

# **Taking the Museum to the Streets**

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## **Abstract**

In a digitalized and globalized world, museum audiences increasingly experience knowledge as something created through blogs, wikis and other social platforms. The challenge this brings to the museum is to move from epistemological approaches and exhibition practices that are grounded in an assumption that collections hold some kind of absolute truth, to a place where collections are seen as layers of accumulated knowledge in which the museum audience actively participates. The WALL is a practical experiment in this epistemological shift. The Museum of Copenhagen has literally taken their collections to the city streets, where a wide public audience has ready and playful access to experience, interpret, adapt, and augment them. This paper outlines how and why this experiment has been conducted; the interactive, physical and graphical design processes, and

the conceptual thinking behind them and the project as a whole.

Keywords: interactive, interaction, multi-user, user generated content

## **1. What is the WALL?**

In April 2010, after a development period of around 18 months, the Museum of Copenhagen, in association with Gibson International and Spild af Tid/Waste of Time, launched a giant multi-touch multimedia installation in one of the central squares in Copenhagen. At its simplest, the WALL (VÆGGEN in Danish) is an outside, mobile exhibition that allows the people and visitors of Copenhagen to explore the cultural geography and history of the city.



Figure 1: The Wall in Kongens Nytorv square

The public face of the Wall is a bank of four high-definition plasma screens 2.3 meters wide each, mounted into a customized 12-meter shipping container that also houses the collection's media database that feeds user interactions in real time, along with

computer and operational infrastructure. Each of the giant screens is fitted with a multi-user multi-touch interface developed specifically for the project's custom "2D/3D cityscape" graphical interface which encourages collaborative use. The software application that drives the user interface was specifically developed to realize functionality that would articulate the conceptual bases of the project.

In the first half year of operations, the WALL has attracted more than 400,000 users, who have viewed more than 2,000,000 images, sent more than 60,000 personal postcards, and maybe most importantly, uploaded 2,500 new contributions of their own. Semi-mobile, the WALL will be moved around Copenhagen over the coming four years. It offer Copenhageners street-access to a poetic cityscape of images and knowledge about their city, and offers a platform for all citizens and guests of the city to interact with and discuss the past, present and future of the city.



Figure 2: Users at the interface

In parallel to the multi-touch installation experienced in the streets, a website connects the WALL, its multimedia database and the museum.

## ***2. The historical and conceptual background of the WALL***

In late 2009 the Museum of Copenhagen started the archaeological excavations for 14 kilometers of a new metro line through Copenhagen. For the museum it represented a unique opportunity to research, document and interpret the continuous history of the capital from the earliest prehistoric sites, over the medieval city, to the present day. But it also represented a unique opportunity to create a vehicle for the repositioning the museum and the conceptual foundations of its collections and their display.

Since 2008 the Museum of Copenhagen, like many other contemporary city museums around the world, has entered into a process of repositioning and redefining the role of the museum within - and as an integral part of - a contemporary, diverse, urban context. The Museum of Copenhagen has been reorienting its missions and practices towards becoming more present and more relevant for the people of Copenhagen and the people who visit the city. And more than anything, we struggle to deconstruct the grand totalizing meta-narratives of chronology, of male power, and of privilege shared by so many other city museums.

So occasioned by the archaeological excavations, but also as an extension of their interpretive and material value in the context of the shift in our perception of the role of the museum and its collections, the museum decided to create an outdoor interactive digital WALL to be installed successively at the most significant excavation sites throughout 2010-14. Here are some of the conceptual bases that informed and inspired the design development of the project.

Acknowledgement is made that much of this conceptual material was generated for a presentation by Sandahl to the 2009 CAMOC/ICOM conference in Istanbul on collecting urban history in the electronic age.

## **2.1 Identities, history, and the future**

In the traditional discourse of museums, identity is most often linked to received interpretations of history. But in real life people seem more concerned with what is to become of them, and how aspects of history can help them better understand their present life and offer new dimensions to their identity building. Here identity can be seen more in terms of choices, more in terms of where people want to go, who they want to be, as a striving, as a hope for the future. Our museum's new approach tries to look at history from the perspective of its relevance to our present time, and the WALL is intended to be an active experiment in articulating that relevance.

While people define themselves as Copenhageners, when questioned more closely Copenhagen identities seem rooted and anchored in the particular, in specific and unique neighborhoods, or even at street level. A city museum such as ours has both the license and the obligation to explore peoples' everyday lives; up close and personal, their sense of ownership and belonging to particular areas. The WALL was intended as a primary tool for such exploration.

## **2.2 Cultural democracy and cultural participation**

Since the mid-20th century cultural policies in Denmark and in Copenhagen have called for equal access to culture for all. Few cultural institutions live up to this agenda. It is, however, an obligation which cannot and should not be ignored, and which is currently being voiced with increasing gravity, inside and outside the sector. With the WALL project we attempt taking the government and the city government at their word as we reorient the values of the museum.

In our opinion, true cultural democracy can only be created if institutions are able to leave behind the notion of the national monoculture; allowing for a continuously shifting perspective, with multiple viewpoints, where a plurality of voices get to speak. In the case of the museum, this requires a reinvention of traditional practices of collection, exhibition and other activities. The museum needs to open not just its doors, but also its mind, and its processes and working methods for public participation. Even before the launch of the WALL project, outreach programs were initiated to address specific and diverse groups and facilitate contributions to the content of the WALL from people who have not traditionally been represented or heard as active voices in the collections of the museum.

In one such outreach program, carried out from December 2008, 10 young people documented, collected, and created artifacts, documents, photos, video, stories, music, and soundscapes over a two-year period in Nørrebro, a neighborhood of town that embodies most of the traditional social conflicts in Copenhagen, but also renewal and the emergence of new cosmopolitan hybrid cultures.

The outreach team were encouraged to use their own networks, their own memories, their own sense of urgency and importance in selecting the themes and the people they chose to work with in this documentation, and some startling new approaches and perspectives emerged which became landmark material for the project's new media database.



Figure 3: Media from the *Nørrebro outreach program*

### 2.3 Shifting paradigms of knowledge mapping

The content created from the outreach program gave us a sense of an urban mapping that was to do with ideas and intuition rather than geography, and which we felt could be useful as a fundamental concept for the structure and presentation of the content of the WALL. Similar ideas were emerging from new perspectives on the museum's rich collection of paintings, objects and particularly photographic material from the mid-19th to the mid-20th century.

In the outreach project, as in the development of the WALL, the museum tried to embrace both traditional oral history methods and more personal or artistic portrayals of a variety of neighborhoods. In the process, geography buckled; the short physical radius of everyday movements became subjectively lengthened; sectarian patterns of gender, class, ethnic or educational background that tend to determine and rule how



most of us move about in our city were transgressed. The project had re-found psycho-geography.

In this new non-literal approach to urban mapping we sought to map the 'social lines' or 'paths of desire', hoping to sketch them like traces on a morning after fresh snow. These routes follow practical needs and emotional realities, rather than administrative divisions or those intended by planners. We wanted to chart the personal mappings of a city, based on local landmarks of subjective associations, of houses, trees, gardens in bloom, vacant lots, sculptures, pets barking in yards, parked cars, eternal roadwork, or the overpowering stench of fish. Even the no-man's-land between neighborhoods can be full of meaning.

### ***3. Project development***

Further elaboration of the conceptual bases of the project progressed organically as project development began in earnest. While there were clear objectives from the start, the interactive and graphical design processes in particular threw up philosophical and ideological questions almost constantly.

In brief, the fundamental objectives agreed by the team were to realize an interactive video wall that:

- allowed the user to explore the city by space, time and theme (where by theme is meant words that invoke the personal spaces and associations discussed above, rather than "objective" catalogue type keywords),
- was a window on the richness and idiosyncratic nature of the museum's collection,
- allowed user comment and interpretation of that collection, user uploads of their own material, and sharing of material via the Web,
- was playful and intuitive in its functionality,
- was multi-user, suitable for operation in the streets day and night, and mobile.

As we entered the development stage, all parties were determined that technology and graphical art would serve concept, and that if the technology and techniques didn't exist to express the concepts at the core of the project, then we would invent them. This determination produced a wonderfully creative environment in which highly original approaches were explored and added to the list for development. Given the 10 month-development period before opening day, this determination might also be seen as hubris, and indeed the short development time was almost the undoing of the project as we pushed the boundaries beyond established practice in visual design, applications, and physical structures.

### **3.1 Developing the WALL user interface**

The principles of using a dynamic media database to serve up the elements of an ever changing user experience had been established by some members of the team previously in the OurSpace installation at the Museum of New Zealand Te Papa Tongarewa. The interactive design challenge with this project was to create a more layered and active experience that had the object of the collection (the city) as the object of the user experience.

#### **Interactive and graphical design**

Principles were agreed to guide the development of the user interface:

- The interface is not to be seen passively. It must not only deliver content that informs and beguiles, it must also invite committed involvement and active participation from the user.
- The interface must be more than an information delivery device at one extreme, and more than just visual entertainment at the other. It must actively encourage users to create social media around the historical objects and the themes they

evoke, thereby creating an ever-expanding number of points of visitor access to and from the museological project.

- Graphic and interaction designs must constantly reference the huge scale and public nature of the interface environment in which multiple users and observers would dwell: this is not a desktop app.
- The elements of the interface must be unique, fresh, and intuitively accessible rather than resembling recognizable Web or desktop application widgets - no windows, buttons, or menus, borrowed from Microsoft or Apple, but re-imagined afresh for the concept, content and functionality of the WALL.

### ***The graphical city analogue***

The central representational concept that emerged was to create a 3D analogue of the city that is peopled by 2D media database objects blended into the model with soft-edged cut-outs in a kind of dream-like 3D collage.



Figure 4: *An early mock-up of the cityscape graphical world*

Intuition was an agreed and valued working method in the team, and the initial explanation by the designers for a 2D/3D cityscape approach was that it looked cool and was fun to play with. And indeed it was. Using the basic gestural grammar of well known existing touch applications like the iPhone, a user could explore the city by moving the viewpoint horizontally and vertically through the 3D model. A horizontal drag panned the viewpoint sideways. A vertical drag tracked the viewpoint in or out (near and far).

Then we realized that this 3D collage approach also allowed us to combine the layers of place, time and themes in a kind of physical way that the user could navigate in and through, all the while celebrating subjective and psychological views: we had found a visual analogy for the psycho-geography of Copenhagen.

More experimentation and testing threw up further advantages of this approach.

- It gives the user a spatial experience that directly reflects the content of the museum's collection.
- It enables aesthetically pleasing and sophisticated compositions with the very diverse media of the collection – from the oldest sketches of the town and its inhabitants through to contemporary snapshots and movies – and all this of widely ranging technical quality.
- It combines the possibility for users to recognize areas, buildings, places and concepts with a more wired and dreamlike experience.

A fundamental part of the 2D/3D idea was that every image that makes up the 3D collage has a real-time connection to the media database, and that the original collection form of the image and its metadata could be invoked by tapping the image (gestural grammar for “select”). Thus, in the example below, if a user tapped the diver in the sky of the collage a window of some sort would open to reveal the original collection image of the diver at the swimming pool, along with its metadata.



Figure 5: 3D collage mock-up incorporating archival material of diver



Figure 6: The collection image of the diver

As well as being a vehicle for exploration and information delivery, this play between a subjective focus on the image in the cut-out version in the 3D cityscape collage and the full original collection version created the ability to deliver surprising and playful experiences. By exposing in the collage only parts of the original images, highlighting single elements of each (a face, a zeppelin, a policeman...), their juxtaposition in the collage world creates new associations and visual meanings, and heightens the user's curiosity to discover the form and meaning of the original components.

The tests and experiments with graphical world were done in 3D computer graphics creation programs (Maya, Cinema 4D), but it quickly became apparent that such programs were cumbersome tools, as each experimental 3D model, complete with image textures imported from the collection database, had to be exported to the real-time interactive 3D rendering engine being built by the programmers (on an OGRE shell). This eventually led to the development of a bespoke 3D collage editor application that allowed the designers to build the cityscape in an interactive 3D model directly from the media database. This application took around 6 months to develop but was released to the designers in progressive iterations.

The 3D collage editor also enabled perspectives to be worked more easily. Because the primary means of exploring the collection was to move the user's viewpoint around and through a 3D world made up of its images, it was a challenge to make the cityscape look good both from all points of view. Generally, it was found that placing the larger images furthest away in the viewpoint created the most balanced perspective, but the detail was ultimately a work of subjective creativity for each area in the cityscape, which for reasons of both usability and rendering speed, were conceived as interlinking circular cells.

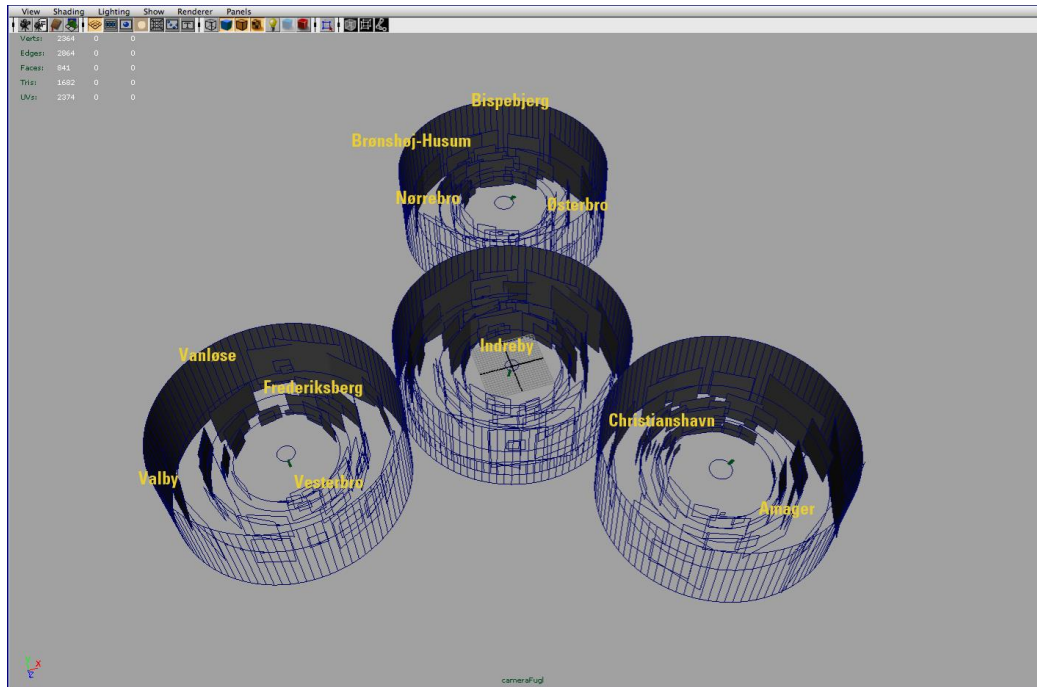


Figure 7: *Cityscape structure*

From a user point of view, this structure meant that we could provide an “endless” experience of moving around an area in the city – users panning the viewpoint horizontally would eventually end up back where they started. If they track the viewpoint vertically (near to far), they would eventually reach the outer edge of the cell and be “transported” to the neighboring cell – proximity to the cell edge triggers an animation sequence of a collage bus ride which covers the transition as the rendering engine loads the images of the next cell from the database.

Within cells the collection material was organized in a way that had its own visual and ideological logic, but still loosely resembled the city’s topographical layout; so people who were acquainted with this would be able to make use of their knowledge while browsing through the cityscape, without penalizing non-locals for whom the interface allowed an intuitive exploration browsing experience.

User testing indicated that there was a delicate balance to be achieved in building the 3D world between the subjective “psycho-geography” of the cityscape and

the resemblance of this “mind map” mind analogue to a “realistic” map: too much of subjectivity disorientated users and discouraged them from exploring spatially, too much “realism” made the cityscape look like a bad imitation of a geographic map. We also found that the collection had to be supplemented by the designers to feed both sides of this equation – the collection obviously was not evenly representative in a geographic sense, and it also lacked contemporary images and even some of the colorful commonplaces of Copenhagen street-life – like tattoo shops, trees and police cars...

Initially we worked in a monochromic color space for the 2D/3D model, but as the cityscape developed, we were seduced by the wonderful range of different colors offered by the spatial juxtaposition of collection images. However sometimes the range was just a bit too much, and a function was developed for the 3D editor to allow the design team to control the overall scene color and lighting, to give a consistent look and feel.

### ***The secondary user interface***

The 2D/3D cityscape was intended as the primary user interface, in itself capable of delivering an explorative, informative, and playful way of browsing the collection. To this was added a graphical layer of widgets whose primary purpose is to be the vehicle for the metadata of each image, and for a variety of user actions on the collection images.

The graphic design intention for this layer was to use hard edges and bold colors in contrast to the more soft collage, and to echo the originality of the subjective viewpoints of the collage. The design is isometric so it could be expanded and multiplied as the need for widgets emerged.





*Figure 8: User interacting with the interface at the wall.*

*One sees both tags, metadata and comments as well as buttons to report, like or send.*

The metadata widget displays database fields for image title, name of up-loader, date, description, and tags/themes. It was also conceived to display multiple instances of related images, so the user can browse an “album” of images by flicking through them, the metadata changing out as the image changes. An album of related images can also be filtered by tapping on a theme/tag at the side of the widget.

Another major widget is the time-slider, which sorts an open album by relative date. It also acts on the cityscape. Other widgets trigger user comment sequences, with a choice of text comments or video comments (there are webcams housed in the screen bezels), and “like”, “report”, and “share” functions which invoke a giant on-screen touch keyboard and related widgets to enable users to enter e-mail addresses and messages.

Similarly the snapshot widget invokes the webcams housed on the bezels of the screens to take a photo of the user and insert it into a snapshot of the cityscape at its

current viewpoint, and subsequent steps enable the user to e-mail this digital postcard to up to three addresses.



*Figure 9: Users taking snapshots at the WALL. Photo: Caspar Miskin, 2011.*

The secondary user interface also provides tools for navigation and content drill down. In developing the 2D/3D cityscape it became clear that repositories of images independent of the cityscape were needed to allow users to easily browse, and filter by theme and time, the large numbers of database images tagged to a given geographic area. And so neighborhood “media stations” were created and placed into the 3D model of each cell. They have a closed and an open form. When a user taps a closed media station (identified by the marker widget carrying the text “Explore X” (x being the local name of the neighborhood), the small image cloud around the marker zooms up and becomes a rotating cylindrical media cloud arranged left to right by time. And the media cloud can be turned an infinite number of times by the user’s touch to go back further and further through the collection for that neighborhood.

Integrated into the media cloud are text objects carrying the highest frequency keywords (themes, tags) entered into the database with that particular neighborhood collection. This allows a user to filter the cloud by keyword and to open the resultant array in the metadata widget.

The media clouds’ keyword filter also allows a user to navigate across the city by theme, with “hyperjump” widgets jumping the viewpoint to another media station with that keyword represented in its media cloud.

## **3.2 System architecture, database, and website**

### ***Server quandaries***

The on-site system architecture of the WALL consists of four high-performance computers running the cityscape/UI custom-written application, which dynamically accesses all the media and cityscape structures from a database server as users browse. To get the high performance required for this, we reasoned that the server needed to

be in the same location as the rest of the hardware. However, our website had to have access to the same data, and it was intended that users could upload their own images on both website and directly at the WALL itself.

We could have put the webserver in the container too, but that would have made our website very dependent on the quality of the network connection, which in a mobile installation could potentially be quite poor. So, we duplicated the database at a web-hosting facility and provided a real-time syncing facility. This meant that if the connection was ever lost, the wall and website would continue to function and the only loss suffered would be the real-time syncing of user contributed media. Another benefit of this design is that it gives us remote backup of our database.

### ***Database and website development***

As there was no suitable existing image database in use at the museum, priority had to be given to creating a rudimentary application that allowed museum staff to commence as soon as possible the huge task of inputting suitable media and metadata. Some digitization of the collection had been carried out in an earlier Web project on the history of Copenhagen (Absalon.nu) and approximately 4,000 images used on the WALL were transferred from this site. Based on the experience of the Te Papa database-driven interactive, we believed a database population of around 10,000 items was an ideal opening day-scenario and preparing the remaining material for WALL use was a major challenge to the museum team.

Simultaneously, development began on the website, as we wanted users to be able to use the site to upload their own material well in advance of opening day, and indeed to work on creating a substantial community of contributors months in advance so that by launch time there would already be user layers in the collection.

The website also had to reflect the museum's new positioning and offer a Web analogue experience of the installation WALL. So a whole new 240 page site was created for the museum itself (<http://www.copenhagen.dk/>) that carried the visual look and

feel of the WALL and its UI, and a sub-site (<http://vaeggen.copenhagen.dk/>) was created for browsing the WALL database, the two sites being of course linked seamlessly from the user point of view.

Much experimentation went into developing a Web analogue for the WALL navigation experience. We found that we had followed our design brief for the WALL almost too well, and it proved very difficult to create a desktop experience that had the same creative and conceptual values. In the end, what pleased us was a concentrated synoptic version of the cityscape created in Flash, with abbreviated metadata on mouse-over, and with randomized database image pop-ups, which can be seen in the current site's header banner. The idea was that it should be a tease both for the WALL experience and to act as a jumping off point for exploring the database.

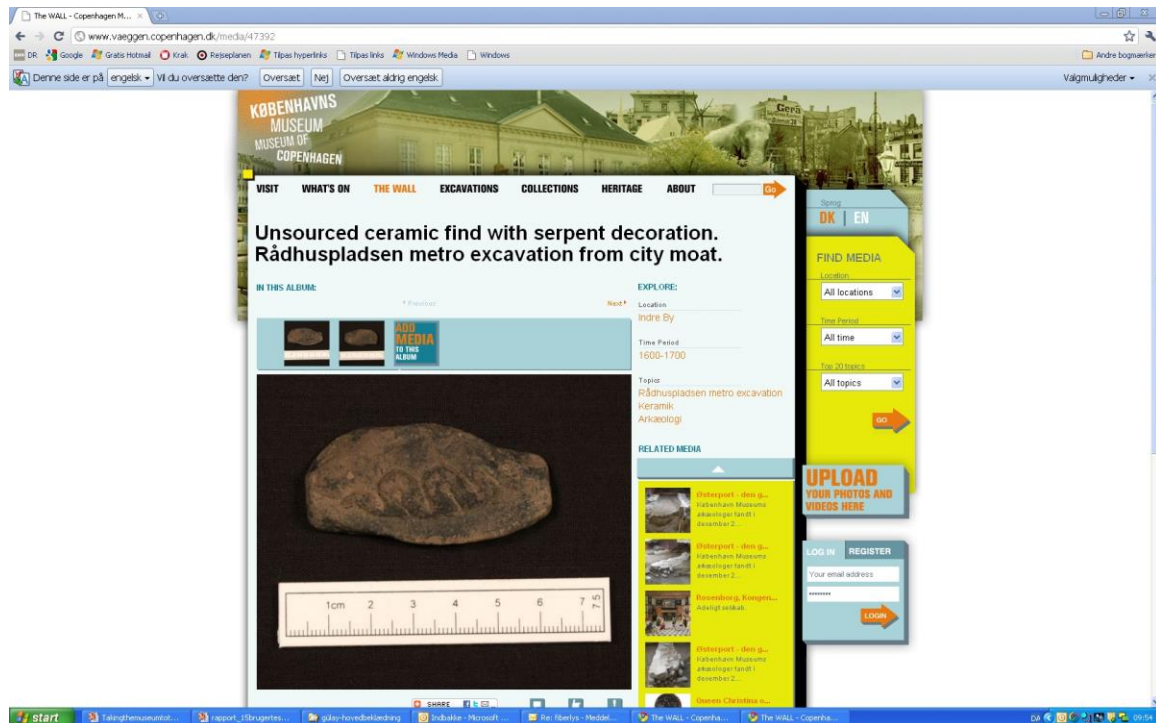


Figure 10: Website sample with opened media.

The sites were launched early in 2010 and immediately attracted some talented



contributors to the database. As the WALL develops over the next four years, the increasing amount of user uploads enriching the WALL will be supplemented by harvesting the most interesting material from the ongoing digitization efforts of the museum, as well as uploading material from new exhibitions and of course from the archaeological excavations around the city.

### ***User and data management***

As any site administrator with user generated content knows, there are many challenges and pitfalls in the management of users and data. All the more so, when the site is driving a huge, highly visible, public installation. While at the core of a project like this lies a willingness in the museum to open up, to encourage public participation, and let go of control, this should not, of course, be confused with allowing all types of obscenity an eternal life on the WALL. Part of the UI design on the WALL itself therefore allowed users to flag media to the administrator, a function mirrored on the website. And as part of an overall database management system, an administrator interface was developed to include receiving such reports and functions to easily remove offensive material at the discretion of the administrator, the intention being to have mechanisms that were not overtly censorial.

### **3.3 Physical, mechanical, and operational aspects**

Without needing to dwell on these aspects in the context of this present paper, it should nevertheless be appreciated that the WALL installation amounts to quite a complex machine consisting of many computers, database servers, a high-speed network, four very large screens all needing 3 phase power and a temperature controlled environment. It needed to be transportable, rugged enough to survive moving and the extremes of the Copenhagen climate. It would be exposed to graffiti and potential

vandalism. It would need to run unattended for 16 hours a day 365 days of the year with the absolute minimum of downtime.

The impetus for using a container to house the WALL came from the city administration wanting to create temporary “container villages” at excavation sites from time to time, to mitigate the years of disruption to the people of Copenhagen. But taking the museum to the streets in a shipping container proved not the most straightforward thing to do. The structural integrity of containers is in their steel ribbed walls. We had to remove one whole side along the 40-foot length of the container to give the public access to the bank of giant touch screens, and provide compensating structural strength with beams and supports sufficient to allow safe transportation of the container. This was a major engineering task requiring custom solutions, such as hydraulic pistons on which the ton of screens ride during relocation of the installation. The final design included hydraulically controlled openings in the cut-away side, which act as an awning when open.

The screens themselves had to be plasma in order to be big enough and bright enough for daylight conditions. But there were no commercially available touch solutions for plasma screens of that size that were also suitable for the daylight and exposed conditions of the installation. We would not let this deter us, and the electronics team designed our own.

In any project this complex there are myriad other details, not least the maintenance routines for remote monitoring of security cameras, servers, applications, error logging, screen-sharing, temperature, automatic start, shutdown, restart on fault, remote power switching, and so on. The production tasks were piling up.

#### ***4. Design meets reality: Hubris comes knocking***

As the production period moved inexorably towards the scheduled opening day of 24 April 2010, it became clear that the production team had a number of challenges that

threatened the ability of the project to successfully open on time.

The software development task unleashed by the ambitious interactive and visual design was huge and falling behind schedule. One of the principal reasons was an early decision to use the C++ video games oriented CEGUI libraries to develop all the widgets of the secondary graphical interface. The name is short for Crazy Eddie's GUI system, and it was now starting to feel prophetic, as programmers struggled to efficiently implement the widget designs in C++, pixel by pixel. While the system was chosen because it offered a large amount of creative freedom in visual design, and is very good at that, the price paid on our project was production time.

The implementation of the touch system designed for this project was initially deferred in the hope of saving time by purchasing a commercial system scheduled for release 6 months before opening. It was not released on that date, and no new date was offered. Programmers were diverted from the UI production tasks to implement the bespoke touch system design.

The container modification ran into quality issues, which impacted on the schedule, which in turn impacted on the ability of the electronics team to test the touch system in situ. It was an intense race against time.

The WALL opened on schedule, to much acclaim. But there remained seemingly unresolvable problems with the touch system and the reflectivity of the safety glass in front of the screens, which initially had to be addressed by temporary solutions. With the application of more time, and the manufacture of amazingly non-reflective safety glass specifically for the WALL, all these problems were successfully resolved, and hubris was kept at bay. But it was a close run thing.

Even though there remained work to be done, the reality of the WALL in operation was joyful. As the summer came on, users flocked to it. They played, they explored, they argued, they got involved. And we were able to start to see how the reality of use stacked up against our expectations.





Figure 11: *The official opening of the WALL*

### ***5. The WALL in practice: into the first year of operations***

It was with both anticipation and some edginess that we started collecting quantitative and qualitative data on user behavior over the rest of the year. Would people regard the WALL as yet another piece of clutter in the urban landscape already being turned upside down by the archeological excavations, or would they embrace it as a novel way of tuning into the history of their city and its museum's collection? Would they treat it just as a plaything and not delve into the deeper layers of the content and experience? Would user uploads to the media database increase? Would the commenting facilities of the installation create new dialogue about the city?

## **5.1 Observations of use**

The general picture that we gathered from interviews, user observations and statistics, is a resoundingly positive reception of the WALL. There is no doubt that the spectacle of a 12-meter glowing window on the collection planted in the street attracts high levels of interest, nor that many people find the experience of using the WALL a compelling and absorbing one. But, as with users the world over, we see a wide range of types of use, and an equally wide range of appreciation. We have quantitative data analysis from the first full six months of operations, and some initial qualitative data from the same period.

### **Usage data**

Statistics are generated constantly by the WALL's computer systems – recording each touch, image selection, comments made, postcards sent, and so on, and this data is logged and archived hourly. However, unlike a website where each visitor has a unique IP address and can be tracked, the WALL application has no notion of individual user sessions. This has to be established by direct observation. High quality surveillance cameras mounted at each end of the container allow an adequate field of vision to observe visitors' interactions with the Wall. The output of the cameras is recorded continuously throughout operational hours, and recordings are sampled and archived for empirical analysis. Empirical data is then correlated to the touch data, allowing extrapolation of some of the usage patterns, acknowledging that the methodology involved could have a margin of error of 7-8%.

From launch to the end of October 2010, the WALL attracted around 425,000 visitors. That is a conservative calculation extracted from the over 10 million touch interactions recorded in that period.

While the average daily numbers over that period are around 2,350, in the summer months numbers peaked at over 4,300 people a day. The WALL is open

continuously 7 days a week from 7am to 11pm.

Visitors navigating around the cityscape make many of the millions of touches recorded, but the balance of touch interactions is made up by visitors opening albums and viewing the constituent images and their metadata, and this is one easy measure of visitor engagement. In the six-month data period almost 2 million images and their descriptions and comments were viewed on the WALL at Kongens Nytorv.

Monthly patterns of image views at the WALL broadly follow total visitor numbers, but we are beginning to see a pattern where out of the high summer tourist season the image views per visitor increase – there are fewer visitors in the colder period, but relatively higher numbers of image views. And this trend is accentuated during the weekends. We surmise that this represents local people showing their interest in the deeper content.

The “send a postcard” feature has certainly proved popular, statistically. In the six-month data period, over 60,000 postcards were recorded and sent, representing around 115,000 different e-mail addresses that have received a postcard from the WALL (which comes with links to the website and an invitation to visit the WALL at its current location).

### **Observations and surveys**

Touch data recorded by the computer systems obviously does not reflect the qualitative difference in usage at the Wall, where observation shows user sessions can range from 7 touches up to as many as 323, and from 20 seconds up to 3 hours!

Similarly observable are marked differences in users' favored modes of exploration; some predominantly "drift" through the cityscape, exploring neighbor cells all around and near and far. This mode of exploration results in a high number of touches per user session, and these users (often couples or small groups) tend to stay longer. Others are button-centric, and explore quickly what is immediately obvious, sometimes without navigating at all. High numbers of tourists go almost immediately,

and often exclusively, to the postcard button, but will then spend 10-15 minutes recording and sending multiple postcards.

Such observations give a context for some of the qualitative data that has emerged from a program of visitor surveys (Snitker, 2010). Methodology for qualitatively analysing user experiences at the WALL needs further attention, as it tends to draw on use and navigation patterns for desktop and Web applications, whereas the WALL experience has been deliberately designed to be open ended; the user experience can be as simple as moving around the cityscape or taking a postcard, or it can be as complex as commenting on comments about media deep within albums within the cityscape. Nevertheless, some interesting and valuable material has already emerged.

### ***Navigation***

Users generally have a positive appreciation of the cityscape and its collage-like representation of Copenhagen. They love the spectacular vision of the giant cityscape, especially at night. They are intrigued by its creative interpretation of past and present Copenhagen. But some users find it difficult and frustrating to navigate geographically. The intuitive and multilayered design does not appeal equally to all temperaments. Some users refer to Google maps and Google Earth and express a wish that the WALL had a similar known and authoritative layout. Others seem to believe that each of the four screens contains different areas of the city, while in fact each screen gives access to the whole cityscape. (Snitker, 2010; Rudloff, 2011).

In interviews, some users report that they miss guidance on how to use the WALL: where to press, how to navigate – even though the instructions are given at two big panels in both ends of the screen. One user said: “I felt like a kid in a corn field: Where am I? Where is the overview? Where can I press and what will happen when I do it?” (Snitker, 2010). Such a point of view is not unexpected, given our experiment sought to create a platform based on intuitive, exploratory and multilayered approaches rather

than an “authoritative” schematic presentation of knowledge and content; what is intuitive to one person can be deeply puzzling to another. But to date no one has reported the WALL as boring.

Other users mention problems locating images they saw in earlier sessions, or finding images they have uploaded themselves. While these functions are native to the website version of the WALL, we think this is a valid criticism, and are pondering how the problem can be solved in a future iteration of the interface.

Expressions of frustration about navigation are both supported and contradicted by user behavior. While some users only touch the wall briefly and don’t explore it further, most users – even those who initially have difficulties figuring out the navigation – spend considerable time at the WALL. The interface seems somewhat compulsive in its constant revelation of layer after layer as the user moves his point of view about the city. Even in the first month of the WALL’s existence, when touch system calibration problems and reflections from the faulty glass made navigation difficult, one more often observed users persisting in their navigations than giving up.

And, importantly, observations reveal how users tend to help each other navigate, how they learn or improve their own navigation by watching other users, and how they discuss both navigation issues and content in pairs or in a group. And when this collaborative behavior happens, the length and depth of user sessions increases significantly. Typically, groups of users interacting strongly among themselves with the WALL as object will explore the interface for up to and beyond a half hour. These observations seem to be a validation of collaborative intentions behind the physical design, interface and content. One of our aims was to facilitate collective interaction and dialogue between users in the city space, and the WALL seems to be doing that.

### ***Uploading and dialogue***

The situation is different with the commenting and uploading facilities. Contrary to our ambitions and expectations, uploading by users at the WALL has been very limited.

Instead, users prefer to upload from the website. But on the other hand, the number of uploads on the website, which was already quite good after the launch of the website, has been rising steadily since the launching of the physical WALL. To date, around 2,500 images have been uploaded by approximately 500 of the 721 users who have created an account on the website or at the WALL. The other users have signed up but only commented on other users' images, while the majority of commenting is done anonymously. Uploads are very diverse, but most of them connect to the idea of the personal envisioning of the city.



Figure 12: Facing and overcoming the need for distance





Figure 13: Intensive use

The user uploads represent different agendas and reference points in the interpretation and representation of the city. Some are documentary of a communal perception of the character of the city, while others reach beyond to highly individual and often more conflicted views of the urban fabric. Some are historical dives into family history; others are reflections of both meaningful and banal instances of everyday life in the city. Almost all of the material generated by users stands out from the material of the collection, the bulk of which consists of the work of professional photographers and artists. One of the most fulfilling experiences for us was to observe how some user uploads enter into a visual dialogue with the museum's material. The portraits of homeless Copenhageners in the 1890s taken by a professional photographer in the

tradition of Jacob Riis is in a many ways complemented by a contemporary homeless Copenhagener's photo of his shelf in a shelter. Although the first photo was created largely to provoke sympathy and compassion, the other reaches deeper into the personal interpretation of urban life. On a lighter note, a cute and clever layer is added to the collection photos of love and infatuation in the urban space by a user's image of a snow heart drawn in the snow on the hood of a parked car.



Figure 14: Homeless shelter in central Copenhagen, app. 1910.





Figure 15: The homeless man, Zharbas, photo of his shelter, 2009



Figure 23: Userupload of himself as a kid tied to a lamppost on Grønttorvet, now Israels Plads in the 1950s. He thought it was a good solution as he had a lot of energy and curiosity and were not used to the city.



Figure 16: *Light bath* – upload commenting the winter in Copenhagen by the user *cuqonia*, 2010

These examples illustrate that the WALL offers an opportunity for Copenhageners to communicate about their city, but also to the museum it represents an important opportunity to develop and diversify its collections and collection policies.

An interesting related observation that came out of the qualitative interviews was that some users were primarily using the website version of the WALL, having visited the actual WALL only a few times or even not at all. The reverse position was similarly registered: users who had only used the WALL in the city space, without realizing that

they could access the content of the database from their home computers, although the Web address is boldly signposted in several places at the installation.

### ***Events and outreach***

An effective way of engaging users in the WALL project and of encouraging them to upload images is to arrange events, competitions and other outreach activities. Just after the launch of the WALL, the museum co-organized a photo festival, entitled Night and Day. In the competition users were asked to upload images interpreting night and day in Copenhagen, and the result was some very creative and outstanding photos. Apart from the Nørrebro outreach project already mentioned, we also worked with a group of citizens in one street of that neighborhood. This project addressed concepts of neighbor and neighborhood and resulted in a series of photos of inhabitants by their front door, and these were displayed both in their street and on the WALL.

### ***Commenting***

The use of the commenting facility has been limited compared to the expectations of our original ambitions that the WALL encourage democratic dialogue about the city. The video commenting facility has resulted mainly in greetings and playful behavior in front of the camera – dancing, kissing, waving. The majority of text comments at the physical WALL tend to be greetings and comments on Copenhagen or the WALL itself (“wow this is cool”), and not so much about specific content in the WALL. This situation is much different on the website, where dialogue between museum and user, and between users, is common. And these dialogues are about content; about specific images, about the information presented by the museum, or about specific conflicts and aspects of Copenhagen life.

### ***A social WALL***

An important behavioral aspect of WALL usage to emerge from the observations is that in most cases it is a highly social activity, something that is mainly done in company with partners, friends and families rather than by the solo city walker. (Rudloff, 2011). This behavior is very much in line with our design ambitions, and with the experiences of other touch screen installations based on user involvement and user contributions, like the OurSpace wall project in Te Papa (New Zealand), or the CityWall Helsinki. (Peltonen et al, 2008). (On the Te Papa Wall, see: <http://ourspace.tepapa.com/>)

The collective experience aspect of the WALL is perhaps most visible when users are using the postcard application. (Rudloff, 2011). Often users are observed experimenting and trying to find the best spot in the cityscape to be the background of their postcard, while communicating loudly and vividly about their endeavors. Groups of students, couples of all ages, and tourists alike enthusiastically send postcard e-mails to their family and friends, or to their own e-mail. The function seems to be about both a “we were there” experience, and a fascination with the technology.

A curious behavioral pattern is the gender divide with younger couples’ use of the interface. Time and again we have observed the male take initial control, the female observing and making suggestions; until it comes time to enter e-mail addresses or messages, when without the couple seeming to discuss it or even be aware of it, the female takes over.

Anyone who has spent time at the WALL has their favorite anecdotes. The elderly couples who can spend up to an hour very slowly and carefully navigating around the cityscape, reminiscing, sharing stories, searching their memories. Unlike the younger couples, these pairs tend to take it in turns to operate. There are the young children who bring their grandparents and show them how to use the interface, being rewarded by a stream of memories and family history.

There is the smart phone generation, particularly male, who take a thrill in the “cool” factor of using the WALL “like a giant touch phone”. The children who spend 10-15 minutes perfecting “playing” the touch interface like a musical instrument.

## **5.2 The future of the WALL**

Although there have been serious challenges, both foreseeable and unforeseeable, in implementing the WALL project, it is with pride and excitement that we head into the next three and a half years of the project. This will see the installation being moved to new neighborhoods in the city, the implementation of new initiatives to involve new groups and individual Copenhageners in generating material and debate at the WALL, and the addition of new material from the museum's exhibition and outreach program and from the collections. Based on the experience of the WALL to date, we are confident that by the time we have finished this particular iteration of taking the museum to the streets, we will have told, retold, and multiplied the histories and visions of Copenhagen, and provided a broader framework for the discussions about the city's present and future development.

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