Bauhaus-
Universität
Weimar

Sociality and User Engagement in Tangible, Embedded and Embodied Interactions in Public Spaces

Eva Hornecker
– Human Computer Interaction Group –
Bauhaus-Universität Weimar 2015

Our Research at BUW

Tangible, embodied, embedded

Public spaces – urban spaces

- museums (very different spaces)

Supporting sociality and Engagement

BBM
BlackBerry
blackberry.com/bbm
Connect with friends in real-time, anytime on BBM.
LEFT 4 DEAD 2
L4D.COM
TIMES SQUARE
WINNER! BEST MUSICAL REVIVAL
LA CAGE
american IDIOT
BEST MUSICAL
BILLY ELLIOT
Avenue Q
PROMISES
PROMISES
SHEY'S
SAMSUNG
Coca-Cola
HSBC
Prudential
0.3% of Saharan solar energy could power Europe.
BANANA SHPEEL
#1 IN CUSTOMER LOYALTY
HYUNDAI
TO SEE A WORLD CUP GAME, YOU:
Broadway
7 AV

TOUS
FOREVER21.COM
Disney
Fall 2010
A World-Class Retail Experience
Broadway
AEROPOSTALE
Kodak
It's time to smile
Kodak
DO NOT ENTER

AMERICAN EAGLE OUTFITTERS
LEFT 4 DEAD 2
TIMES SQUARE
GET YOUR PHOTO UP HERE
STEP INSIDE FOR YOUR 15 SECONDS OF FAME
LIVE IN THESE AE JEANS
AMERICAN EAGLE OUTFITTERS
PROMISES PROMISES
american IDIOT

LEAVE YOUR MARK
GET YOUR 15 SECONDS OF FAME.
VE NY"
SEFA MEKA, VIRGINIA

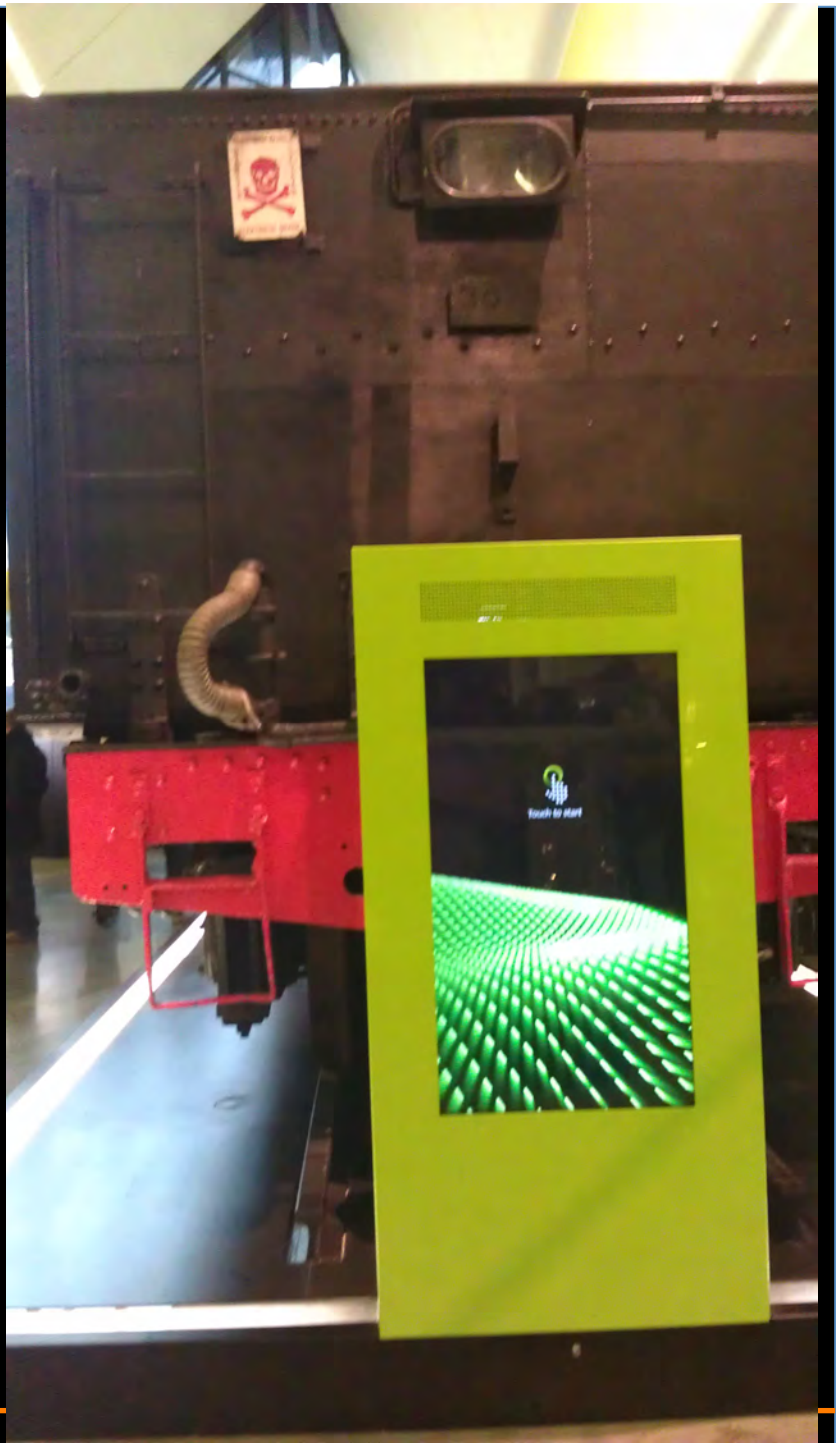
牛
火 | 锅

天下
天下

DB
Ihre nächsten Züge auf Gleis 3 / Your next trains on platform 3
Zukunftsbahnhof

Shot Tower
eum
DIRECTORY
MORGAN

Baillie Burt Tramcar No. 1089



LONDON Rd AND CLYDEBANK
GLASGOW

Sociality and Engagement

2 application contexts: Museum installations

Interactive installations in urban space

What kinds of configurations of technology can support interaction in the here-and-now ?

What usage scenarios we may come up with, once we understand public spaces as social spaces

Space as ‚res publica'

Fostering ‘Shared Encounter'

[…] the interaction between two people or within a group where a sense of performative co-presence is experienced and which is characterized by a mutual recognition of spatial or social proximity (Willis 2010).

[…] a digital encounter is an ephemeral form of communication and interaction augmented by technology (Fatah gen. Schieck 2010).

Sociality and Engagement

Sociality and Engagement

Hornecker & Stifter, 2006
Learning from Interactive Museum Installations. OzCHI'16

New Interaction Modalities

(touch, tangible, gesture, full-body movement, ...)

How does it affect how we interact with the world, with each other?

What new user experiences do they generate?

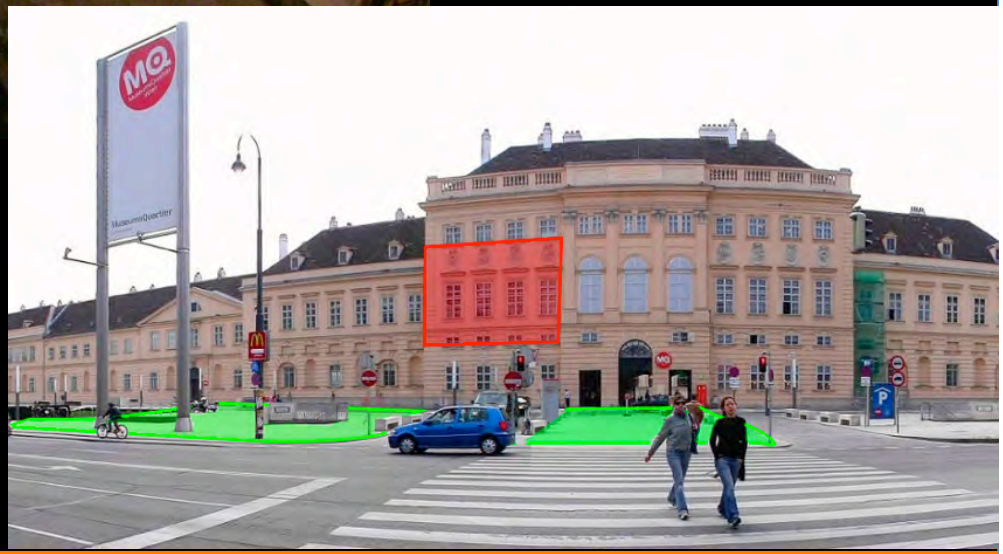
- Social interactions
- Affective aspects of user experience

Interaction with architectural space

Touch, Tangible, Full-Body: Old Interaction Modalities

The Role of Space

Thinking at
architectonical scale



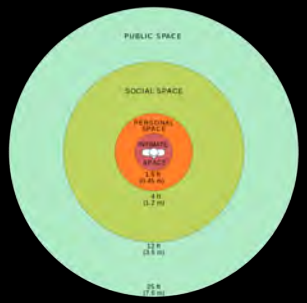
Hornecker & Stifter, 2006
Learning from Interactive Museum Installations. OzCHI'16

Shared
Focus

Space as Orchestrator

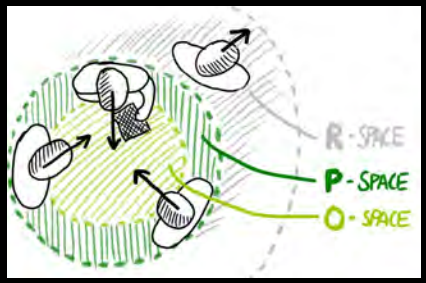
Helpful background theory:

E. Hall: Proxemics Theory

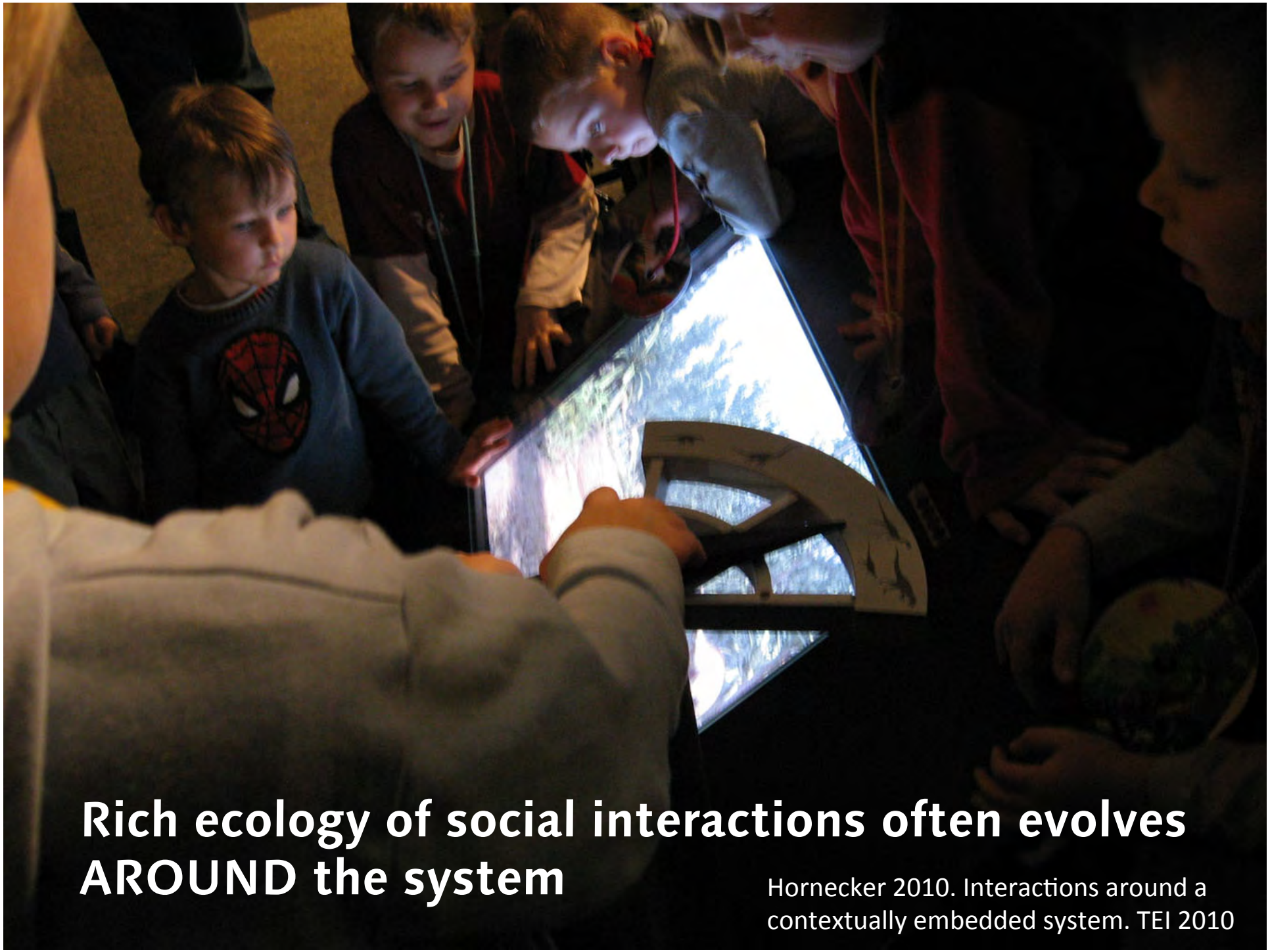


Marquardt, Hinckley, Greenberg 2012

Kendon : F-formations



Space Syntax (Hillier):
‚Space is the Machine'


Rich ecology of social interactions often evolves AROUND the system
Hornecker 2010. Interactions around a contextually embedded system. TEI 2010

Engaging with the City
and
Engaging with Others

Playable City?

Modern Cities – anonymous, cold

Can public acitivities, which are fun

- foster identification with your city and social cohesion
- support creative appropriation: this is MY city
- create motivation for participation ?

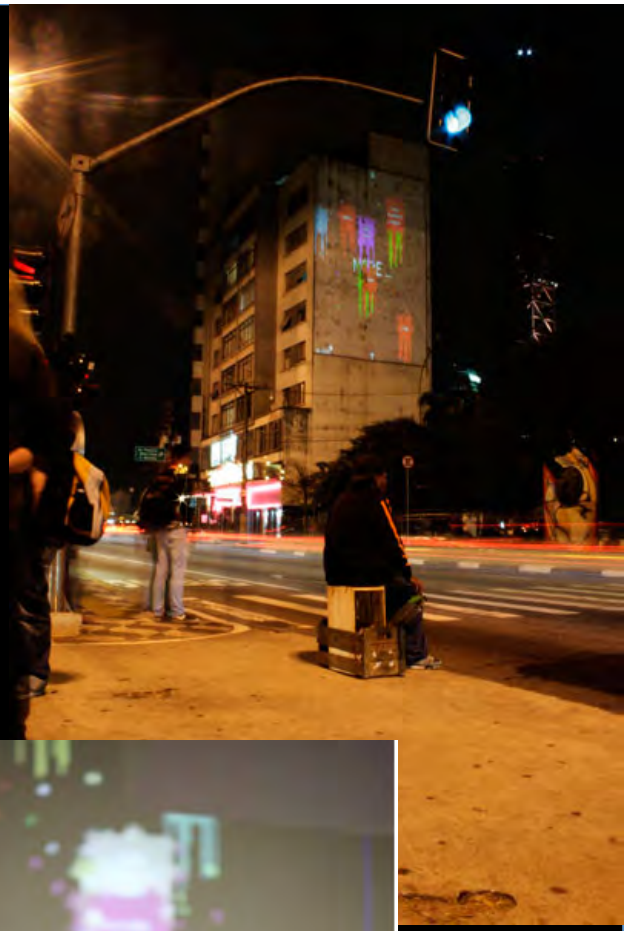
‚Shared Encounter' concept

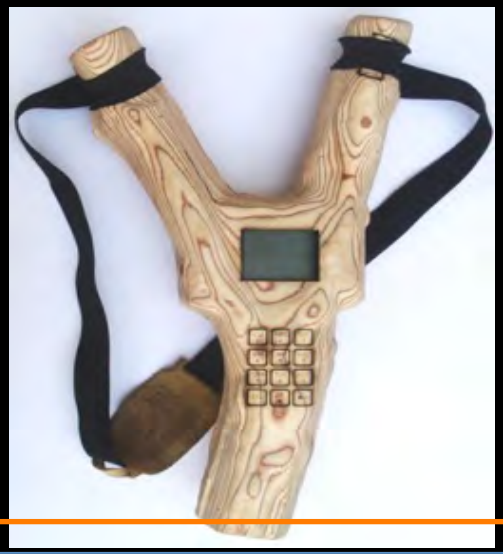
Playfully appropriating the city

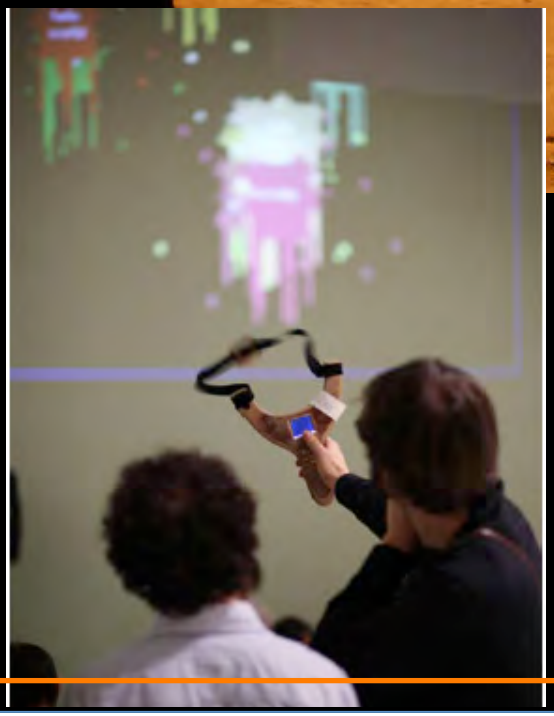
Children are good at this!

SMSlingshot

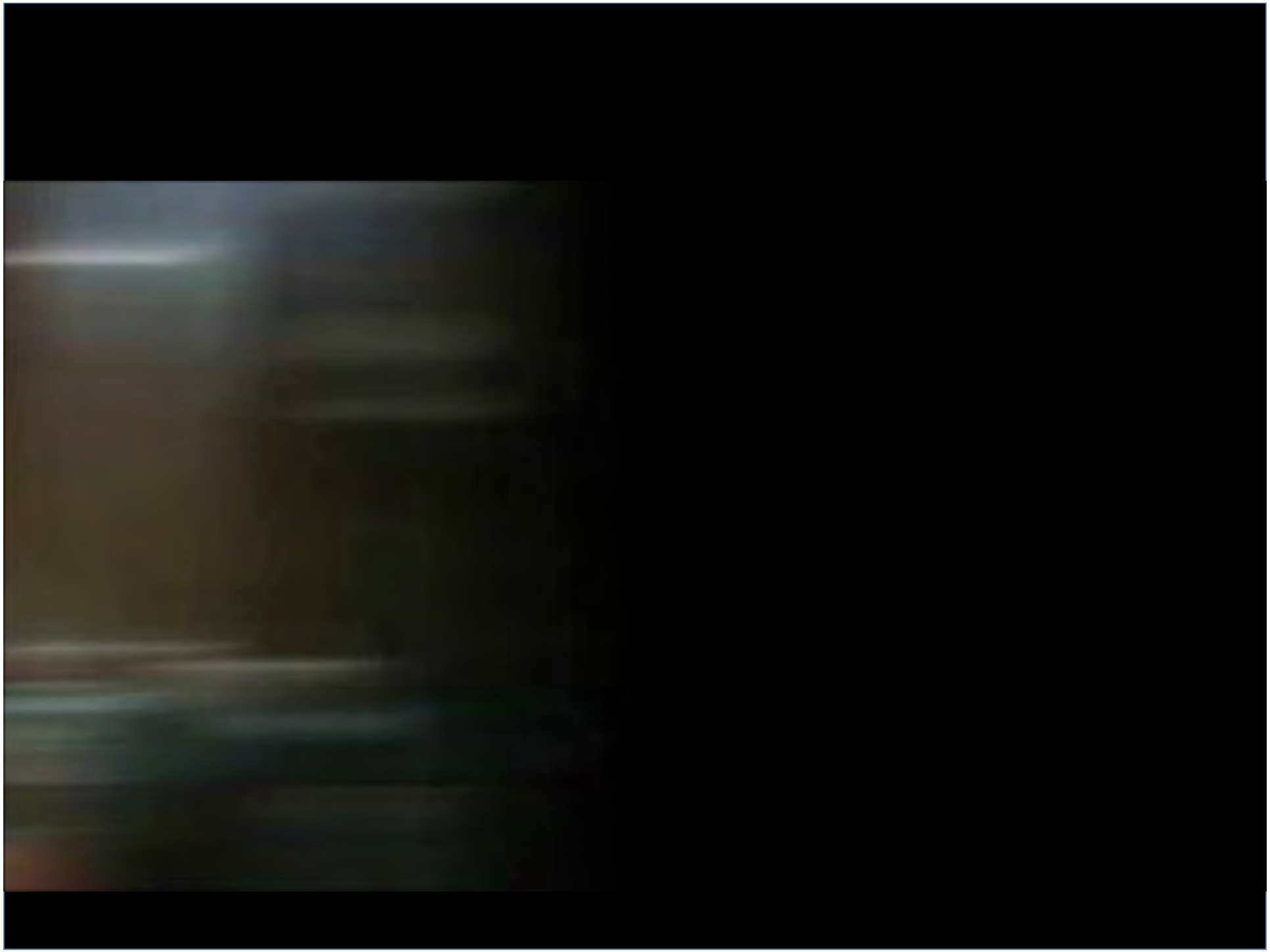
Patrick Tobias Fischer (PhD Student) + friends: VR.Urban







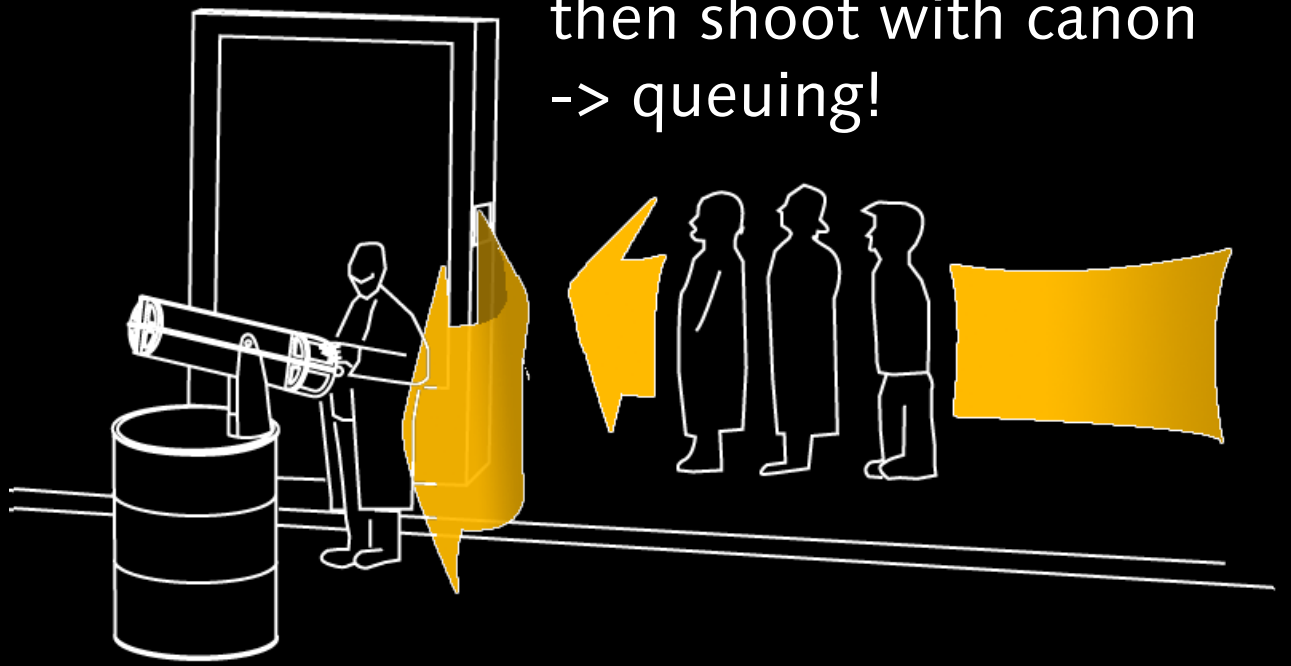
Fischer and Hornecker, *Urban HCI: Spatial Aspects in the Design of Shared Encounters for Media Façades*. Proc. of CHI'2012



ReClaim the Screens

First Version: spread.gun

Typing in message at screen,
then shoot with canon
-> queuing!



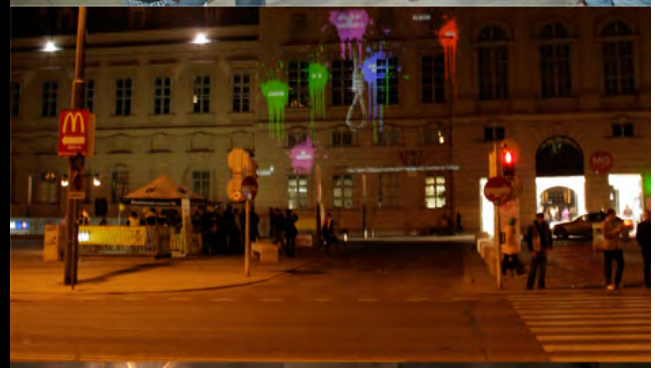
SMSSlingshot : more flexible, guerrilla-like, portable, expressive gesture

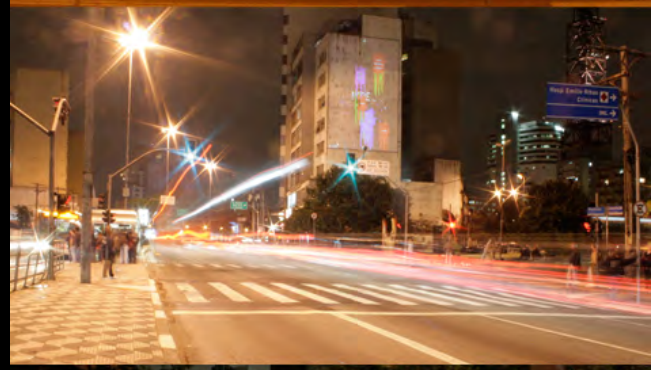
Plaza

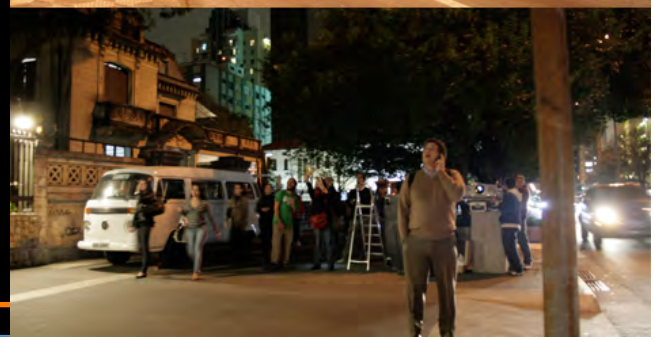
- People have time, meet up, want to relax,
- Suited for narrative structures

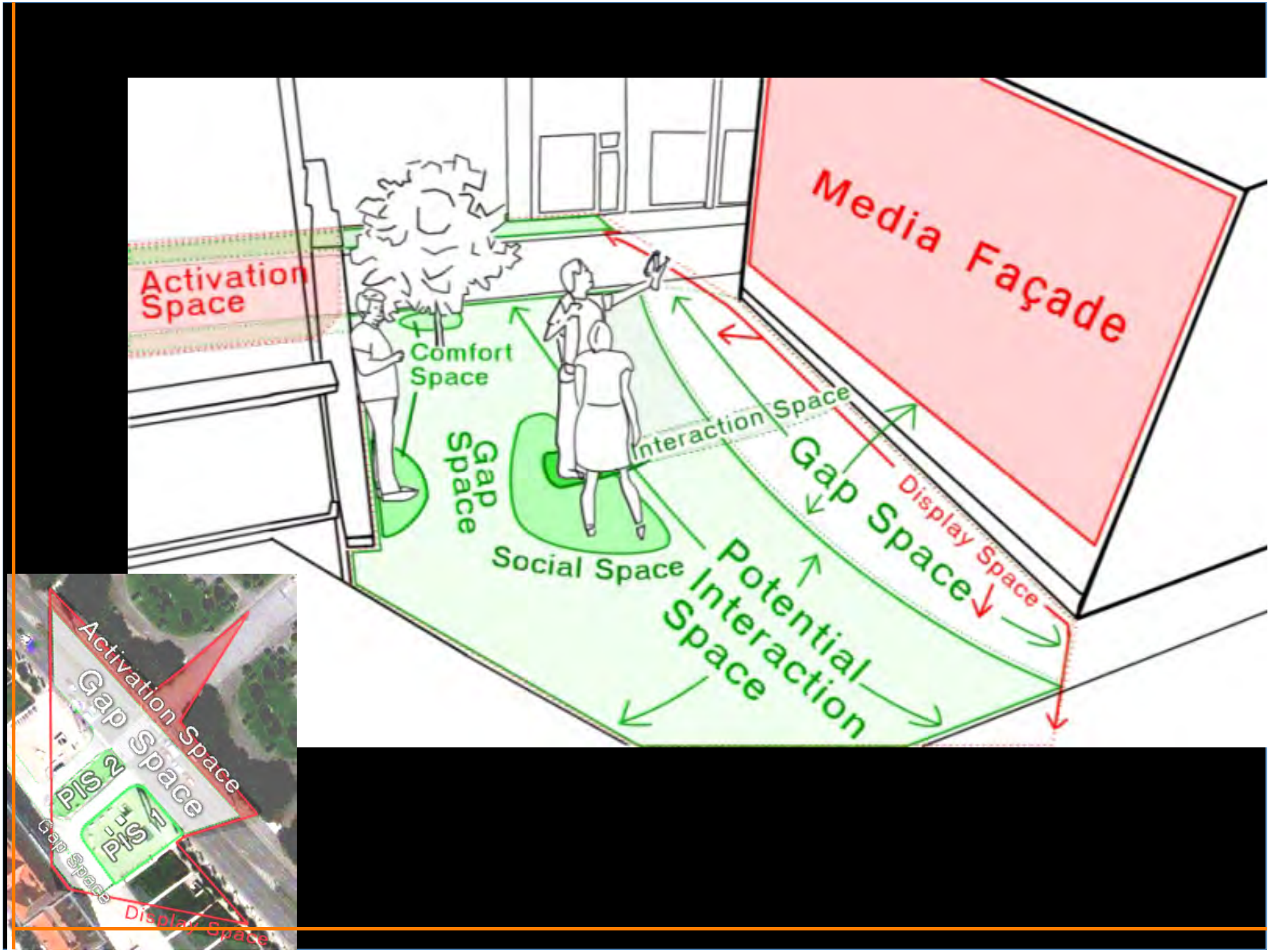
- Steady flow
- Ad-hoc, short interactions

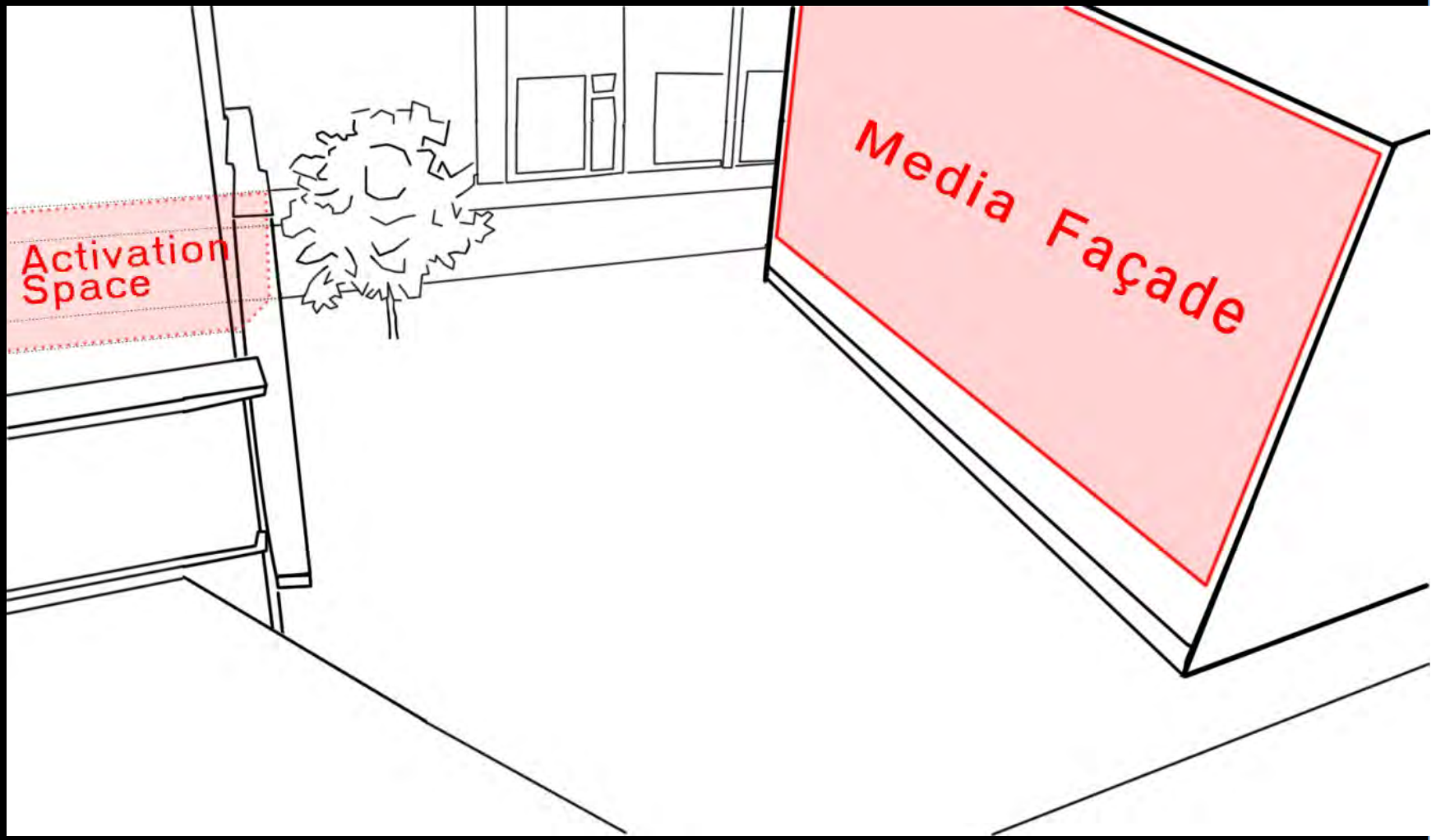
Walkway

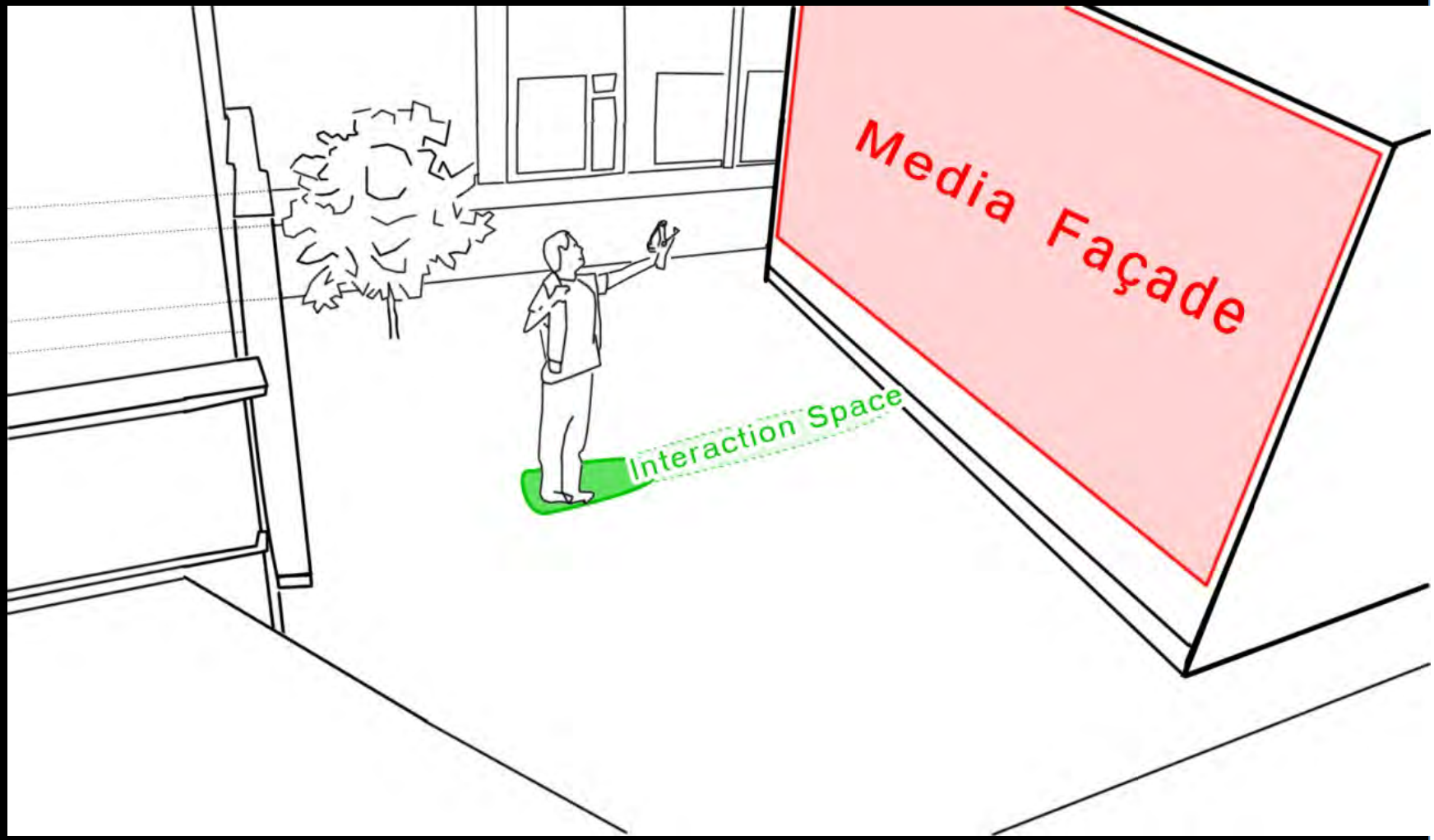




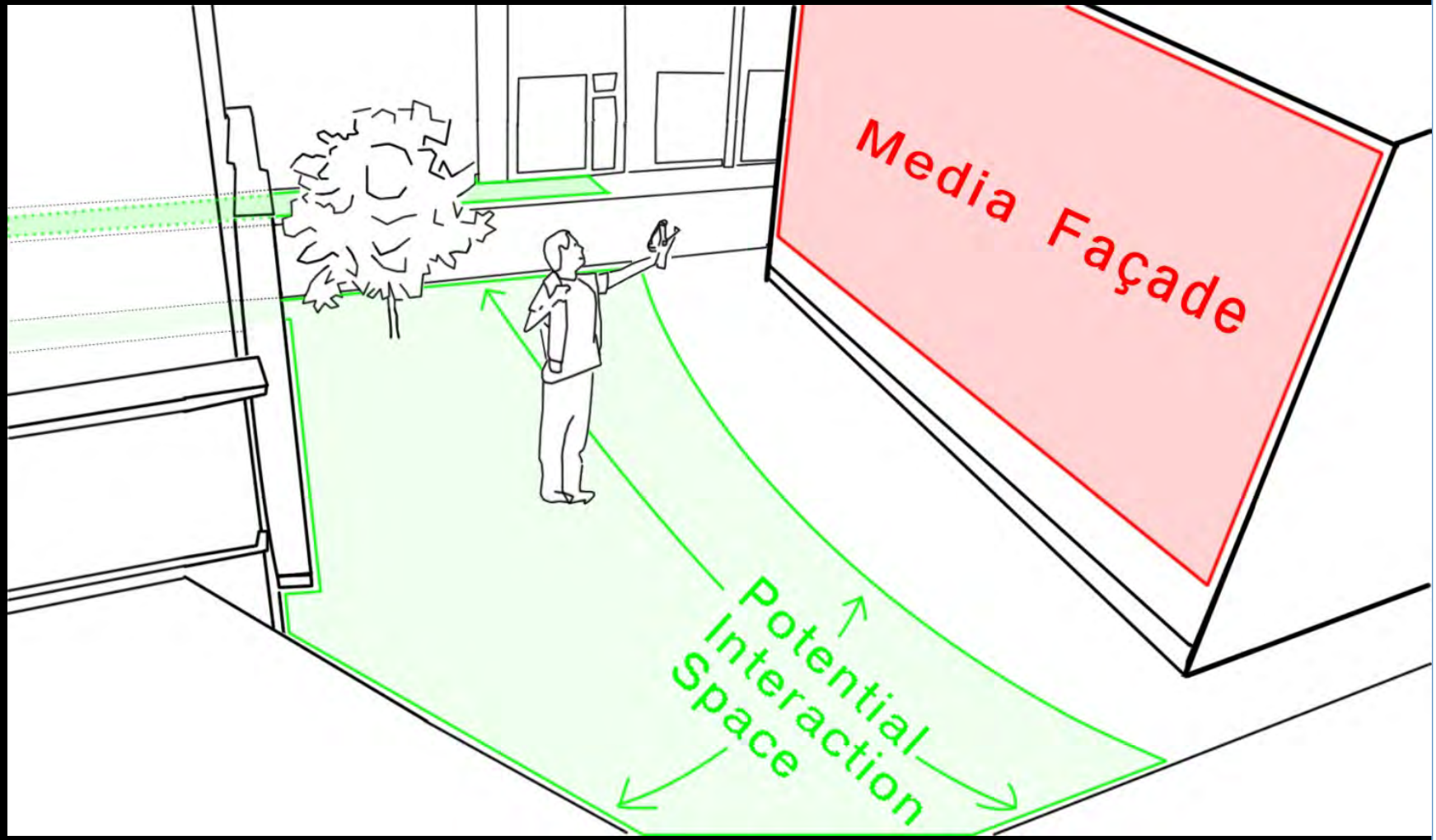



Media Façade
Activation Space
Comfort Space
Gap Space
Interaction Space
Gap Space
Display Space
Social Space
Potential Interaction Space
Activation Space
Gap Space
PIS 2
PIS 1
Gap Space
Display Space

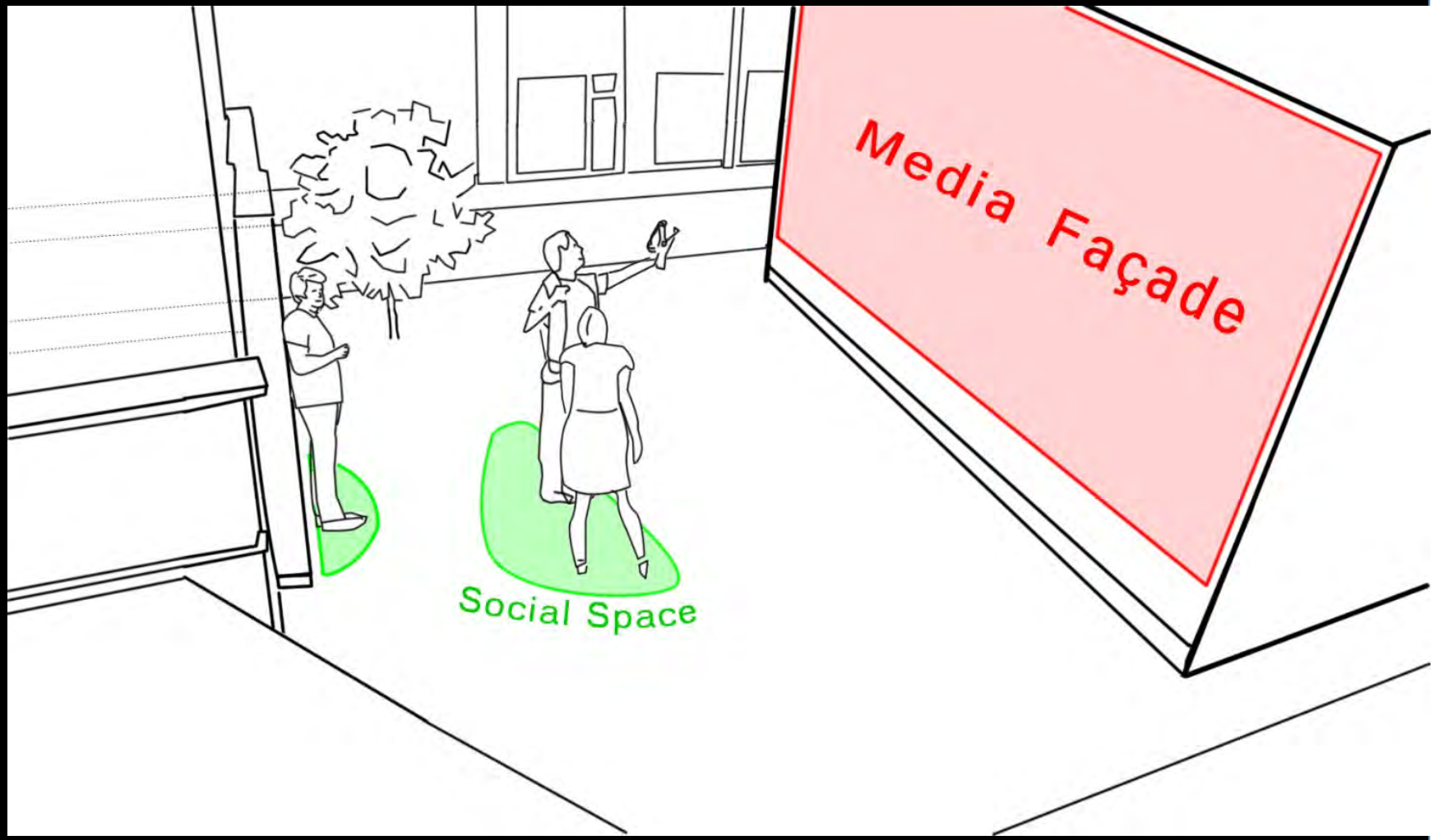

Activation Space
Media Façade



Interaction Space

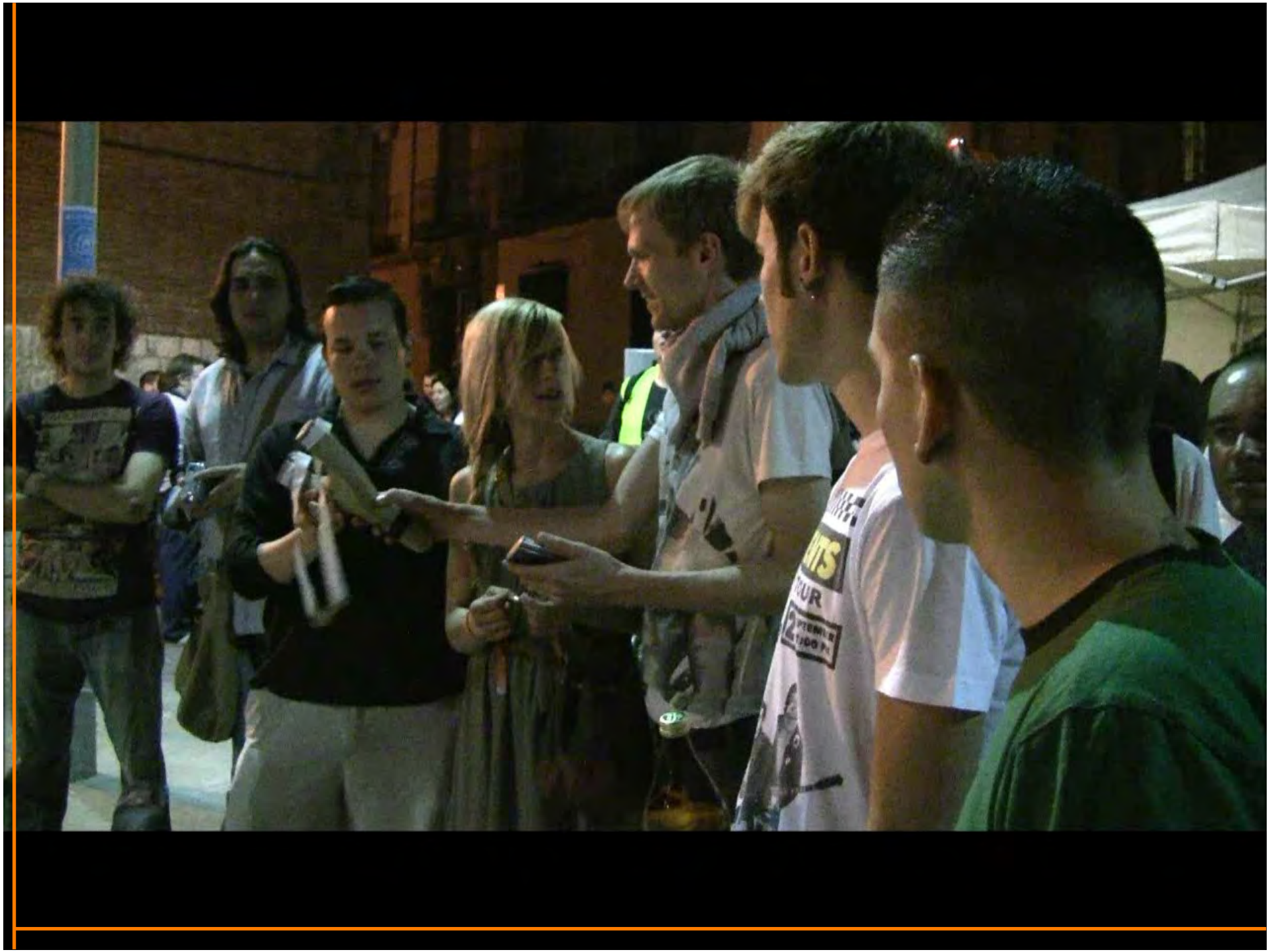


Potential Interaction Space



Social Interaction Space

Social
Interaction
Space



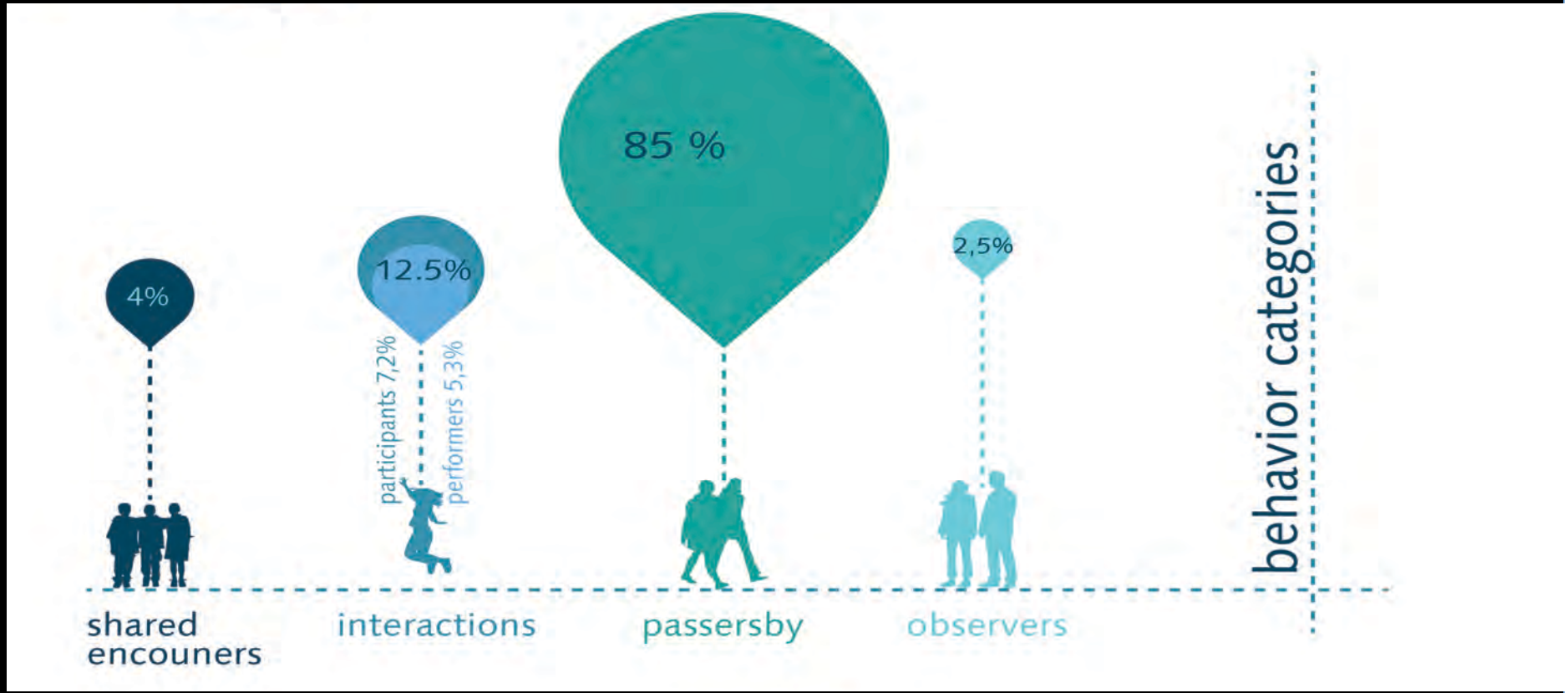
Materiality and Embodiment

- Slingshot metaphor easy to understand
- Bodily experience of Throwing…
- Throwing is expressive, visible – performative act

Playfully appropriating the city

Playfully appropriating the city

Playfully appropriating the city



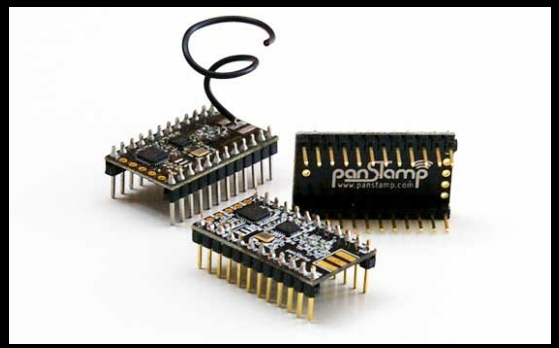
Kick/Flickable Light Fragments

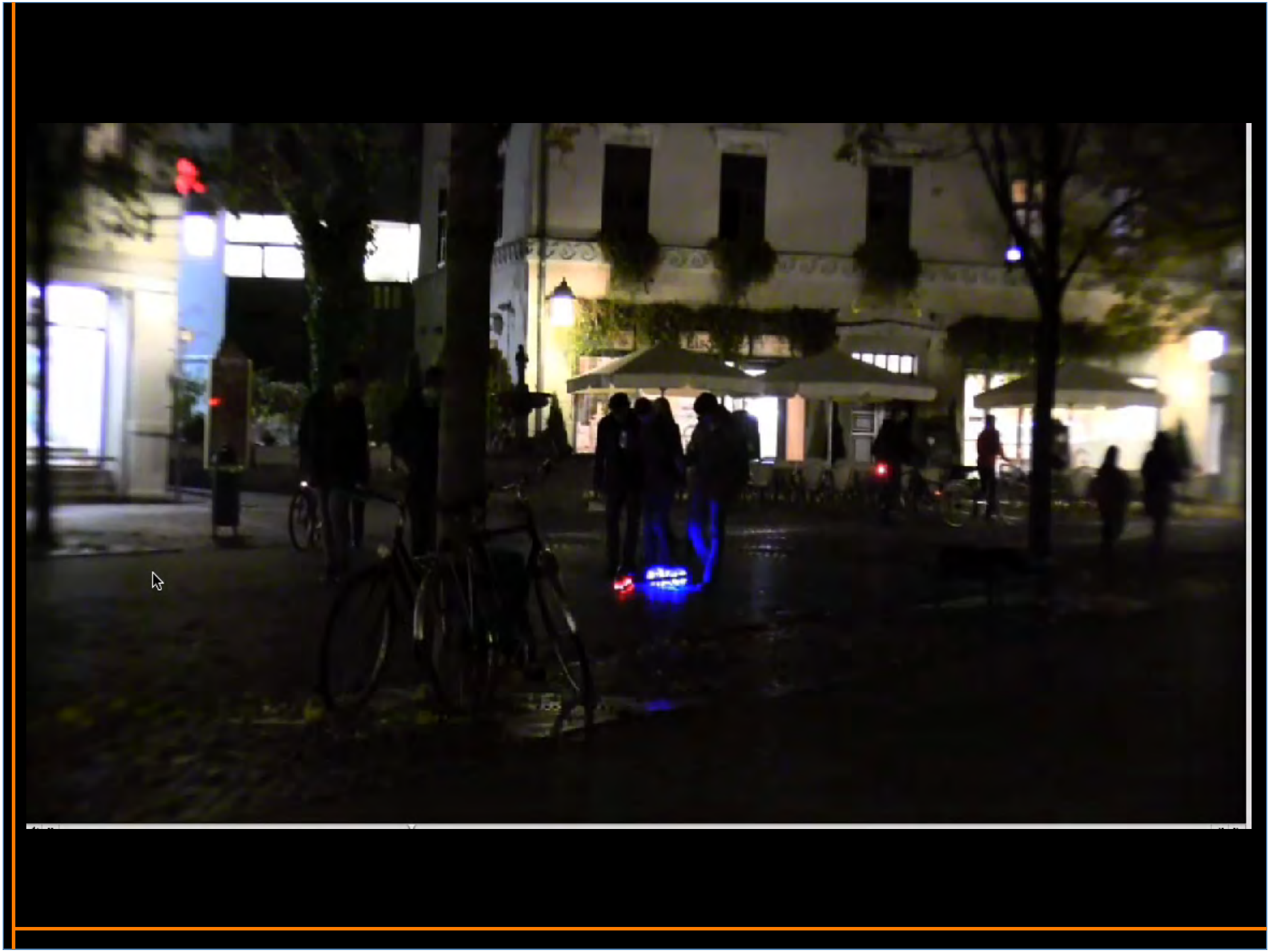
Fischer et al. Movable, Kick-/Flickable Light Fragments Eliciting Ad-hoc Interaction in Public Space. Proc. of PerDis2014

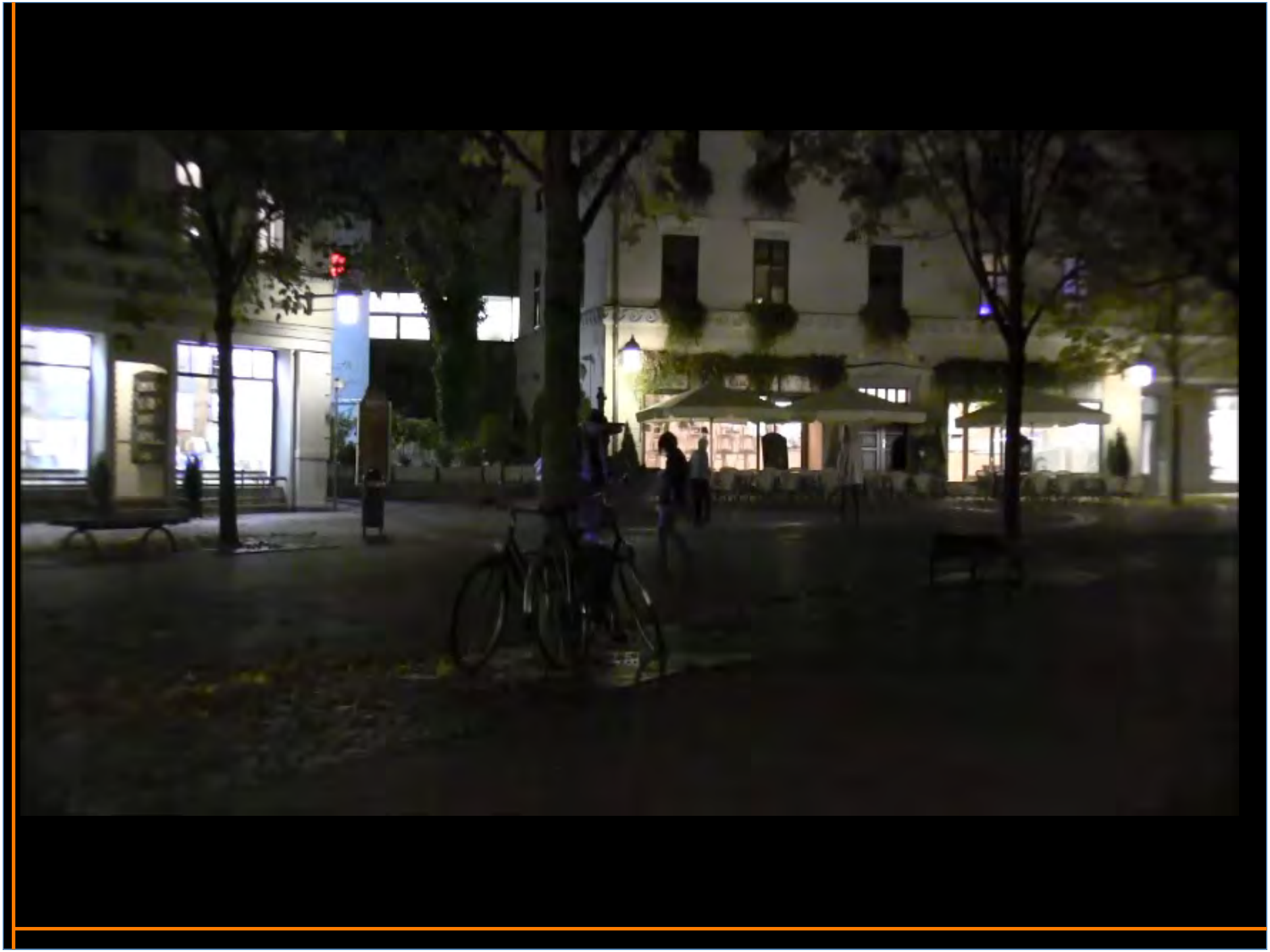
Different Shapes

Different ‘personalities’ have different reactions

HD


pan lamp





Degrees of engagement

- Finding meaning/ sense making
  - Interaction
    - Understanding reactions
      - Creative play + Inclusion of Environment

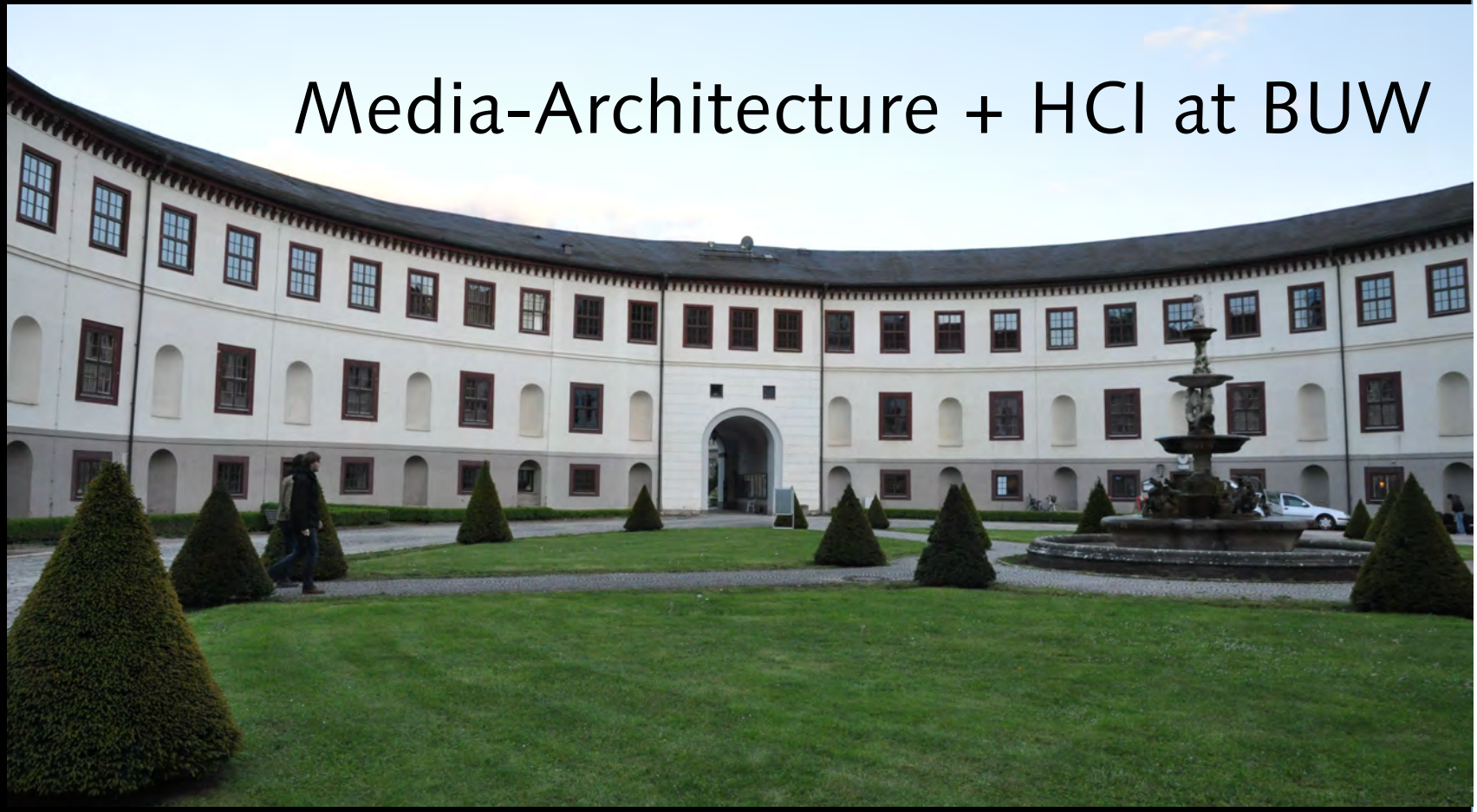
Parasitic Interfaces: the PIPE

- Fixed to urban fixtures
- Visibility of lights
- Discoverability

2015

Meiningen - The Theatre-machine

Meiningen - The Theatre-machine



An interactive façade mapping

Fischer et al. Castle-Sized Interfaces: An Interactive Façade Mapping. Proc. of PerDis2015

Background

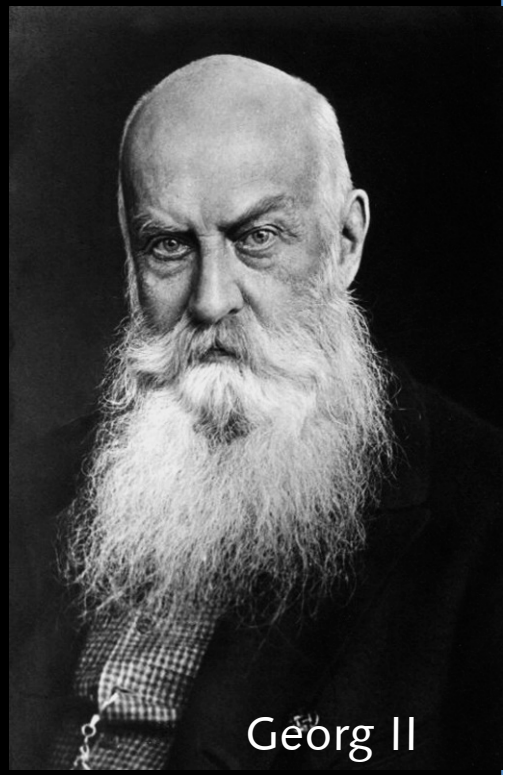
Story related to historical context

Gesamtkunstwerk

- Reactive Element
- auto-active …
- Performative ….
- Interactive ….

Engaging Citizens with THEIR heritage

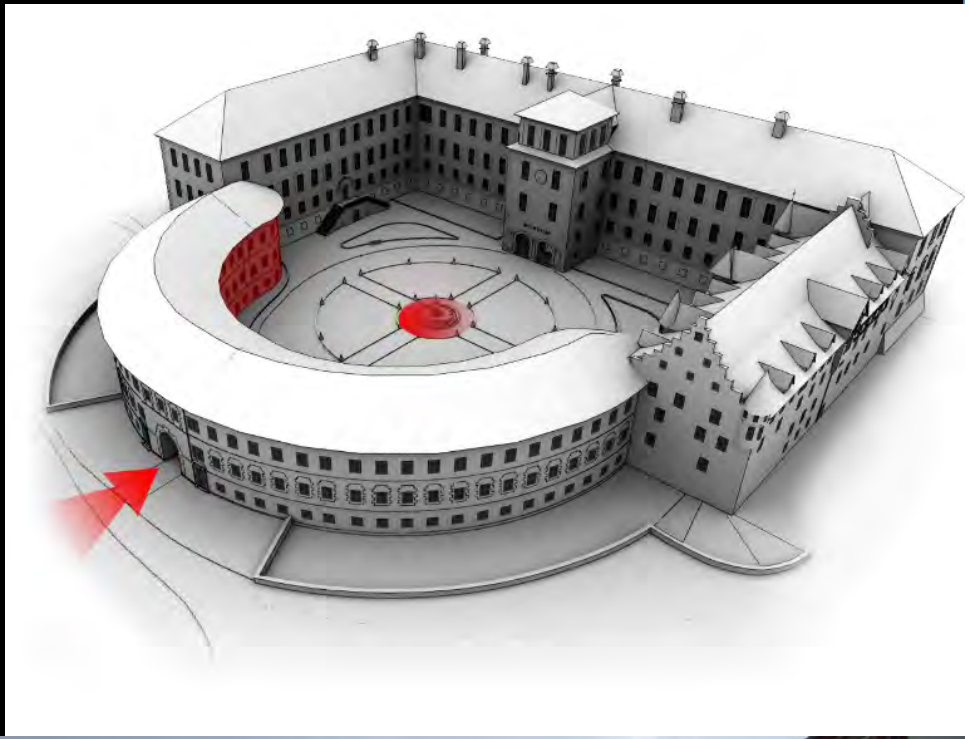
© WartenbergTrust



Georg II

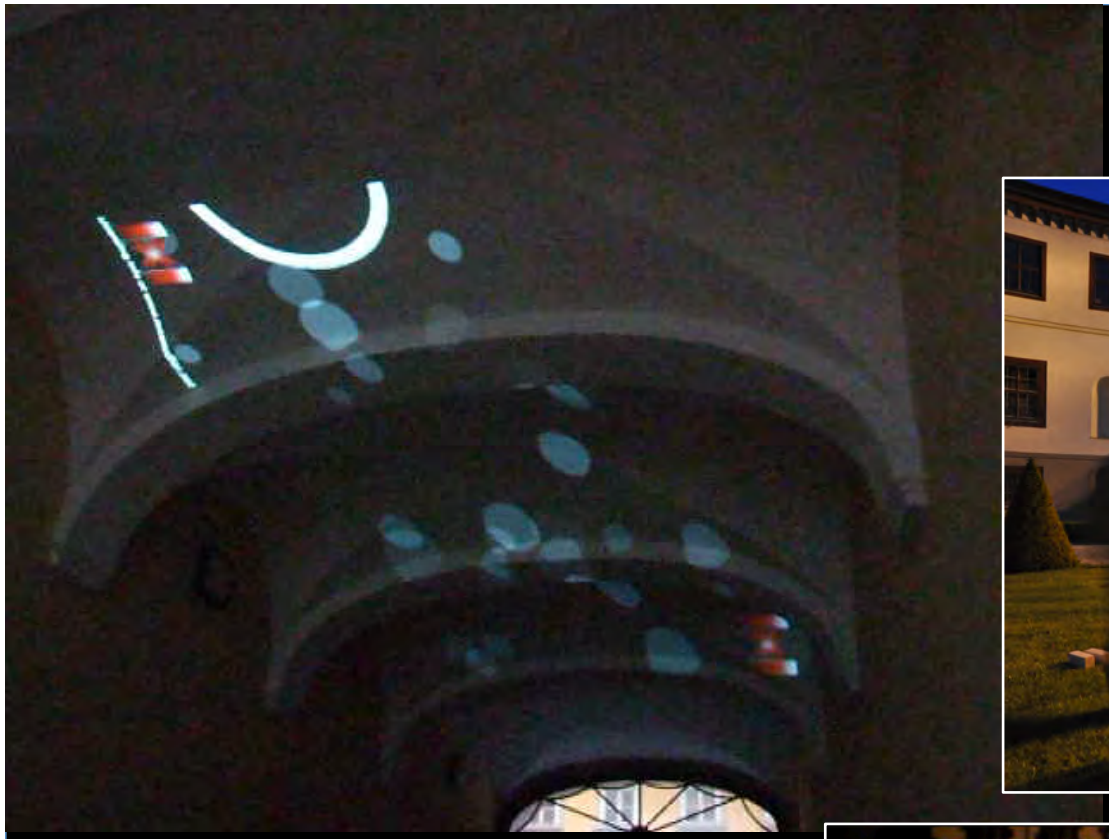
Castle Elisabethenburg

- 120m curved façade
- central fountain
- one entry tunnel



© Aryan Khosravani

Development



© Candy Welz

Circles follow visitors that enter the archway

© Candy Welz

Façade mapping show about the 12 theatre principles

© Candy Welz

© Anke von der Heide

Choreography drawing attention to fountain + machine

The Theatre Machine

aim – multi user interface

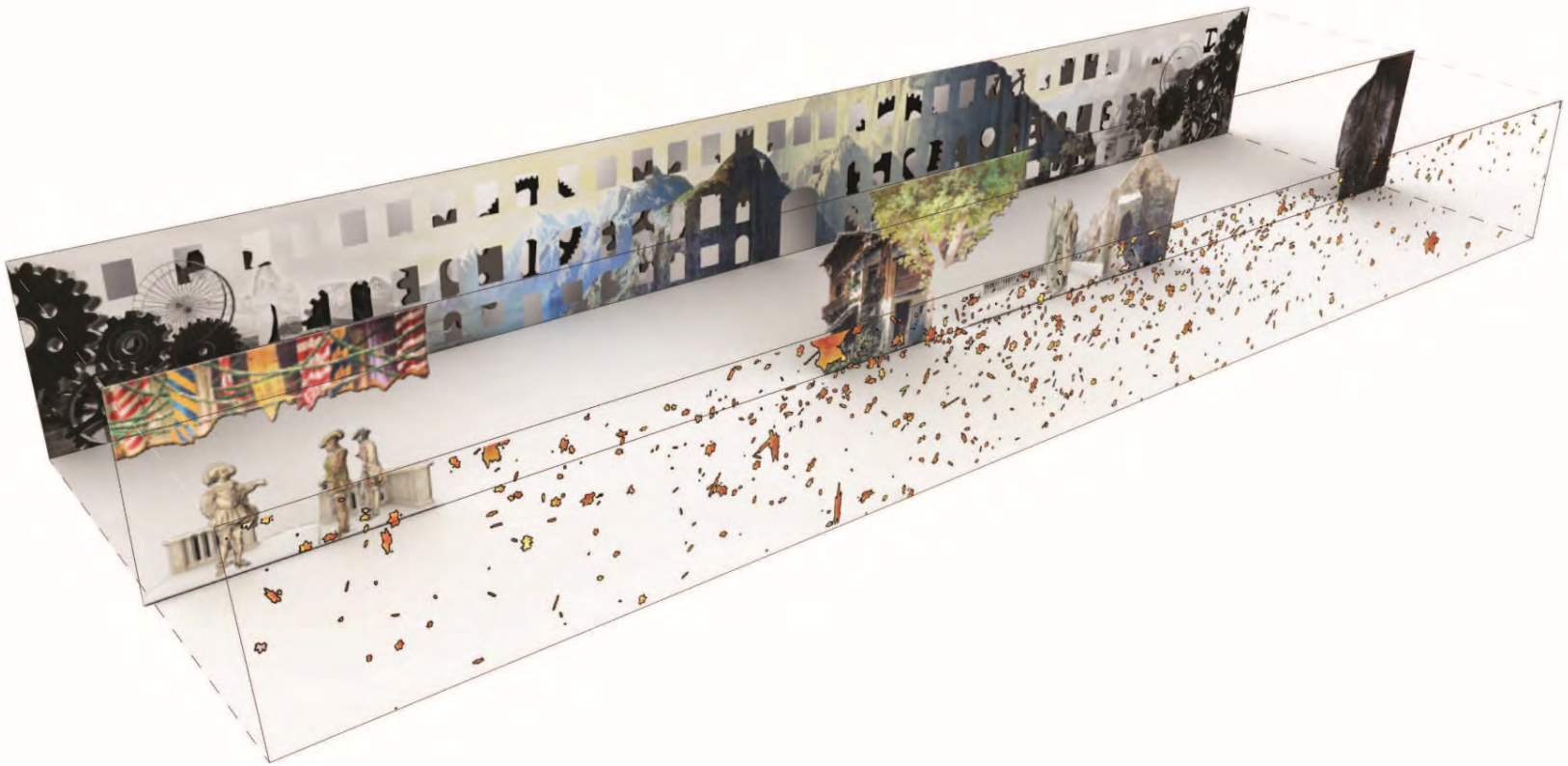
- biggest possible interaction space
- non competitive
- intuitive usage

Rope Interface

3 parts, 3-5 m length

Early on-site visits

The Theatre Machine



Moving one rope moves one layer on façade

The Theatre Machine

- Accessible:
  - low-tech, observable interaction, playful
- Social interactions & encounters
- Empowering: my movement has a BIG effect
- 'Content' is interesting (visually, topically)
- Stages of Engagement – up to creative acts and delight

Supporting Engaged Interaction in Museum Spaces

- What does engagement mean?
  - Hands-on – minds-on
- Role of social interaction
- Museum Experience: Sensory, Cognitive, Emotional, Social

Cultural Visits are Social Occasions

Burns Birthplace Museum
Ayrshire

Social Encounters in the Museum Space

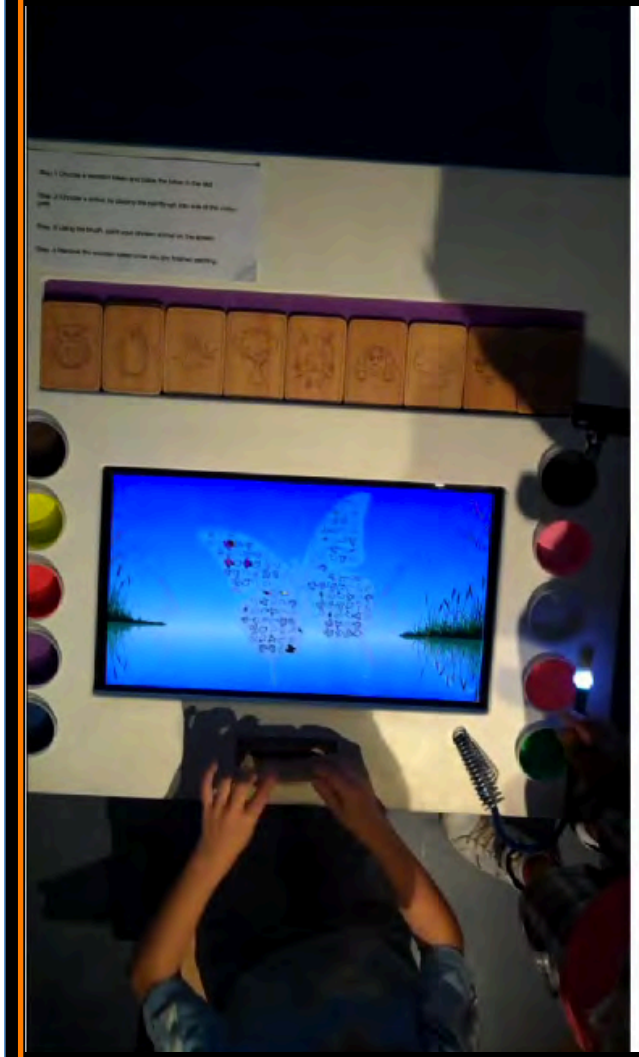
- Investigating what makes good museum installations that engage visitors
- Museums as testbed for understanding what makes interaction engaging and fun, sparks conversation

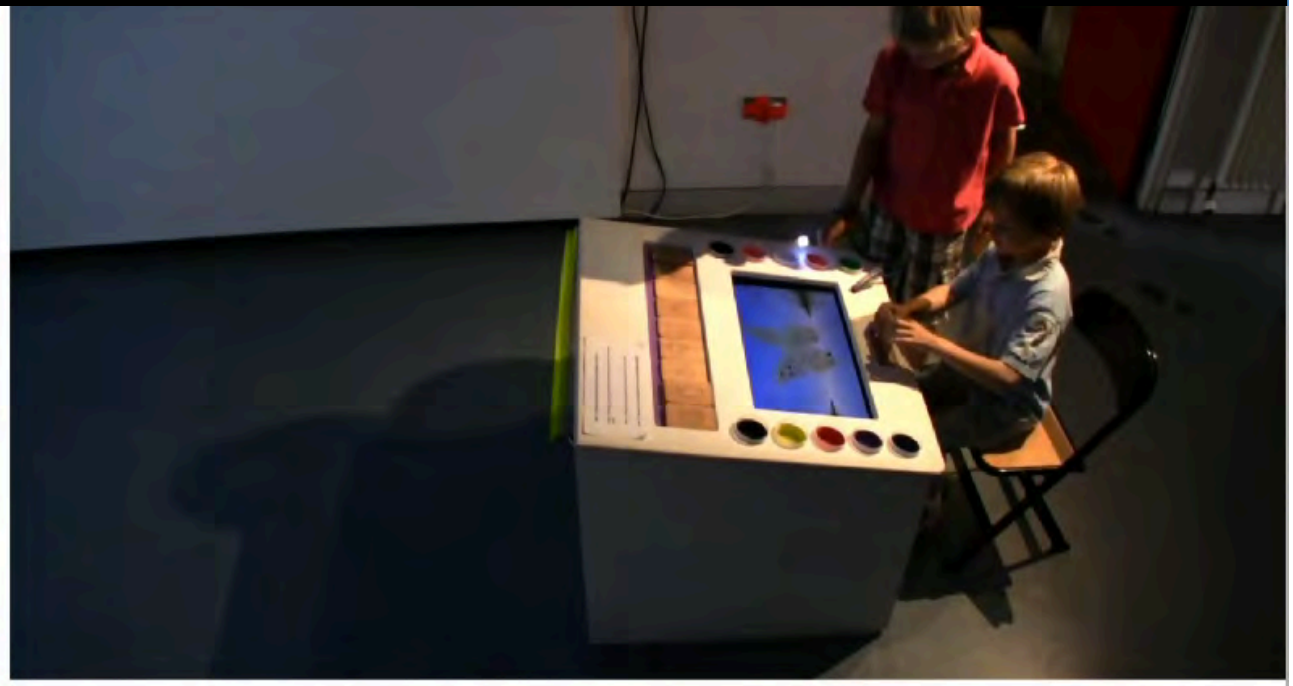
Early Research: Technical Museum Vienna

Groups vs. solitary usage
Sharing activity

Like being active (not info push)
Creative appropriation & challenge

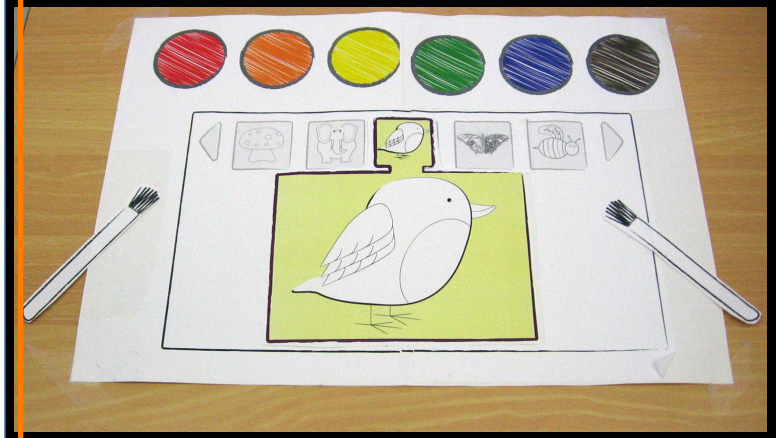
Tangible Manipulable Resources





Clarke, Hornecker. *Social Activities with offline tangibles at an interactive painting exhibit in a children's cultural centre*. Proc. of BritishHCI'15

Developed via Paper Prototypes and Mock-Up



(1) Paper prototype

(2) Mock-up (physical Interaction central)

(3) Final system

Physical Resources for Planning Activities as a Parallel Process

Bystander activity

Cards a resource for discussion and negotiation

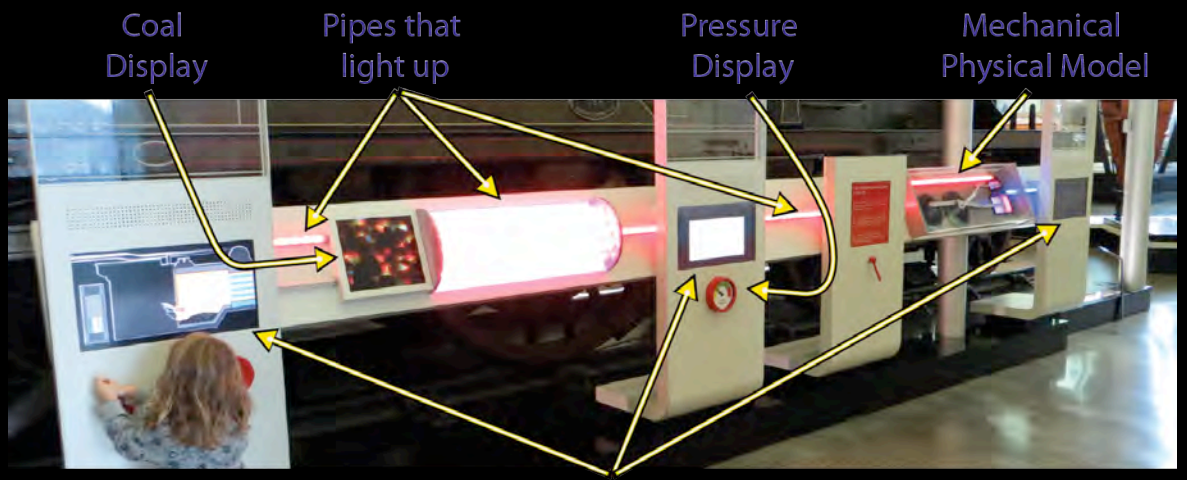
Painter undisturbed – sole control over paintbrush

Distribution in Space enforces Collaboration

Glen Douglas Steam Engine Installation, Riverside Transport Museum Glasgow

Distributed controls, distributed displays

Can't be used alone



Clarke, Hornecker. Experience, Engagement and Social Interaction at a Steam Locomotive Multimodal Interactive Museum Exhibit. ACM CHI'13 EA

Risks of de-coupling technology from heritage

"[Only] few educational conversations were observed at the table except for reading aloud"
Eva Hornecker
"I don't understand it either but it's cool" – Visitor interactions with a multi-touch table in a museum"

Physical-Digital Assemblies – Experience & Engagement with Museum Artefacts

meSch at the *Allard Pierson Museum* in Amsterdam:

'The Illusion of Motion in Greek Art'

How can it be that we see movement in and on objects that by definition are unable to move, such as vases and statues?

meSch

Tangible and Embodied Interaction

“Strike a Pose”, Gallery One, Cleveland Museum of Art

meSch project

Crafted tangible, embedded and embodied interactions are evocative, memorable and effective…

…but expensive, time-consuming to realize and not easily portable.

Making this affordable and manageable for heritage institutions -> DIY approach!

- Co-Design with curators and museums
- Enabling curators to develop and author interactive installations
- Based on ‘smart objects'

Concluding Thoughts

- Examples from variety of Activity Areas
  - Museums, Urban installation
- HCI / Interaction Design needs to learn from (urban) sociology, architecture, urbanism, facilitation methods, kindergarden play methods etc.
- Lots of concepts and knowledge out there…

Concluding Thoughts

- What kind of technology do we want to put in public places to make us engage with them and with each other, to make us care
- How can we foster ‘shared encounters'
  - With technology – or with low-tech tech?
- Playfulness strategy just one possibility

Learning about Spatiality

- Spatial configurations of technology and architectural design influence social interaction patterns
  - Is there 'space' for people?
  - Is there shared focus?
  - Space for companions and observers
- 'Distributed Activity' (movable system or fixed but large) increases the interaction space
  - more people interact, more space for social encounters
- Thinking at architectonical space level
  - Space influences interactions <-> installations need to fit the space!

The larger Ecology of Interaction

- Rich (social) ecologies of interaction often evolve AROUND the system
  - Even simple systems…
- Needs space (for bodies) and option for activity
- Design for multi-user and for observers, support group dynamics
  - Allow for bystander activity
- Create opportunities for 'shared encounters'

Interaction Modalities Influence

- Visual access to ongoing activity
  - Easier/harder to join in
  - Effects on joint awareness – how fluid is collaboration, how fixed do roles need to be?
- Tangible and Embodied Interaction
  - Make it accessible, fun, performative, expressive
- Physical interaction can increase performativity
  - Fun to perform
  - Attracts attention (part of the spectacle)
  - Implicitly social control

Interaction

- Discoverability
  - Understand basic principle
  - Input-output mapping
- Levels of engagement
  - Short interaction satisfying, interaction style develops with exposure
- Support sharing and hand-over (e.g. mobile devices)
- Different types of collaboration feasible

Thanks!

Merci Beaucoup!

EU meSch Projekt (2013-2017). http://mesch-project.eu/about/
ICT Call 9: FP7-ICT-2011-9, Grant Agreement 600851.