and interaction. The final concepts each address specific features of the façade and interaction styles. The final concepts are as follows:

Contours

This concept aims at playing with the spatial features of the stairs and creating an illusion with the LEDs and the façade. During a short period of time, the façade is used to draw specific lines along the stairs, emphasizing the contours, stairs and the architectural expression. It begins with lines drawn around the edge of the stairs, followed by each step being lit slowly upwards, and a similar fade out after a few seconds. This is replaced by a fade in of the central part of the stairs, followed by a slow fade in of the entire surface. Finally Contours conclude by pulsing up and down for a few minutes, before the pattern is repeated.

Playhead

This concept uses the position of the users on the stairs as input. The stairs acts as a musical score sheet, with each step representing a line, or pitch in relation to the key, and the position of a user indicates when the note is strung. Users sitting on different stairs will result in different notes being played, and the space between them represents the time interval. Every now and then, a play head moves horizontally along the stairs, and plays a note for each person occupying the stairs. The note is accompanied by a visual effect, such as a bursting bubble or fireworks.

Traces

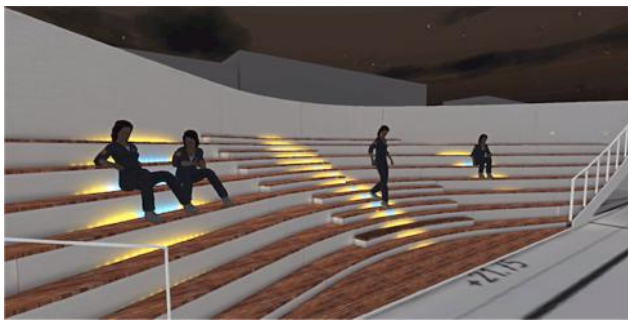

Figure 11 - Concept example Traces, captured from video

This concept revolves around the footprint or traces that the users of the stairs leave behind. When a person or group of people are seated on the stairs, they generate an aura or circular light around where they sit. If they move to another part of the stairs or leave, they light up new parts of the stairs as long as they are at the domain. The aura itself fades away slowly when no one is sitting in it. That way previous use of the stairs will linger on in the form of these auras for some time, creating traces of the use of the stairs as seating area.

5. DISCUSSION

We now turn to a discussion of the relationship between the different phases of the workshop and the challenges for media façades outlined above. From this discussion we condense a series of insights that can act as input to other researchers and practitioners within the field of media façade design, as well as highlight future research questions.

Our first design insight is the value of distributing the complexity of the intertwined design challenges for media façades. Our workshop as a whole did address many of the challenges outlined by Halskov and Dalsgaard [8]. However different challenges were tackled in different phases, which worked rather well. This approach, however, also brought along the problem of ensuring coherency among the many different threads brought up during the different parts of workshop. A specific problem we faced was capturing the bodily insights from the Site Tour and bringing them along in the next phases. This highlights an interesting area of research, as we have experienced this problem in other areas than media façade design, in example when trying to capture the richness of a verbal discussion on concept posters in an inspiration card workshop [23].

Our second design insight is closely tied to the interplay between the individual phases in the workshop. While each step were planned towards addressing specific challenges, several of the steps included discussion of emergent themes and elements. For instance, some of the images presented in the Qualities of Place session, prompted a discussion on the social patterns and possible impact on usage, when regarding the metro station as more than just a stair. Similarly, the sketching of the final concepts brought a range of themes from the previous steps in to play, as we elaborated on each concept. When we sketched the rough idea of what eventually became Playhead (see above), we discussed the relations between number of occupants on the stairs and the quality of the audio. Would a large number of users disrupt the audio and visual qualities of the concept? Many of the emergent themes echoed both the general focus of our work with media façades (e.g. [4], [9]), as well as reflecting individual research and design research, such as the qualities formulated as part of the Inspirational Sources part of the workshop. At the same time we see this as part of the workshop progression, where each event was planned and tied together by the overall ambition of building a common vocabulary and reference throughout the day.

Our third design insight is the complexity of the relationship between inspirational sources and the projected building, which is quite hard to capture as well as keep focus on during the workshop. This may complicate the session in three aspects. First, the actual setup is complex and involves both equipment and time consuming preparation, second it is overwhelming to relate to all three elements actively during the session, while still producing ideas and sketches, and third, from a research perspective, it is complicated to reconstruct the strands of inspiration in relation to the generated concepts and evaluate how each challenge was addressed in particular, as well as the entire workshop from a process perspective. It is very hard to assess what parts of the workshop played a prominent role, and what parts drifted into the

background. While we did not take elements directly from the Site Tour into the sketching session, as we did with the images from Inspirational Sources and the list created during Qualities of Space, it still played a significant role to us, as designers, in terms of a shared repertoire and vocabulary.

Our fourth design insight is the importance of making explicit the dialectical relationship between the present and the potential when working with buildings that are not yet realized. This was underscored in our workshop when insights from the Site Tour was brought into the 3D Exploration part of the workshop – and elements from that discussion were still part of our vocabulary during the final generation of concepts. While the importance of this dialectical relationship is nothing new in designing interactive systems, we consider this issue to be extremely relevant in designing media facades, since they are often radical interventions into civic life that can hardly be ignored by the users of the Stockholm Metro. An interesting area of future research could thus be how we can work with areas and buildings that are still in the planning phase, since the context is not available here. We consider the purposeful work with external representations one way of helping us and other participants in a design process working with this particular kind of complexity.

While we did try to address as many of the challenges we found relevant within the context of the workshop, two where intentionally left out. First, we did not find it relevant to address the third challenge, namely the issues regarding safety and robustness, since in revolves around the integration into the built environment, as well as preparing the installations for wear and tear in the lifetime of the installation. This challenge will be left to tackle, when the final concept is chosen and process moves into installation, testing and final operation. Second, the fifth challenge, namely the alignment of stakeholders and balancing interests, are more prominent in the beginning of the process, around requirement and initial agreements, and in the final decisive parts of the process, where this project is at the time of writing. While the selection of the proposed concepts, where assessed against our impressions of the key stakeholders and geared towards what we perceive as interesting in their context, the city architect in Stockholm still have to give their final verdict. In that regard, we intent to develop the workshop format towards including key stakeholders and users in the workshop, as part of future experiments and research.

6. CONCLUSION

We have presented our work with the Odenplan media façade, in order to contribute with experiences and examples of how to address a range of different challenges faced when designing media façades. Specifically we have shown how different challenges are salient during specific periods of the design process, as well as given examples of how designers and media architects can go about creating, iterating and capturing ideas for media façades. We underline how different design artefacts, such as 3D models, can be used during the design process to meet some of the challenges outlined by Dalsgaard and Halskov [8], and we have shown how different kinds of inspiration [22] can be used to open up the design space and create new ideas for media façades. Adding to this we have consciously worked with mixed reality approaches, in example by sketching on a whiteboard on top of the 3D model. Such examples has the power to inspire and enter into the repertoires [36] of researchers and practitioners alike, and we have discussed how we ourselves are inspired by others in the field.

Our contribution also highlights the fact that media architecture and media façades in particular are developing fields, and we consider our work here to be of value for helping lay the ground for understanding how the design work of media façades unfolds. With that in mind, we follow Vande Moere and Wouters [41] by calling for the creation of new methods and tools for designing media architecture, in order to help researchers and practitioners build their design. We are ourselves working on refining both the sketching and 3D exploration methods as ways of working with buildings that are still in the planning phases, as well as doing on-going studies into the ways sources of inspiration can be brought into the design process of media façades. The challenges faced when designing media façades are in that sense typical for the more general development within HCI and interaction design, in that the technological development opens up new domains, creating the need for new understandings, methods and tools.

Of further interest to us, are also ways of involving stakeholders more directly in the design process via workshops like the one described in this paper, as part of field studies or in the later prototyping phases. While it was relatively easy for us to use methods like 3D Exploration, it remains to be seen whether this is a good way to involve stakeholders and users less well versed in using information technology. This highlights how participation as a topic comes to the fore, as technology for media façades becomes more available and the façades begin to permeate everyday lives of the general public.

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