

# Emergent IoT configurations for same-place collaboration

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With the collaboration of Terranet AB

# Research questions

How could meetings and presentations become more collaborative?

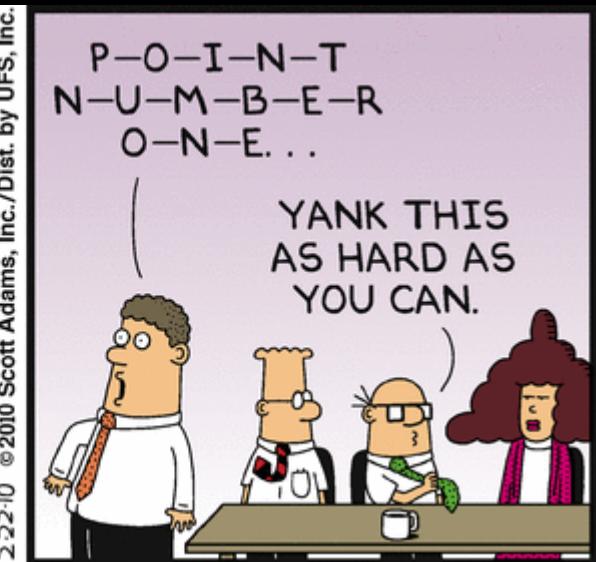
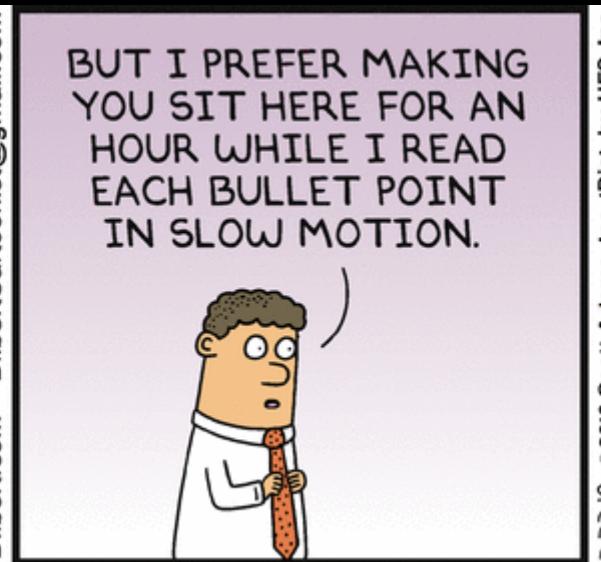
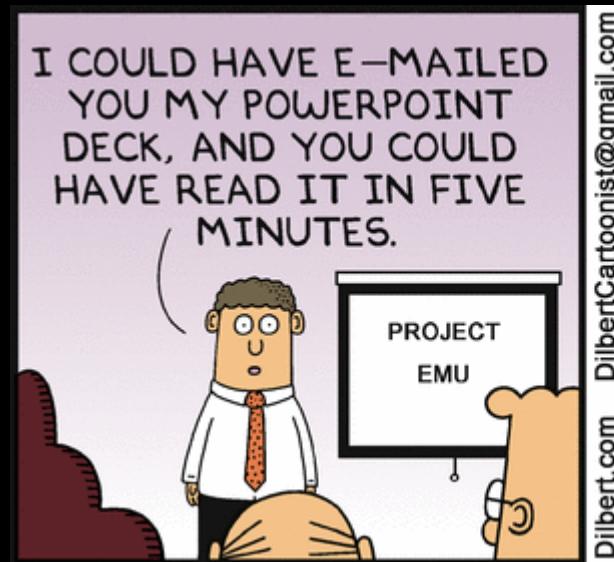
How could mesh networks improve collaboration in a work context?

What other possibilities open up when we are able to connect devices such as smartphones and projectors?

# Collaborative presentations

Presentations tend to become boring monologues

Difficulty in sharing the projector limits collaboration



“the cognitive style of the standard PowerPoint presentation:  
foreshortening of evidence and thought,  
low spatial resolution,  
a deeply hierarchical single-path structure,  
breaking up narrative and data into minimal fragments,  
rapid temporal sequencing of thin information,  
conspicuous decoration and fluff,  
a preoccupation with format not content,  
commercialism that turns everything into a sales pitch”

Edward Tufte, “Beautiful Evidence”

# Research Method

Literature review

Focus: collaborative presentations

Prototype and evaluation

Directions for iteration

Exploration

Outline of future research directions



"The NiCE discussion room: Integrating paper and digital media to support co-located group meetings", Haller et al., 2010



"Blended Spaces for Collaborative Creativity", Benyon and Mival, 2012



"OpenProject: : A Lightweight Framework for Remote Sharing of Mobile Applications", Negulescu and Li, 2013

# Initial Concept

A team can carry out a presentation together with just their phones

Small choreography to start the meeting

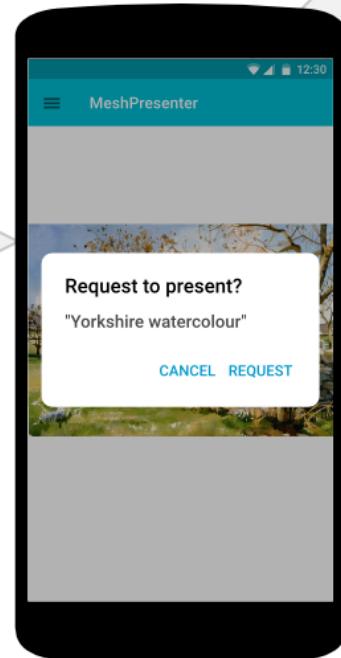
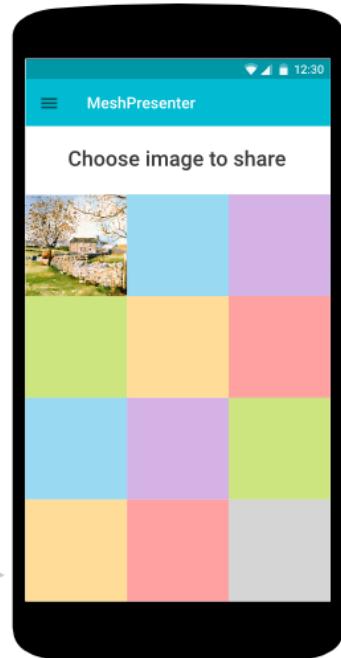
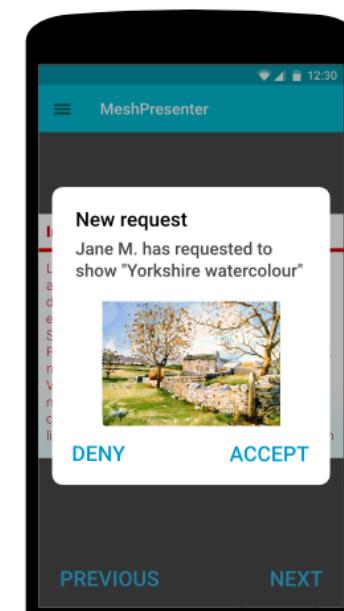
Current slide appears in all phones

Fluid interaction presenter and audience

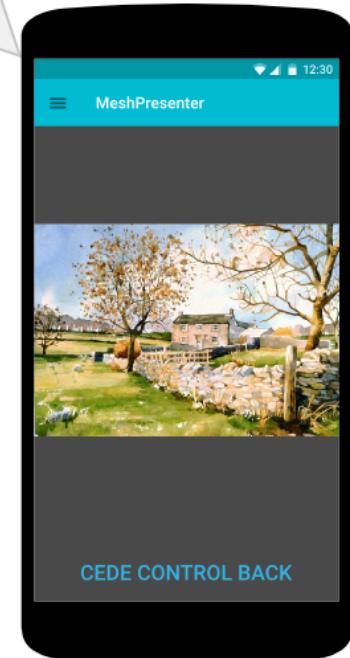
Audience can easily display their images

Encourages sharing and collaboration

## PRESENTER



## AUDIENCE



# Prototype

Android app

Terranet mesh network technology

Slides are distributed beforehand

Simple message-based protocol

UI modes: presenter, audience, projector

# Mesh networks in the workplace

Mesh network:

topology in which each node relays data for the others

flat structure, all nodes cooperate in the distribution of data



# Technological foundations

Ways to join the mesh

Set by default

Browse the existing networks

**Tap another phone (NFC)**

Presenting content

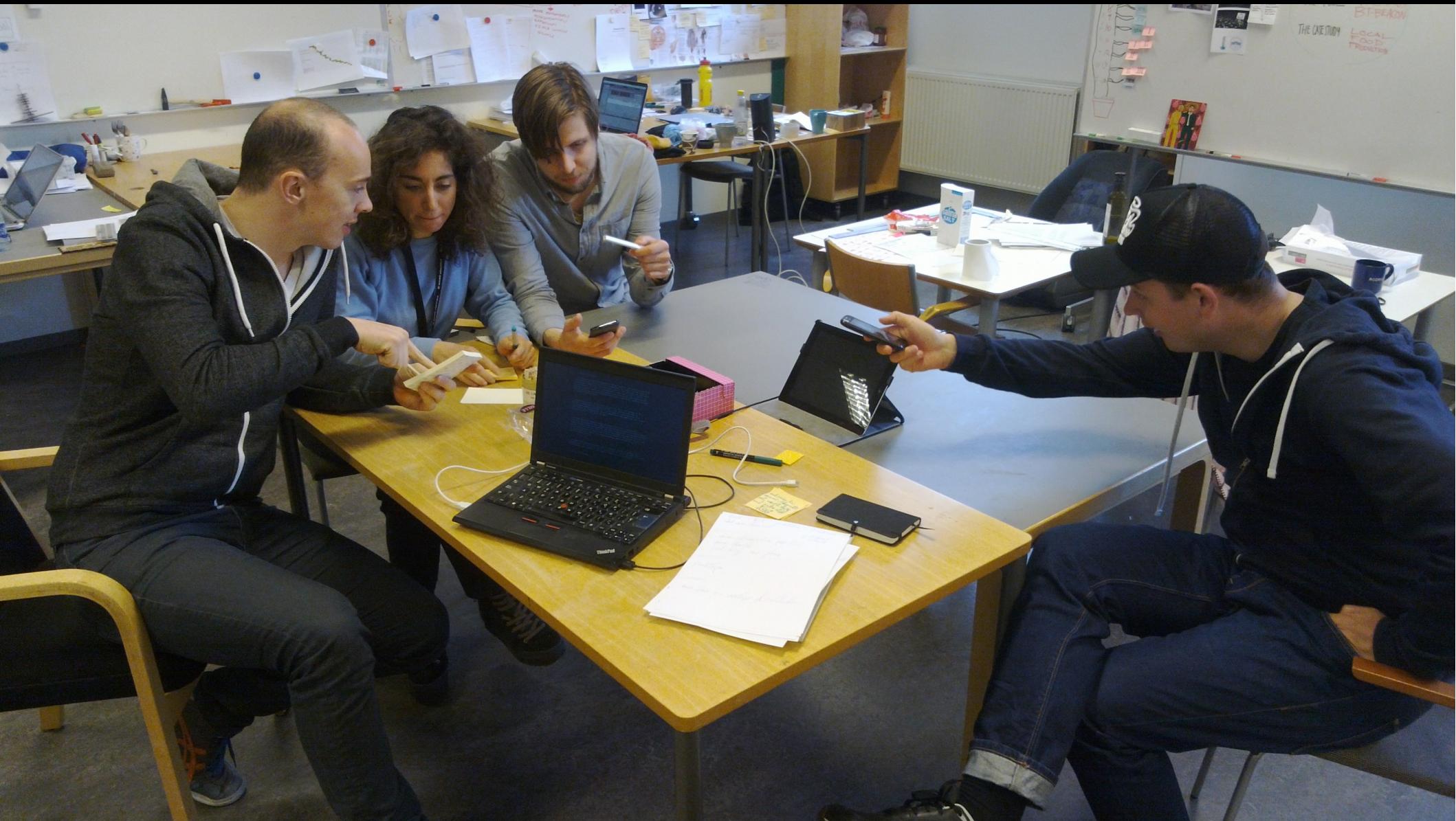
Directly on the phones

Connect phone to projector

**Smarter projectors**



# Evaluation: collaborative session



# Results: presentations

Next iteration of the app

More document types - between apps

Different audience sizes - more notifications

Handing control over between presenters

Pointing

Summary: original slides + contributions

# Results: mesh networks

Location is important

Support voice

How to integrate remote attendees?

# IoT for augmented spaces

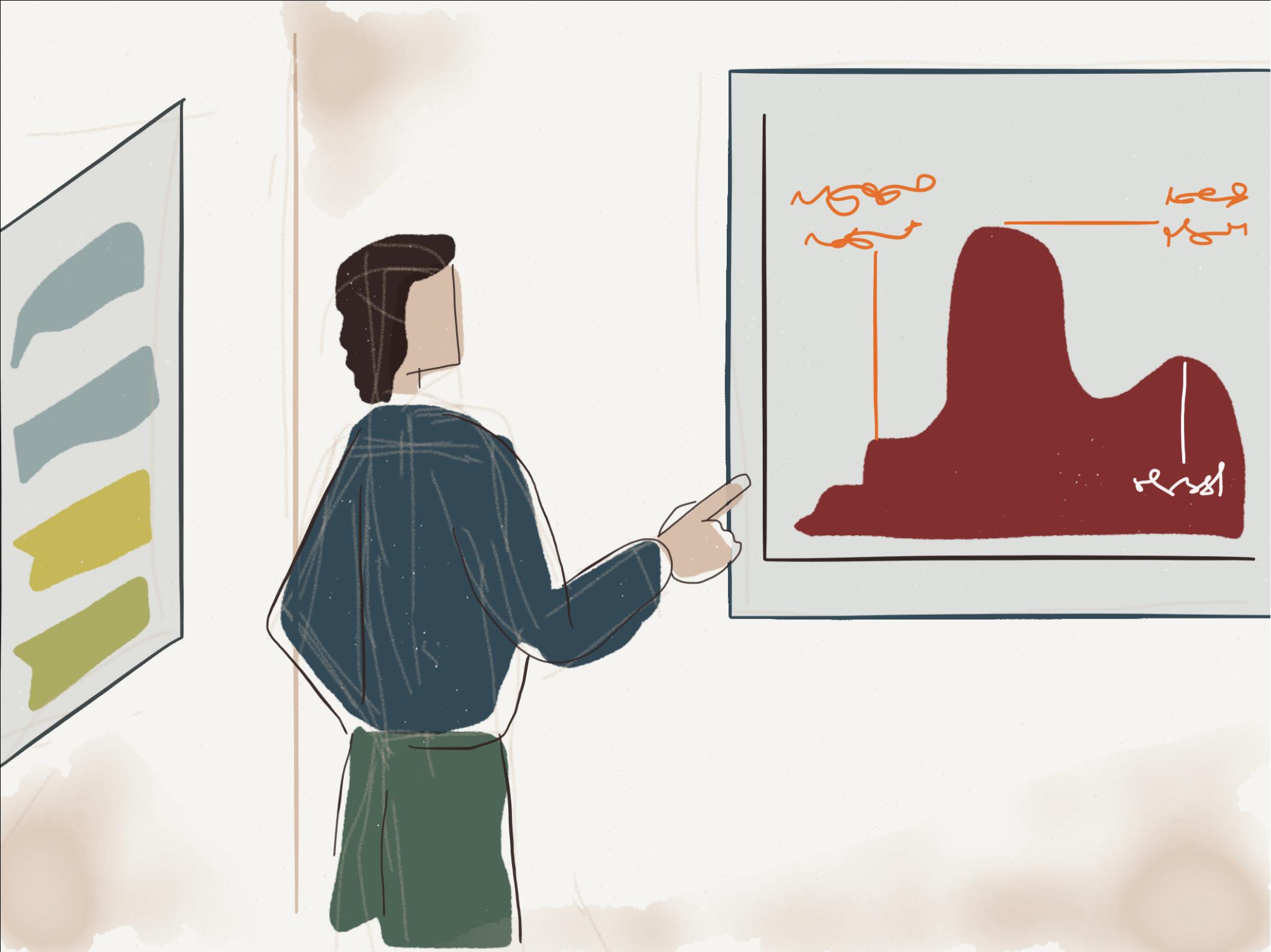
Emergent configurations of  
connected components

Existing communities of practice

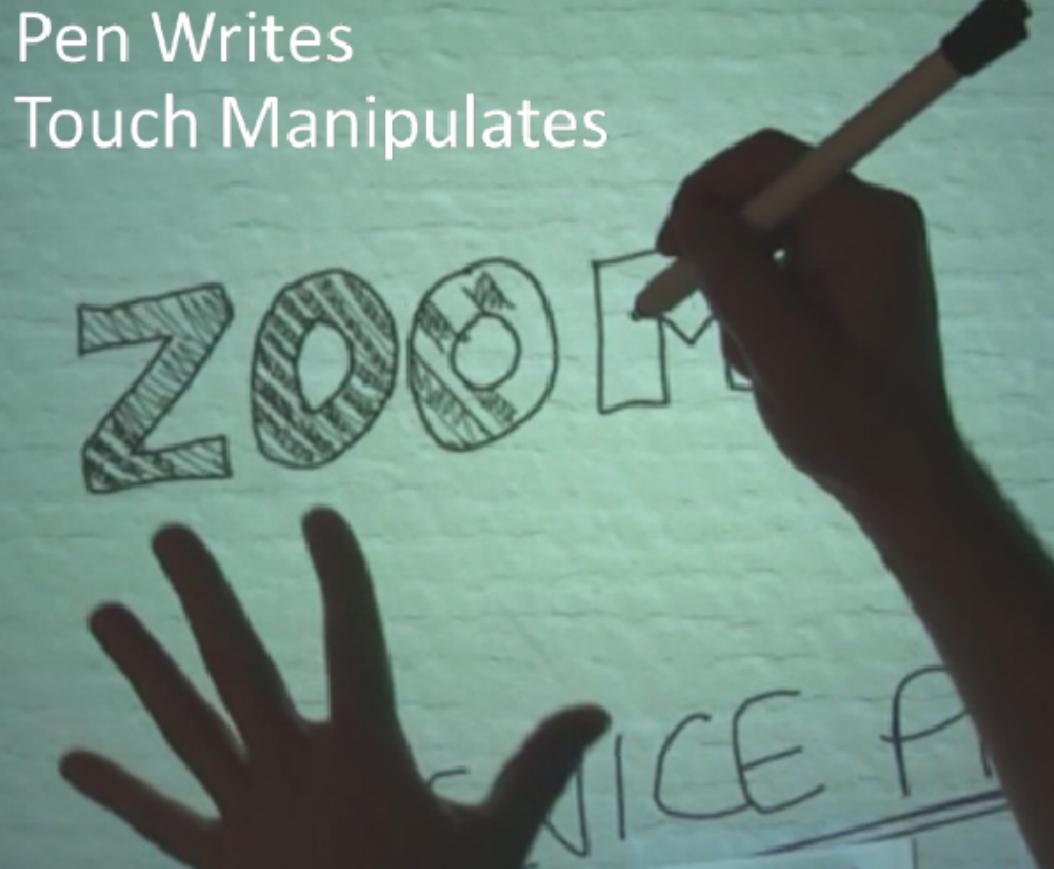
Appropriate & integrate new tools

Tacit knowledge in the workplace

*“what could we do with a smarter projector?  
could we use it for creative purposes?”*

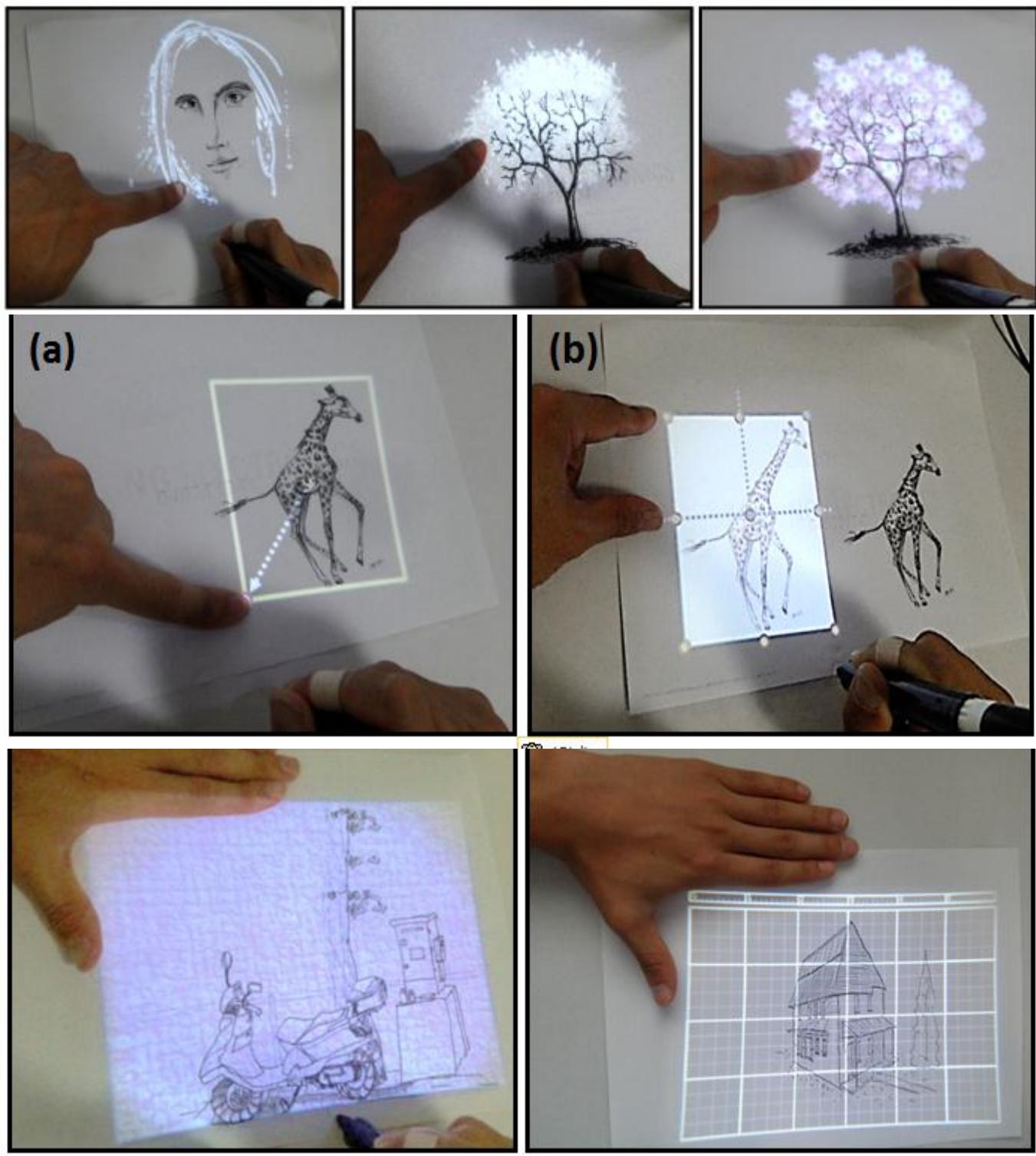


Pen Writes  
Touch Manipulates

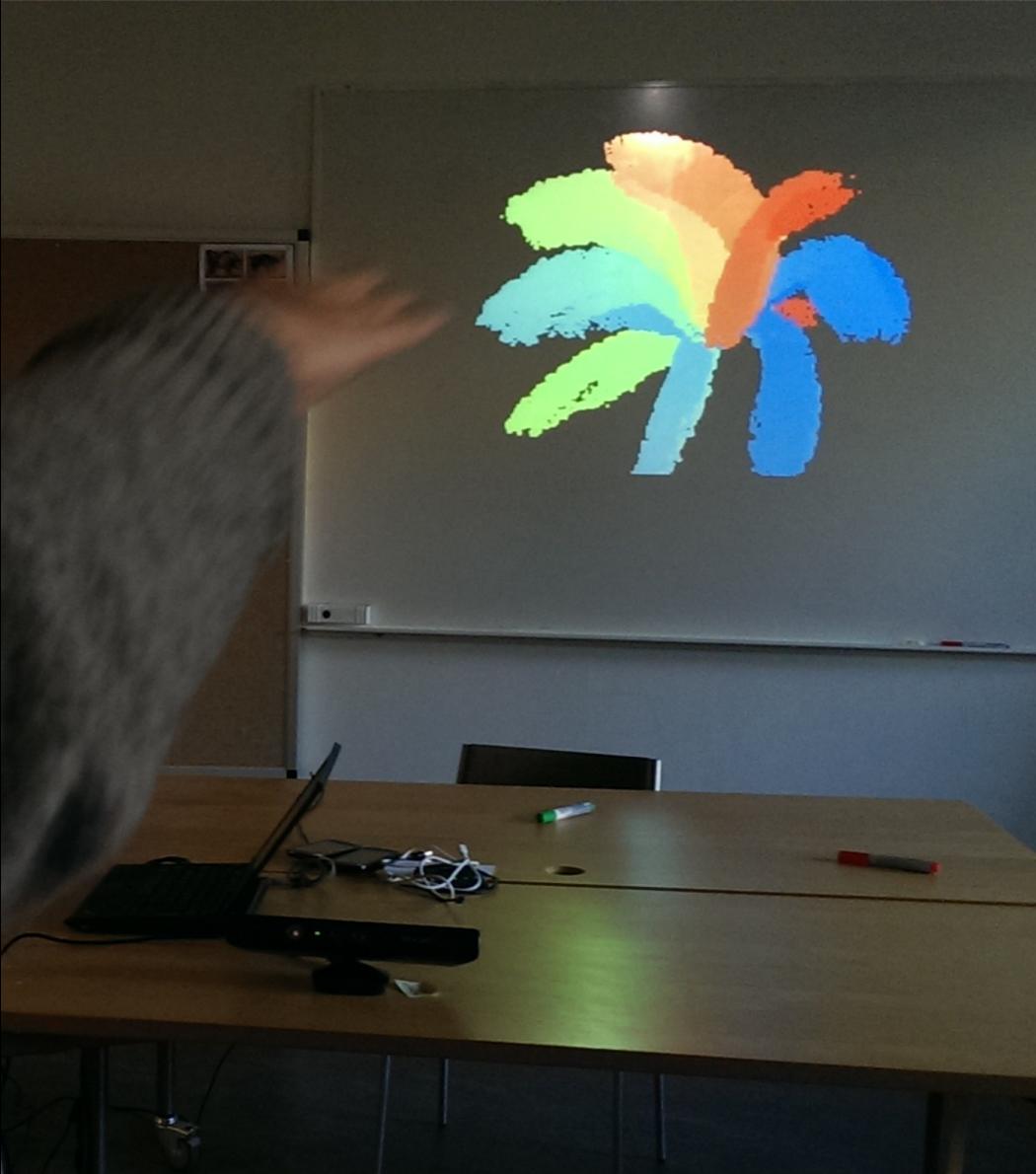


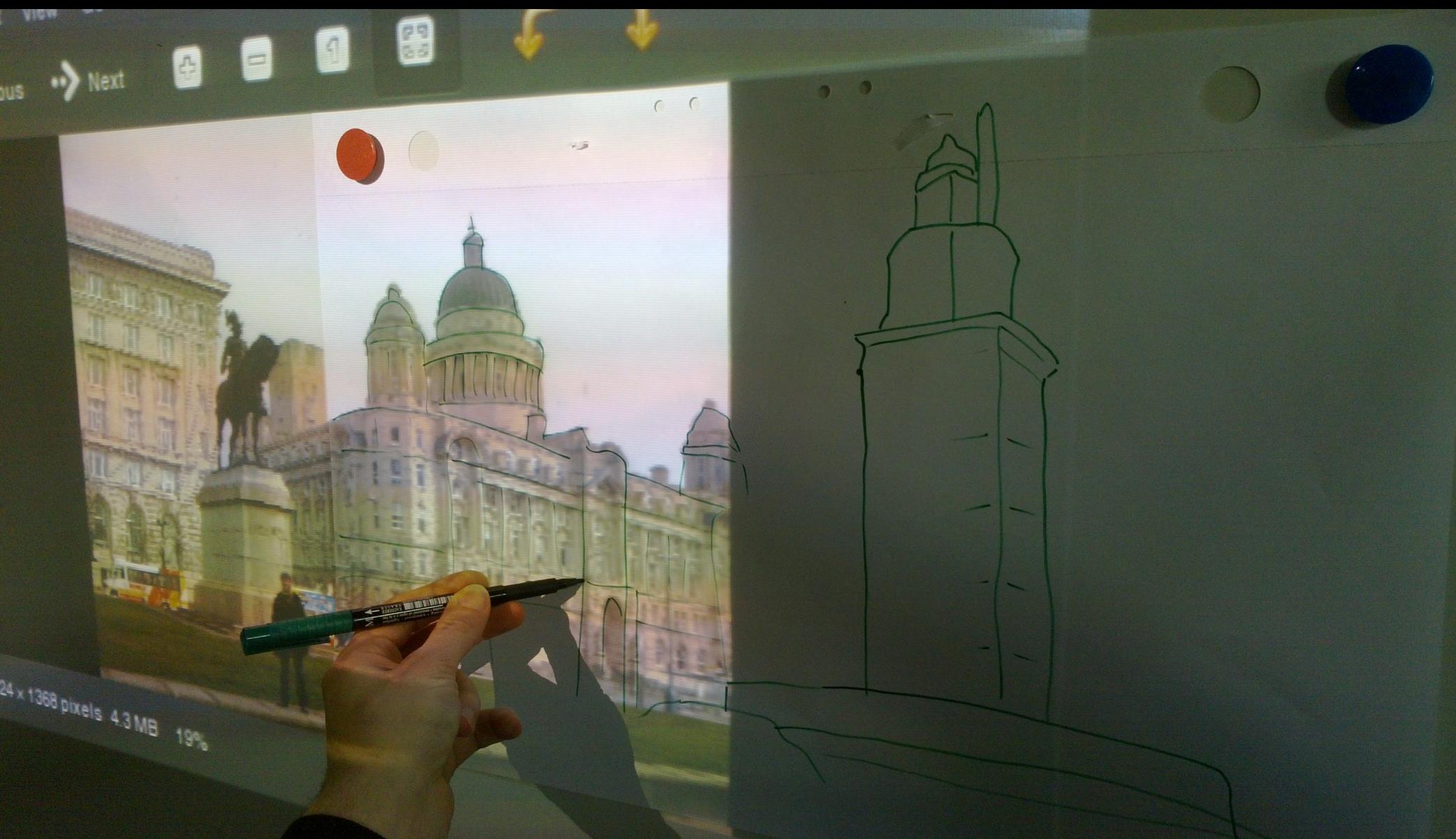
Pen + Touch = New Tools

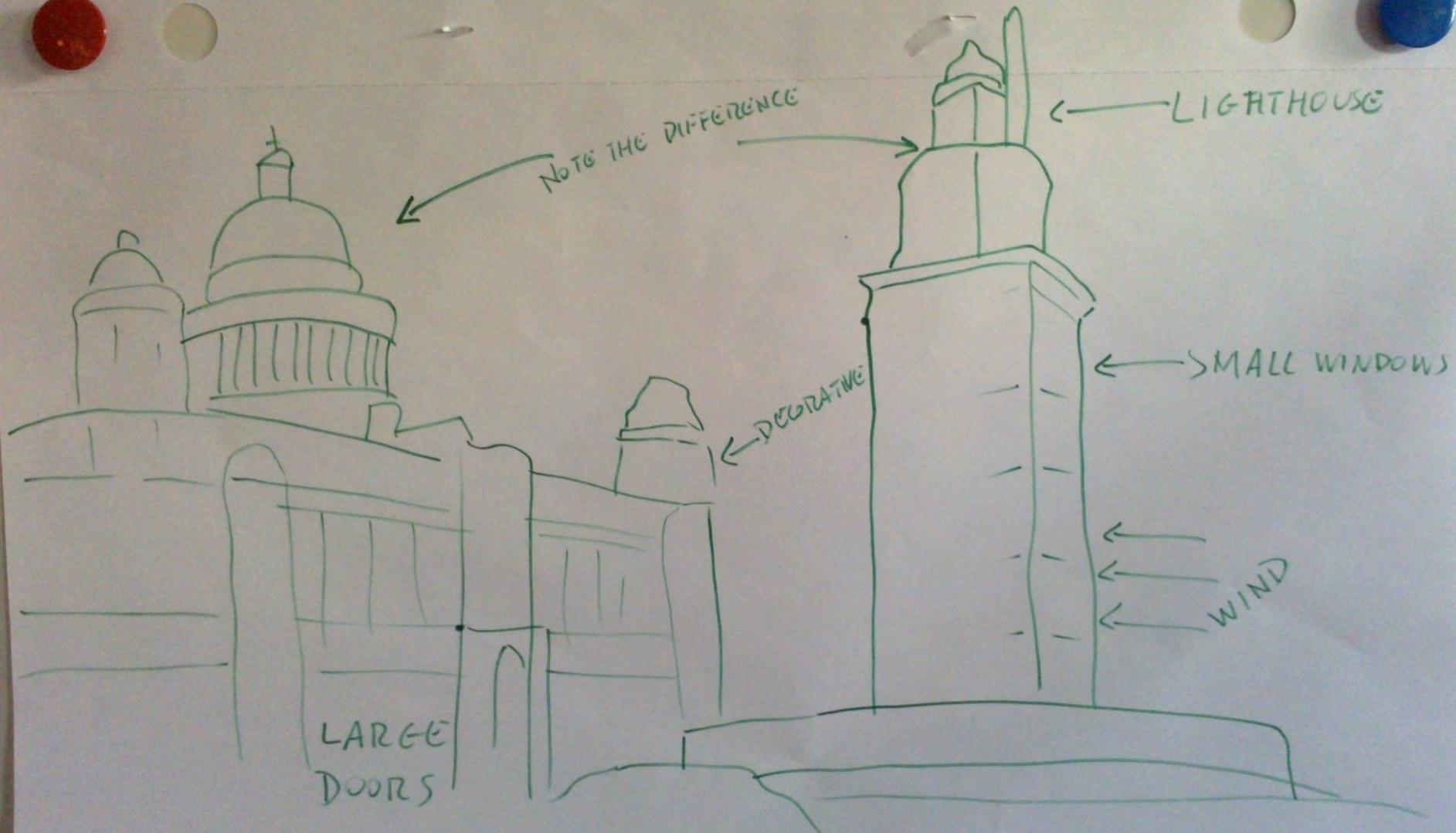




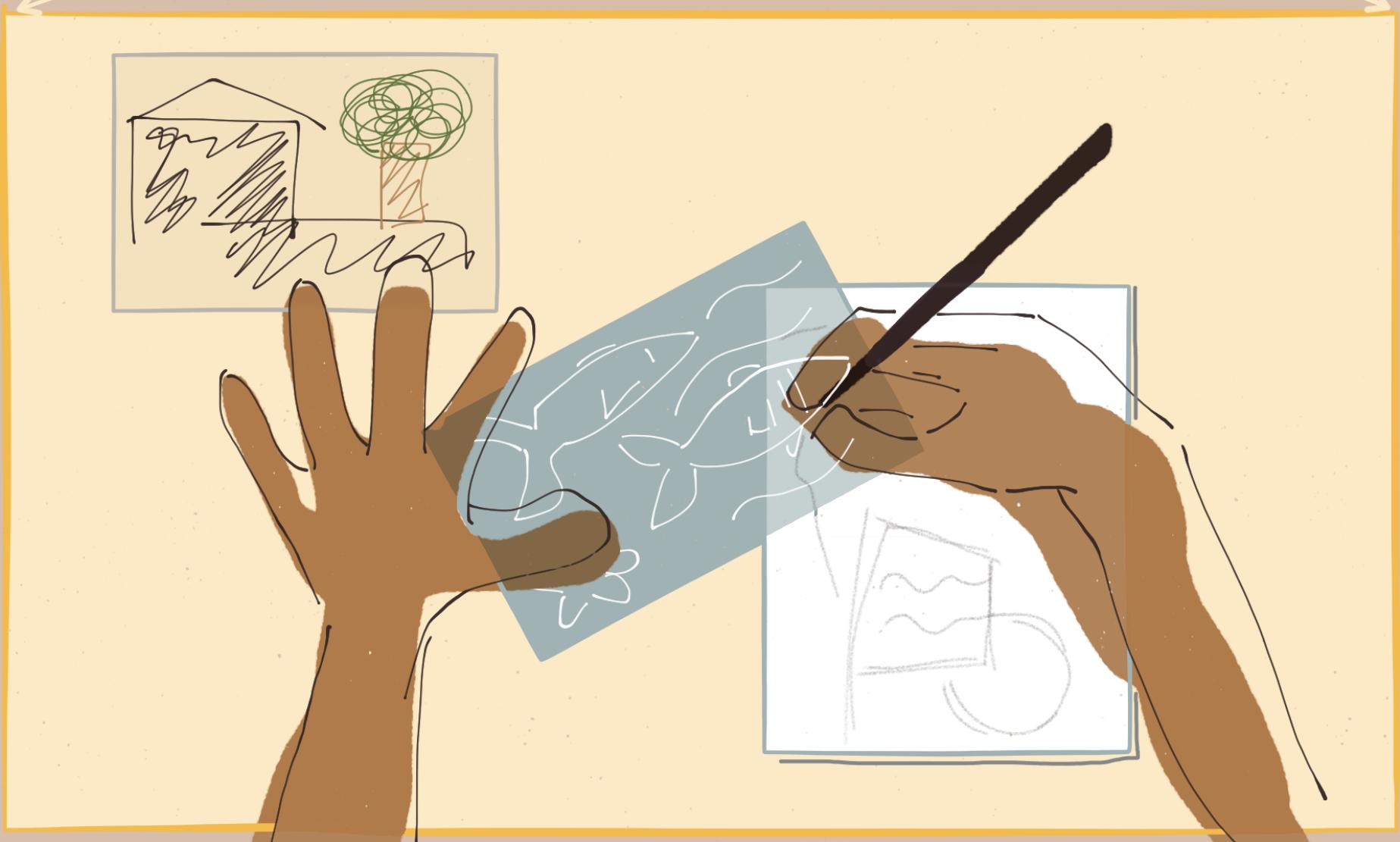
"AR Pen and Hand Gestures: A New Tool for Pen Drawings", Hark-Joon Kim et al., 2013







PROJECTOR



# IoT for Augmented Spaces

Rich interaction possibilities in the fluid combination of IoT tech. in the workplace

Create richer workplaces, not through large installations but with flexible components

Existing situations can be improved, and new ways of working and creating may be found

Through smaller, modular connected components that allow appropriation and recombination

# Conclusions

Flexible & collaborative presentations

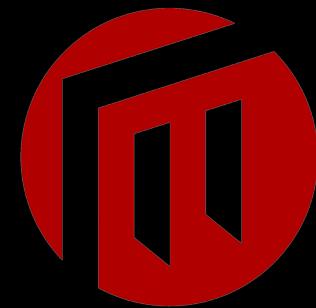
Choreography to get the meeting started

Fluid exchange presenter - audience

Clear future iterations of the design

Initial exploration of the larger field of components for augmented spaces

Thank you!



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