LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

FAKULTÄT FÜR MATHEMATIK, INFORMATIK UND STATISTIK
INSTITUT FÜR INFORMATIK
ARBEITSGRUPPEN MEDIENINFORMATIK UND
MENSCH-MASCHINE-INTERAKTION

Interface Design for Creativity, Engagement, and Learning

Dr. Julie Wagner

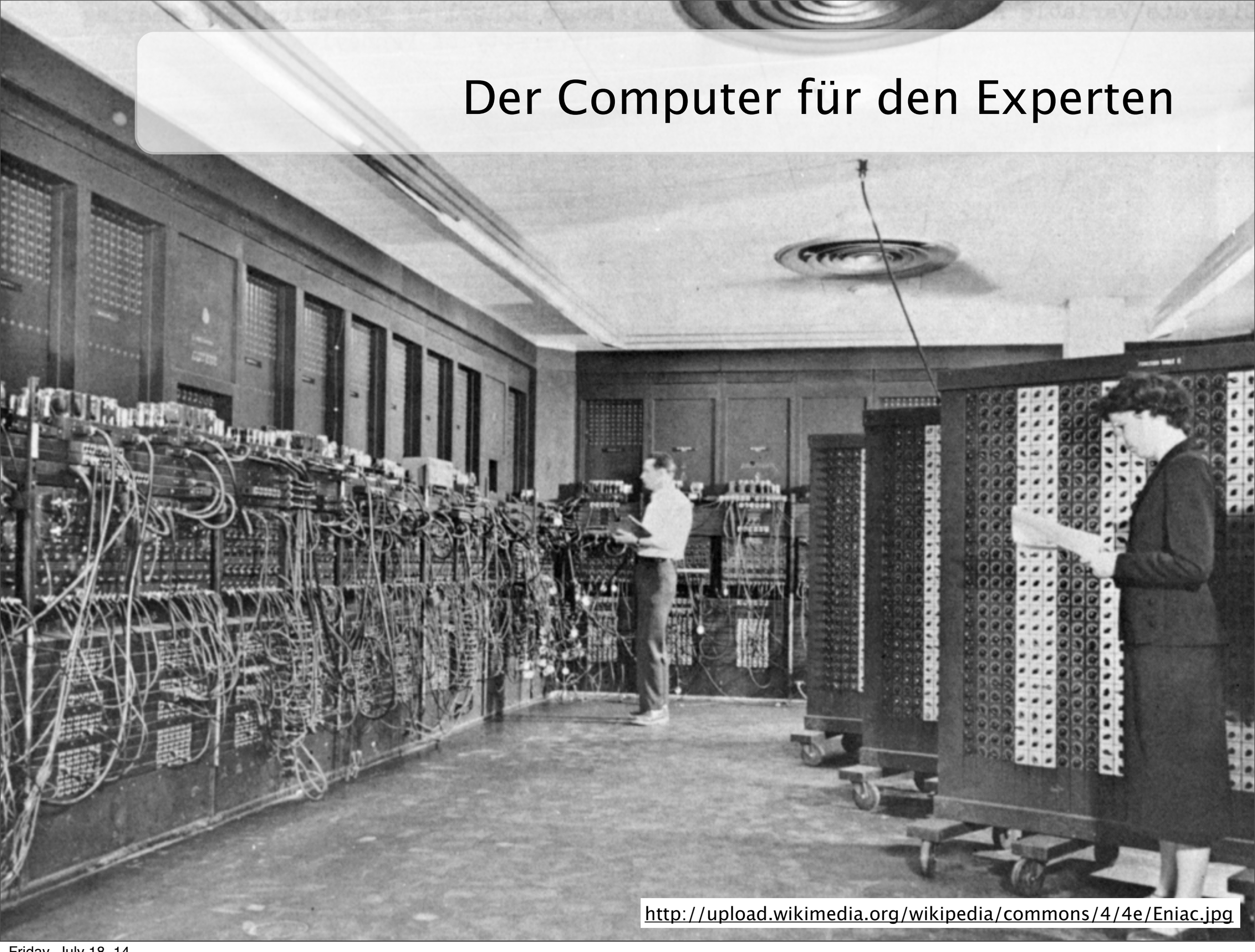
Media Informatics munich

Enchantée!

- Wilhelm-Gymnasium, Braunschweig
  - Abitur mit Leistungsfächer Mathe + Physik
- Informatik (Diplom), RWTH-Aachen
- PhD, Université Paris Sud
  - Stanford University
- Post-doc Télécom ParisTech
- Post-doc (LMU)

Was ist Mensch-Machine Interaktion (HCI)

Der Computer für den Experten



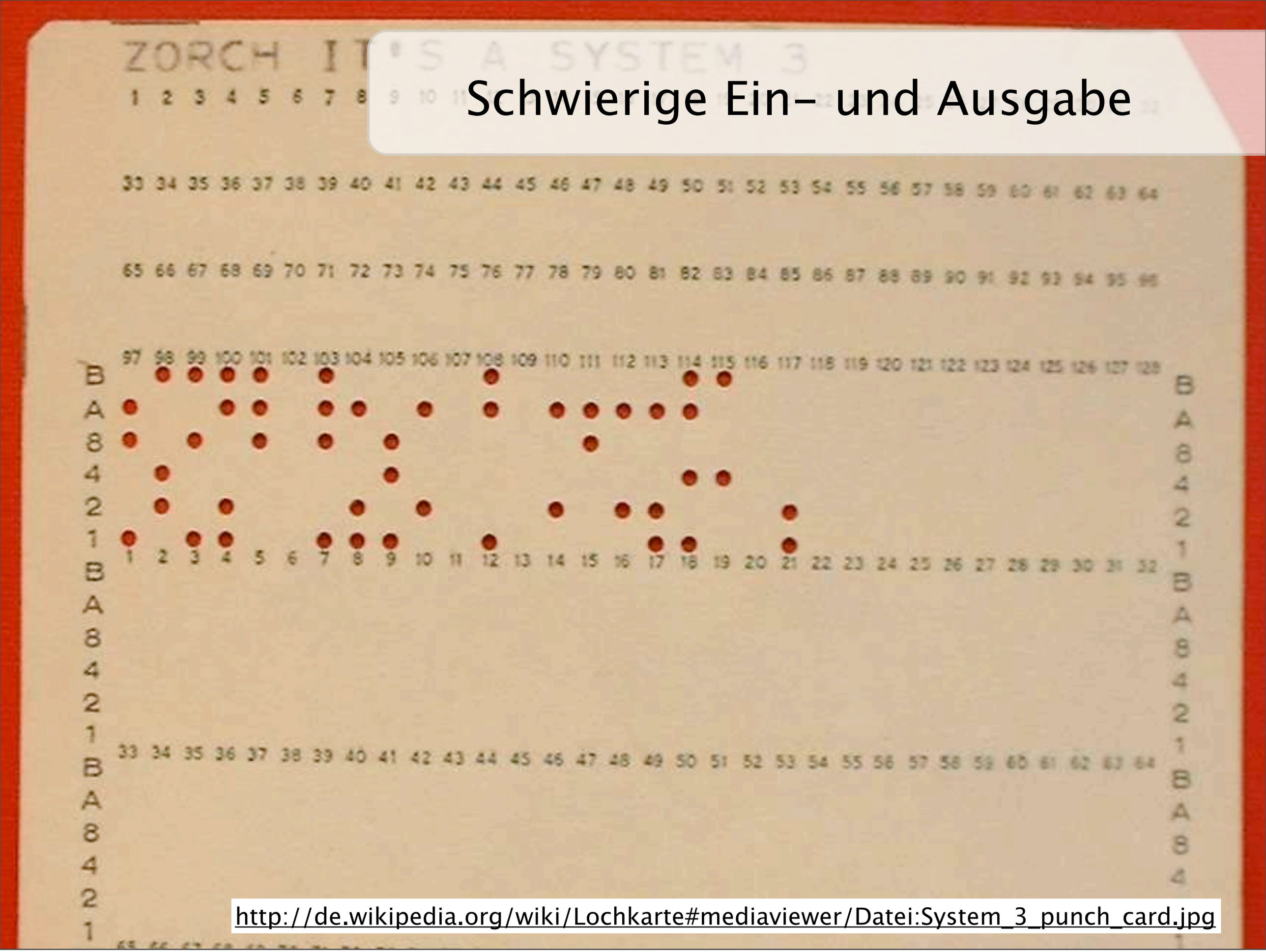
http://upload.wikimedia.org/wikipedia/commons/4/4e/Eniac.jpg

Der Computer für den Experten

- Der erste Universalrechner (1946)
- Oftmals von Frauen programmiert
  - Kabelverbindung von Komponenten
  - Drehschalter für Operationen (+, -,*,/)
- Ein- und Ausgabe?

http://upload.wikimedia.org/wikipedia/commons/4/4e/Eniac.jpg

Schwierige Ein- und Ausgabe



http://de.wikipedia.org/wiki/Lochkarte#mediaviewer/Datei:System_3_punch_card.jpg

Schwierige Ein- und Ausgabe

- Extra Kognitiver Schritt
- Lange Lernzeit
- Späte Fehlererkennung

http://de.wikipedia.org/wiki/Lochkarte#mediaviewer/Datei:System_3_punch_card.jpg

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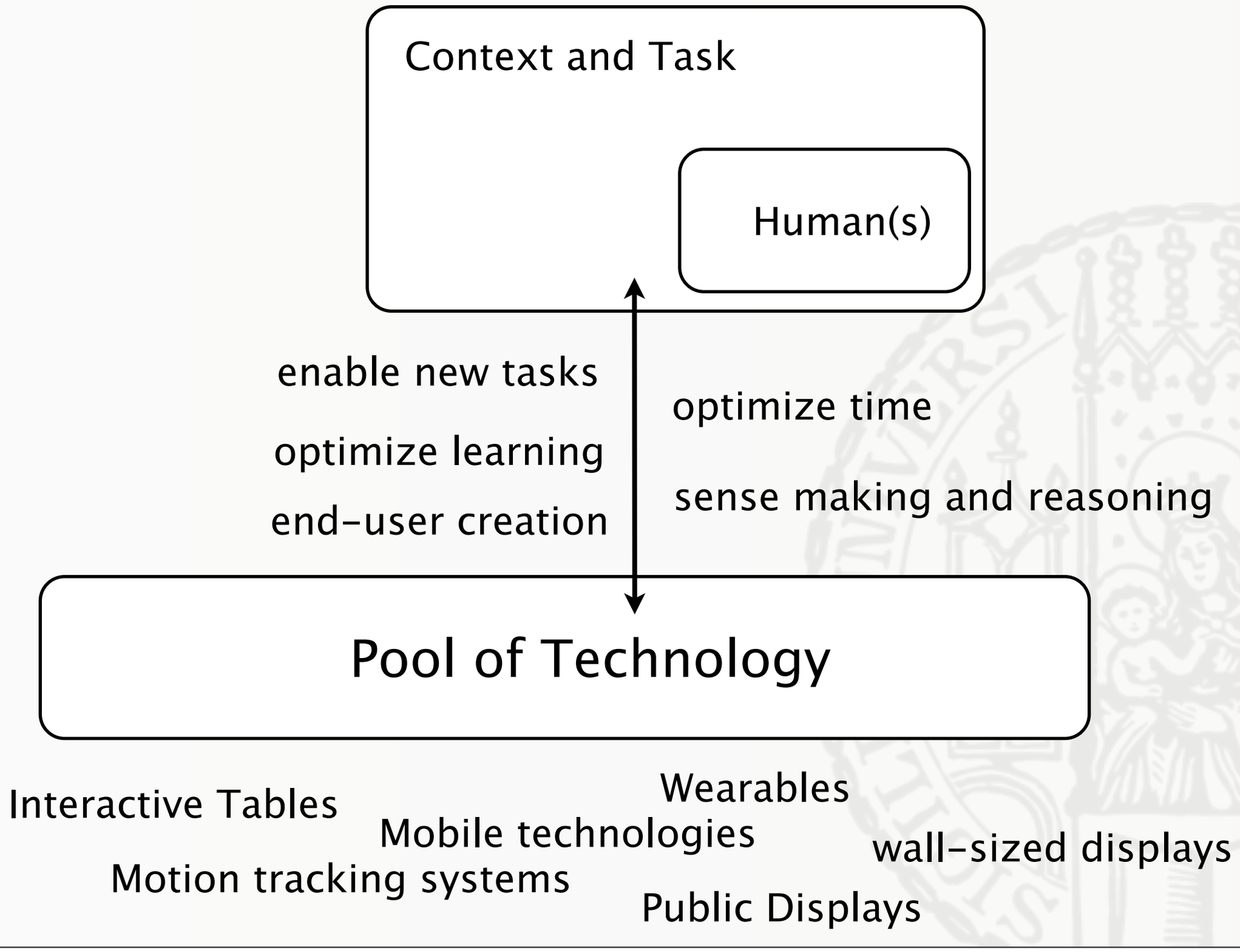
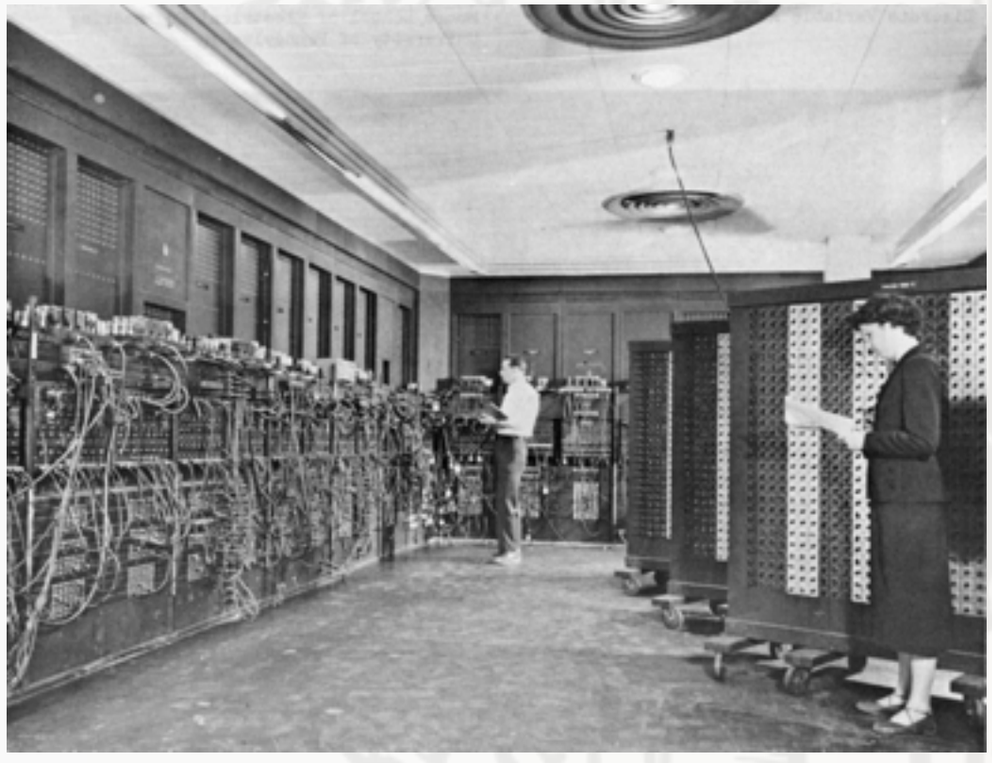


Human-Computer Interaction and Artificial Intelligence

- the computer as a tool
  - human in control vs. control take-over
- augment human capabilities vs. replace it

http://www.swmb.de/news/wp-content/uploads/2012/08/HUD.jpg



http://upload.wikimedia.org/wikipedia/commons/4/4e/Eniac.jpg

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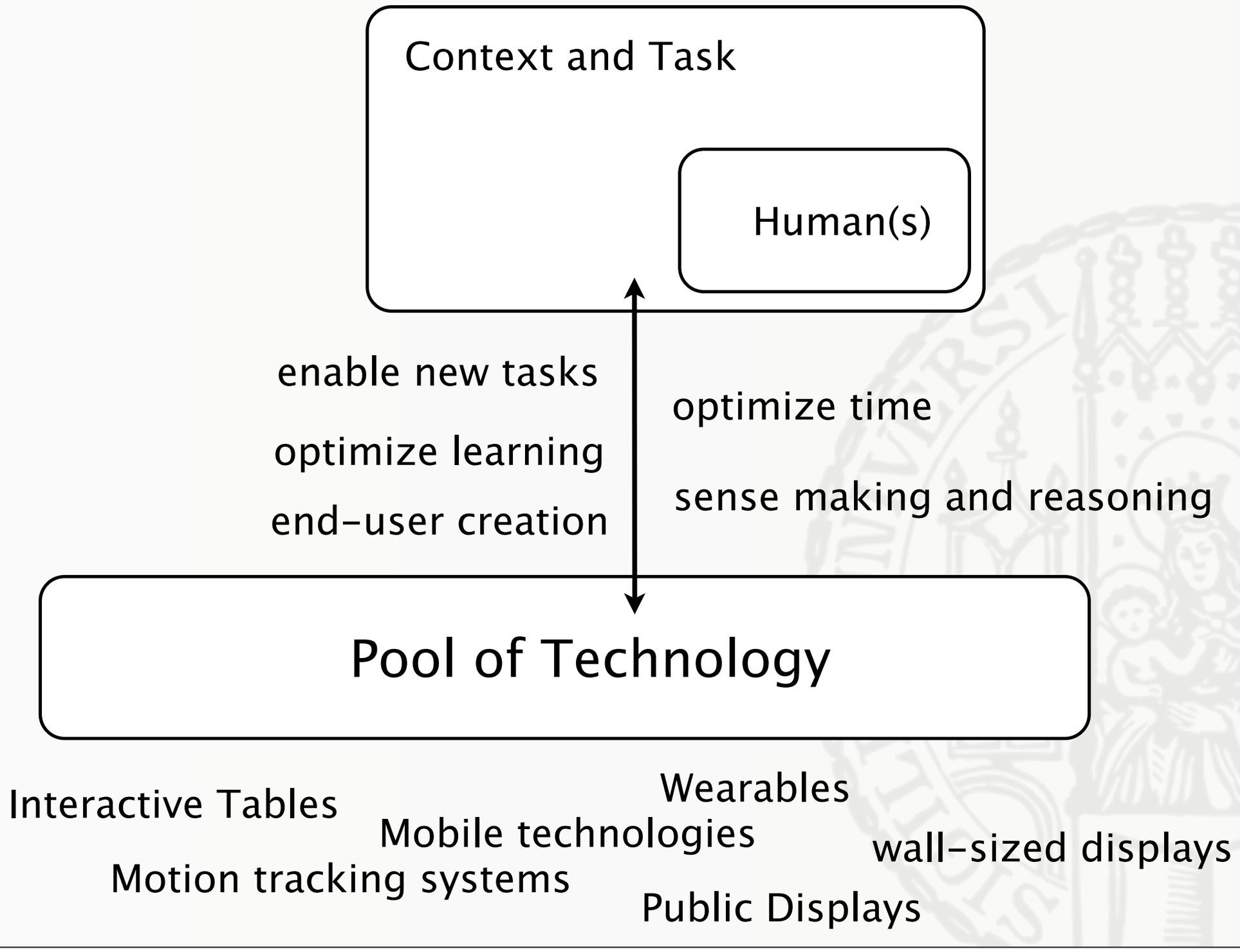
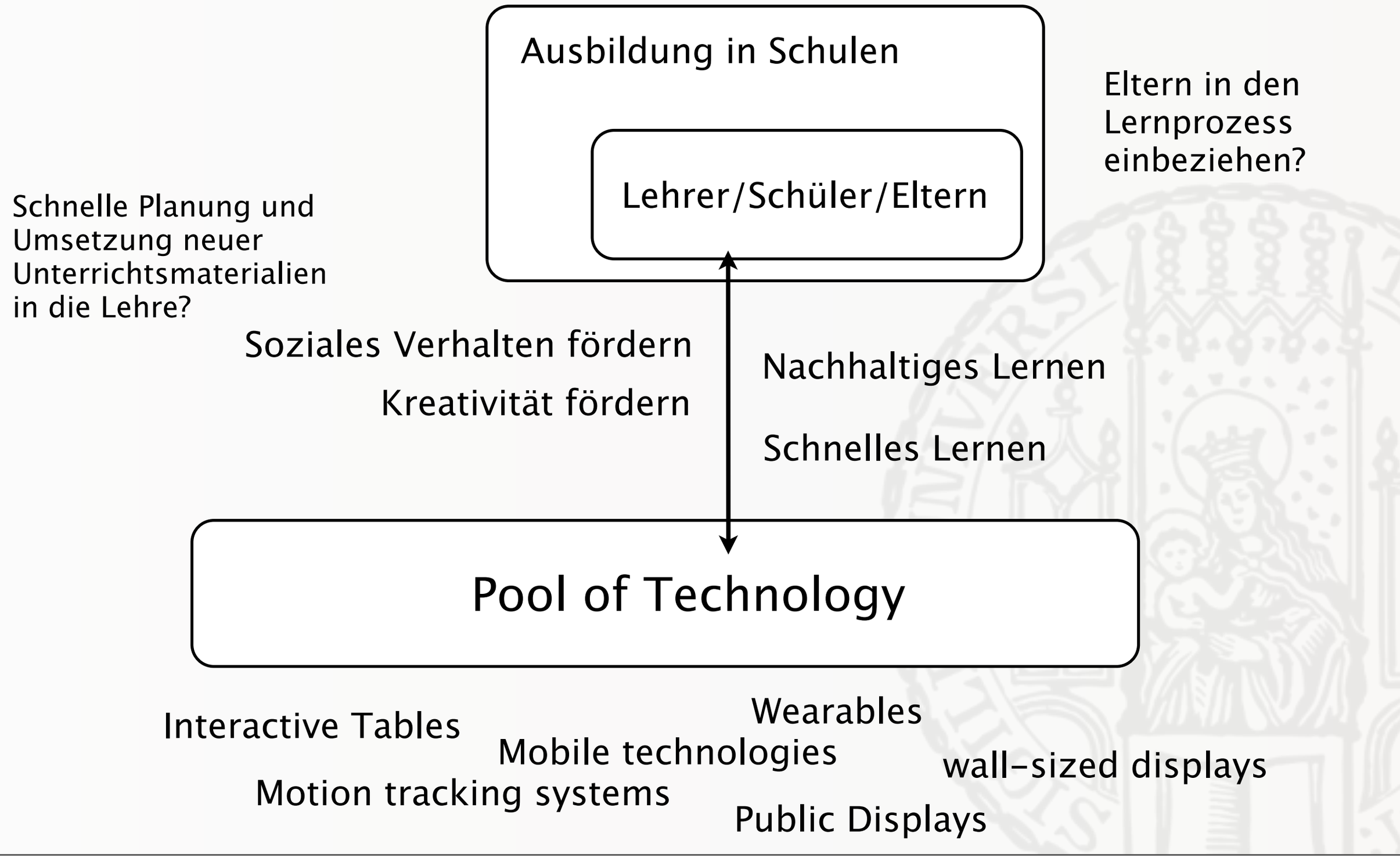


Was sind Ihre Ziele in der Lehre?



Was sind Ihre Ziele in der Lehre?

Ausbildung in Schulen

Lehrer/Schüler/Eltern

Eltern in den Lernprozess einbeziehen?

Schnelle Planung und Umsetzung neuer Unterrichtsmaterialien in die Lehre?

Soziales Verhalten fördern

Kreativität fördern

Nachhaltiges Lernen

Schnelles Lernen

Pool of Technology

Interactive Tables

Mobile technologies

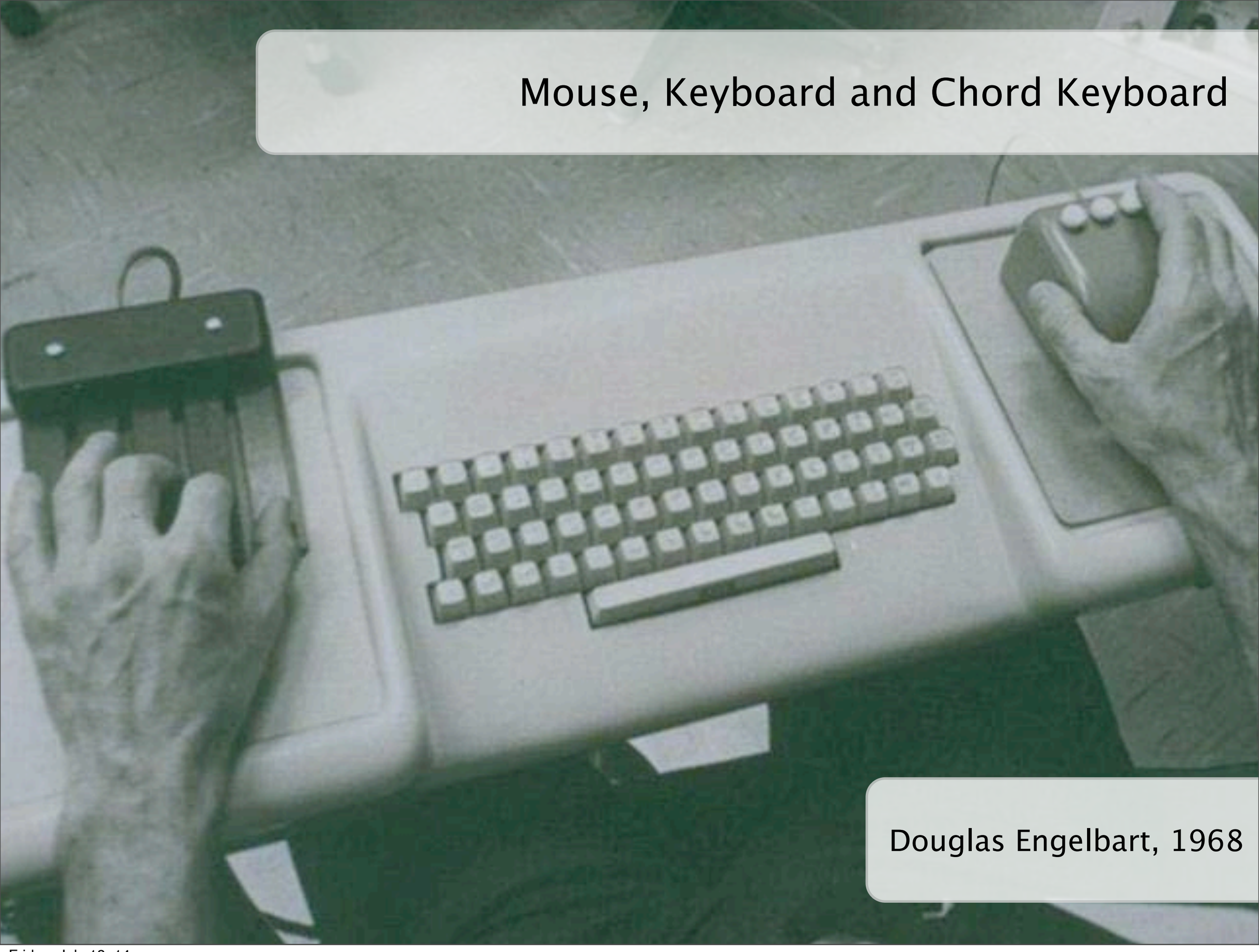
Wearables

wall-sized displays

Motion tracking systems

Public Displays

Mouse, Keyboard and Chord Keyboard



Douglas Engelbart, 1968

http://1.bp.blogspot.com/-XdNE9Vvondg/UM4gXAebTeI/AAAAAAAAAPQ/yeMvaza8Bbw/s320/parc_tab_hand_1.jpg

- Interaktive Boards
- Laptops
- Smart phones
- Tablets
- Internet

Weiser 1990: Ubiquitous Computing

Google glasses and augmented reality

http://www.tomsguide.com/us/google-glass,news-17711.html

1968, Ivan Sutherland

http://louislau91.files.wordpress.com/2013/06/sword_of_damocles.jpeg

Skinput: Bio-acoustic sensing device

https://www.youtube.com/watch?v=eK9GdNq4fnc

MYO, Thalmic Labs

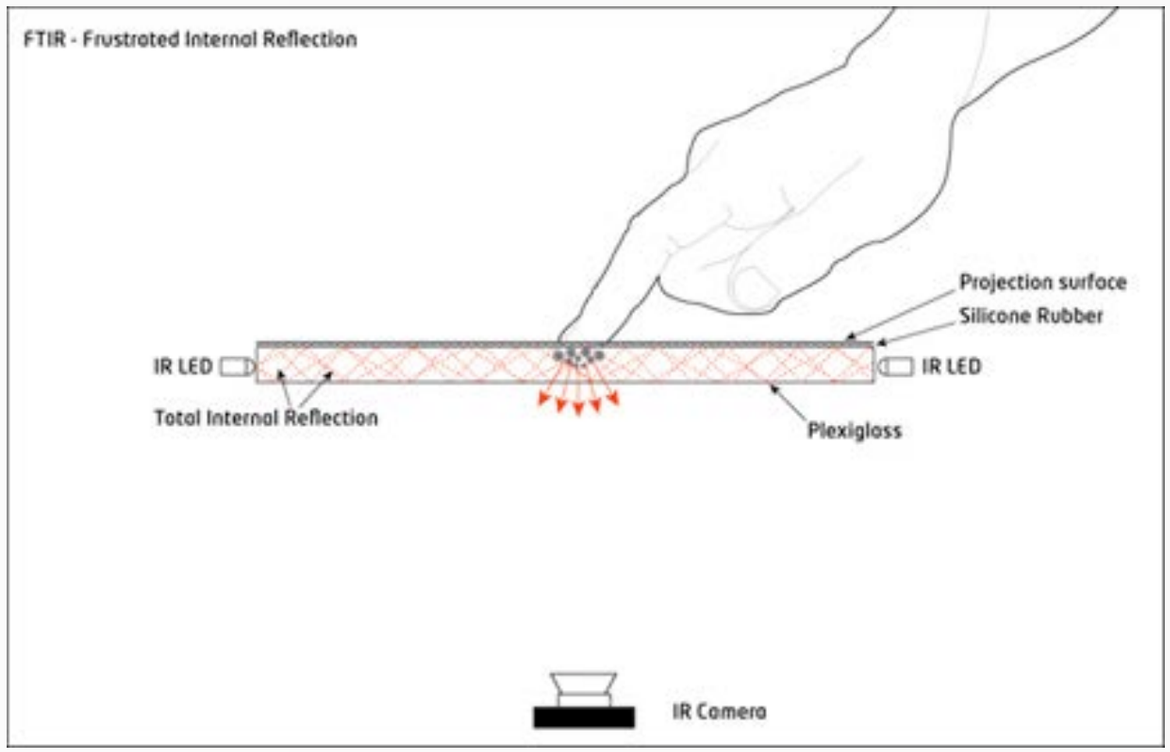
https://www.youtube.com/watch?v=oWu9TFJjHaM

Interaktive Tische

http://www.youtube.com/watch?v=5JcSu7h-I40

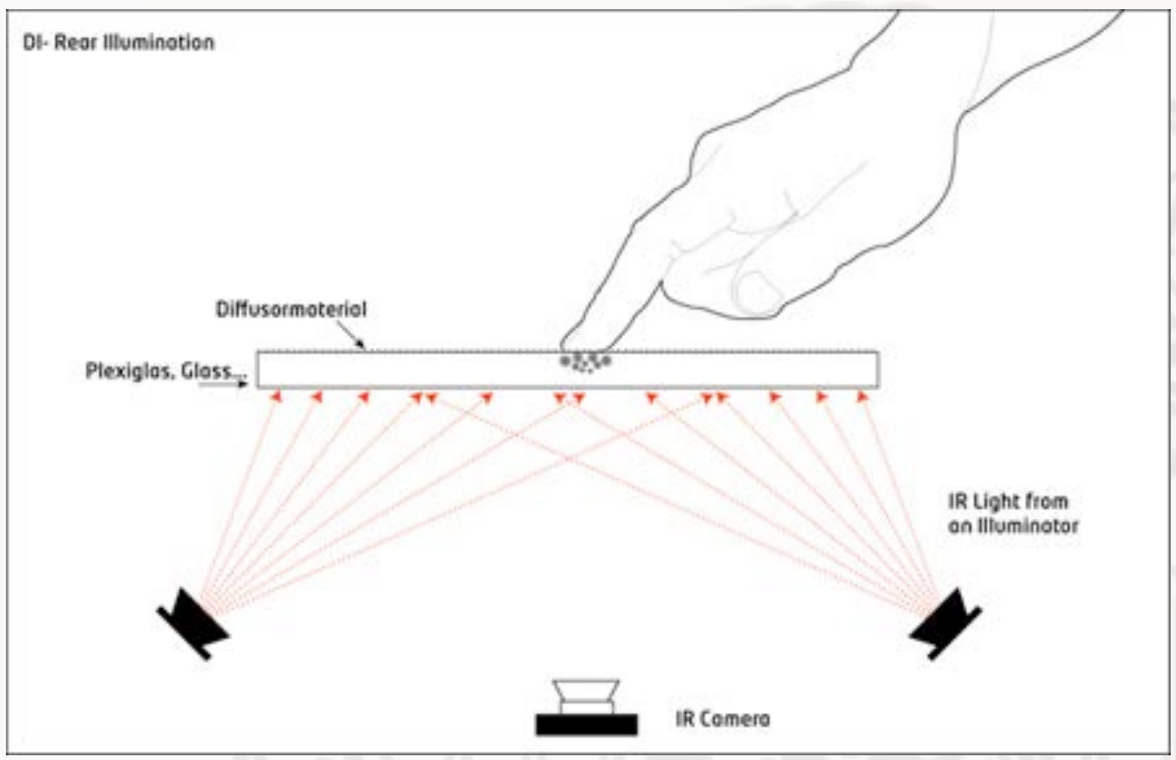
Interactive Tabletops

Frustrated Total Internal Reflection



http://wiki.nuigroup.com/images/f/f7/Ftir.jpg

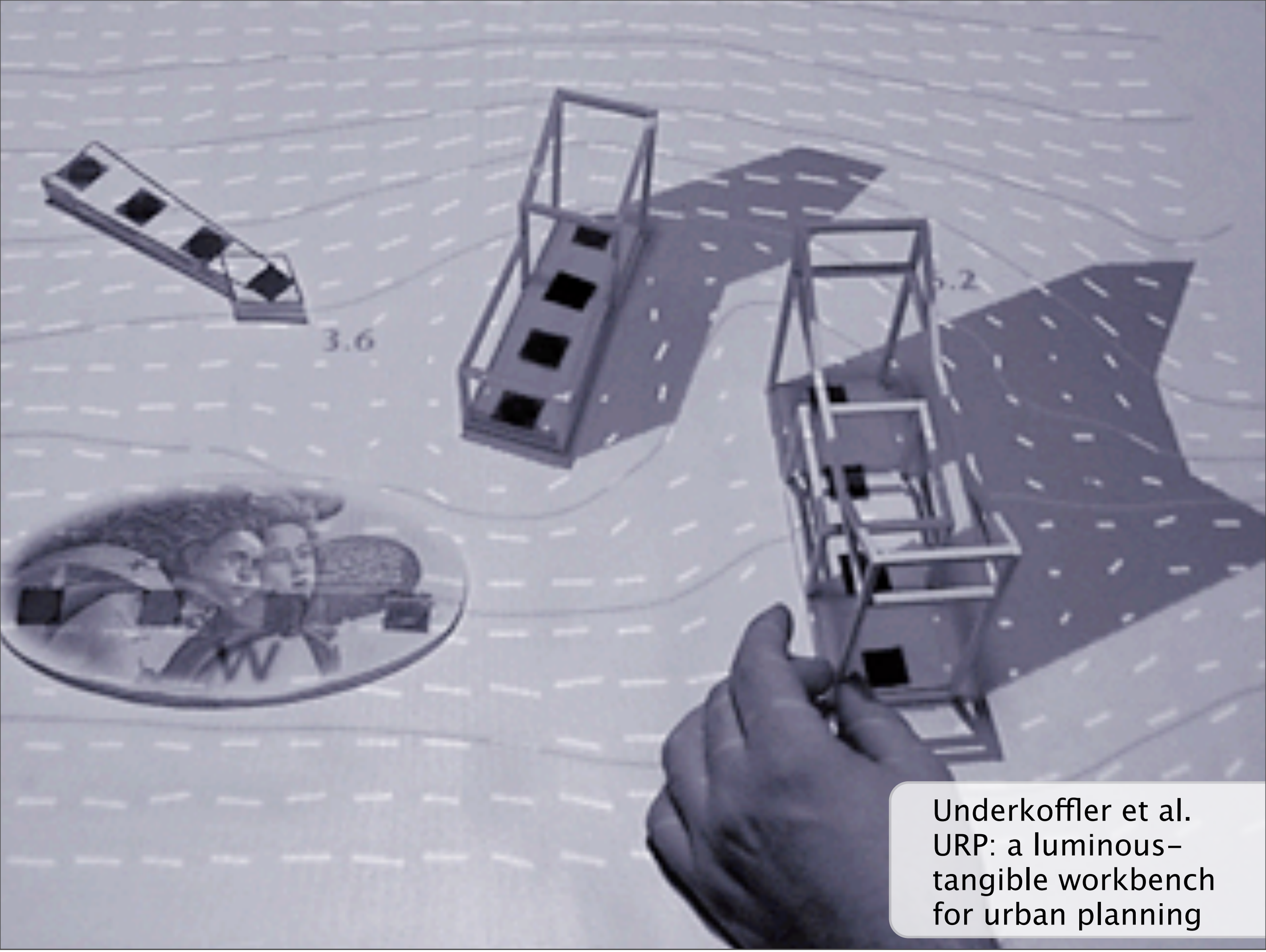
Diffused Illumination



http://wiki.nuigroup.com/images/a/a0/Rearditouch.jpg

SLAP Widgets

http://www.youtube.com/watch?v=I2rDHUUkd5Y


3.6
Underkoffler et al.
URP: a luminous-
tangible workbench
for urban planning

Urp

http://vimeo.com/48600713

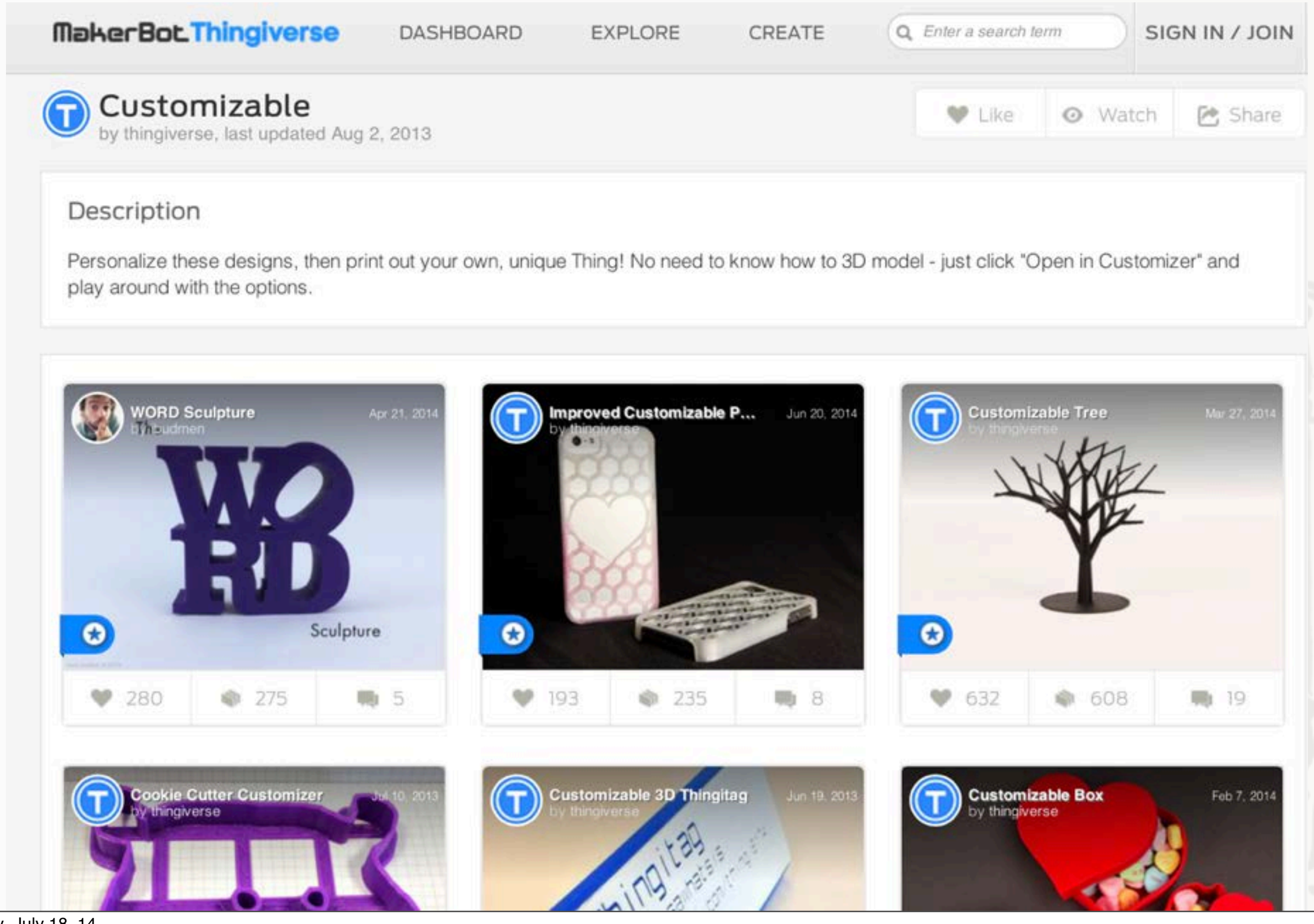
ZeroN - Levitated Interaction Element

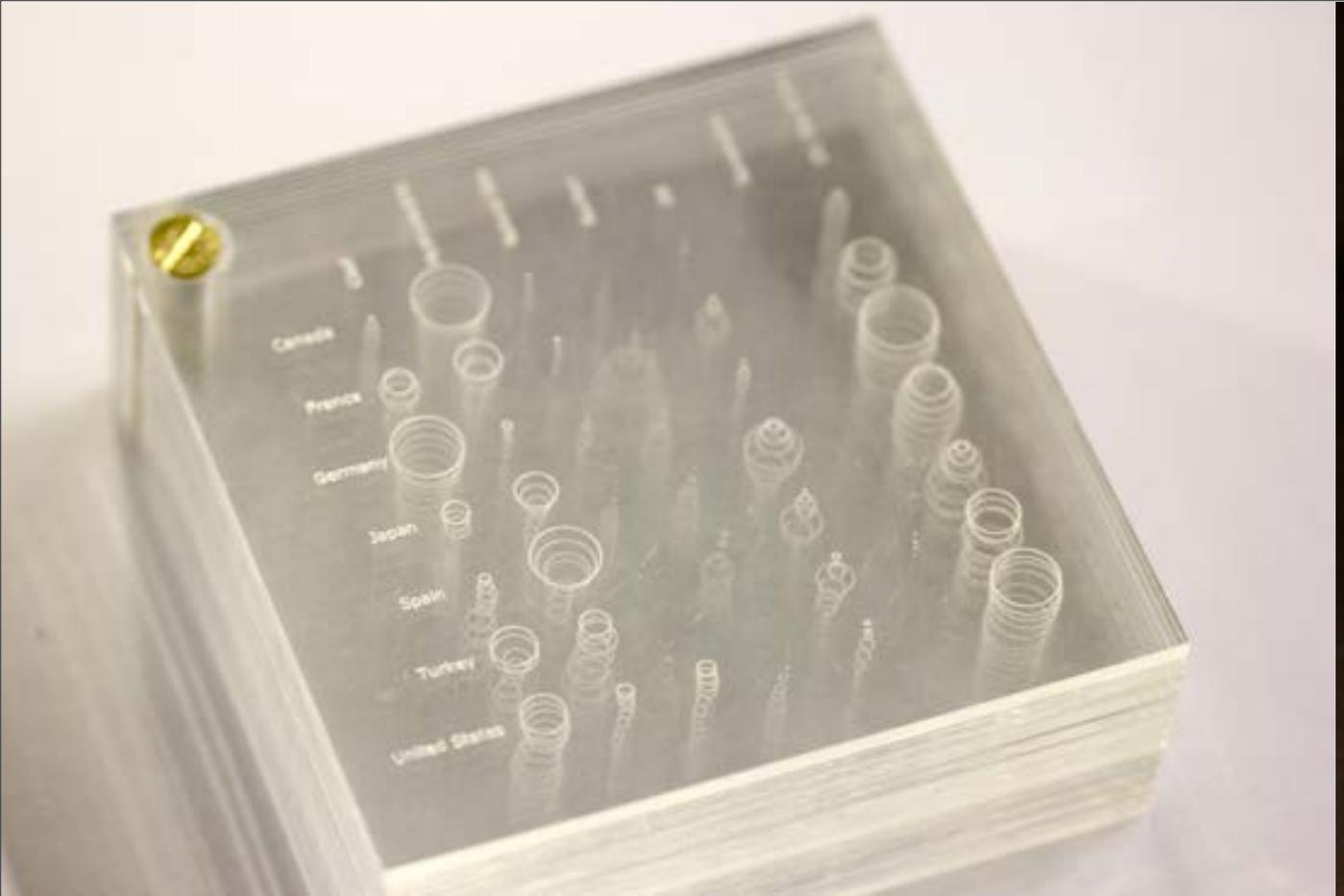
http://vimeo.com/41796732

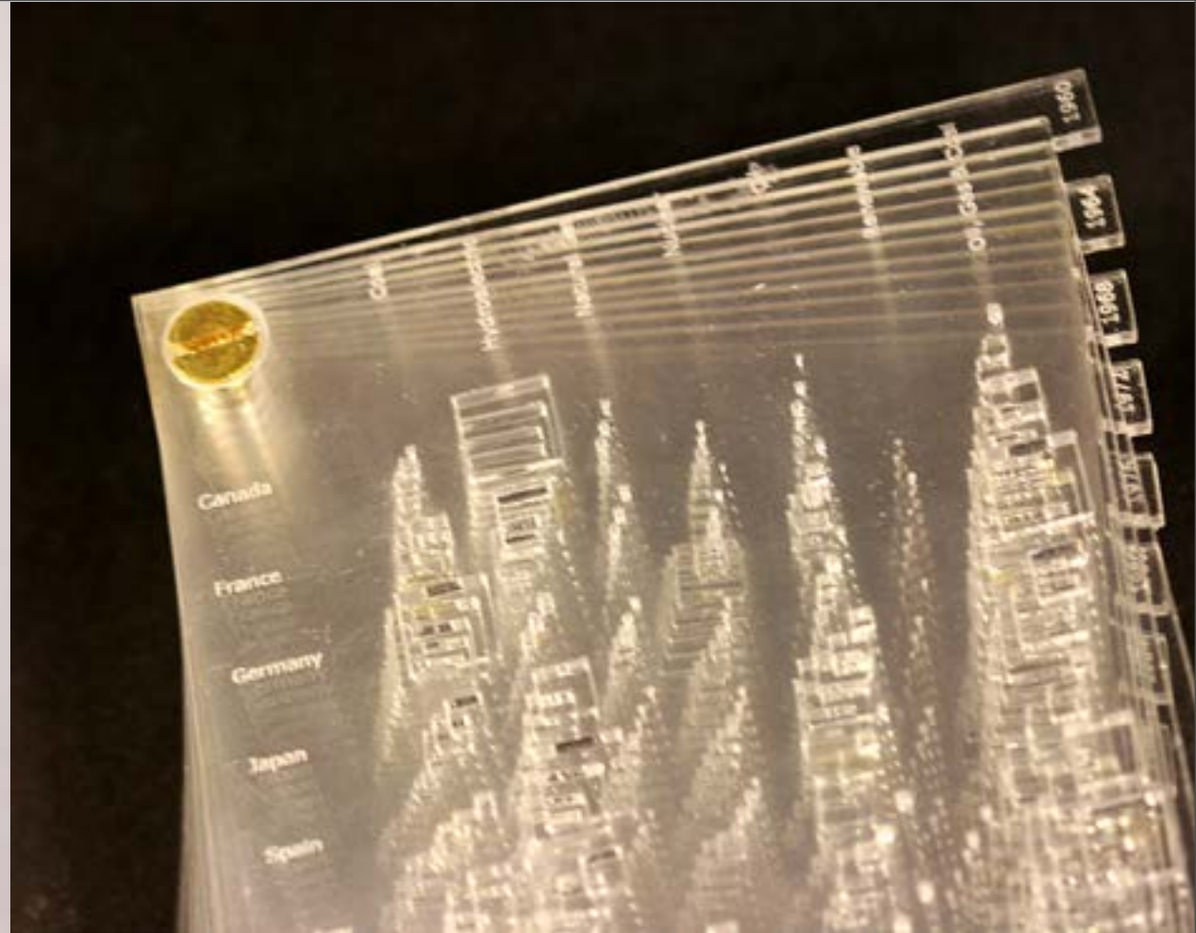
Fab Lab Movement

- space for everyone to create and share
- started at MIT

Download Physical Objects




Canada
France
Germany
Japan
Spain
Turkey
United States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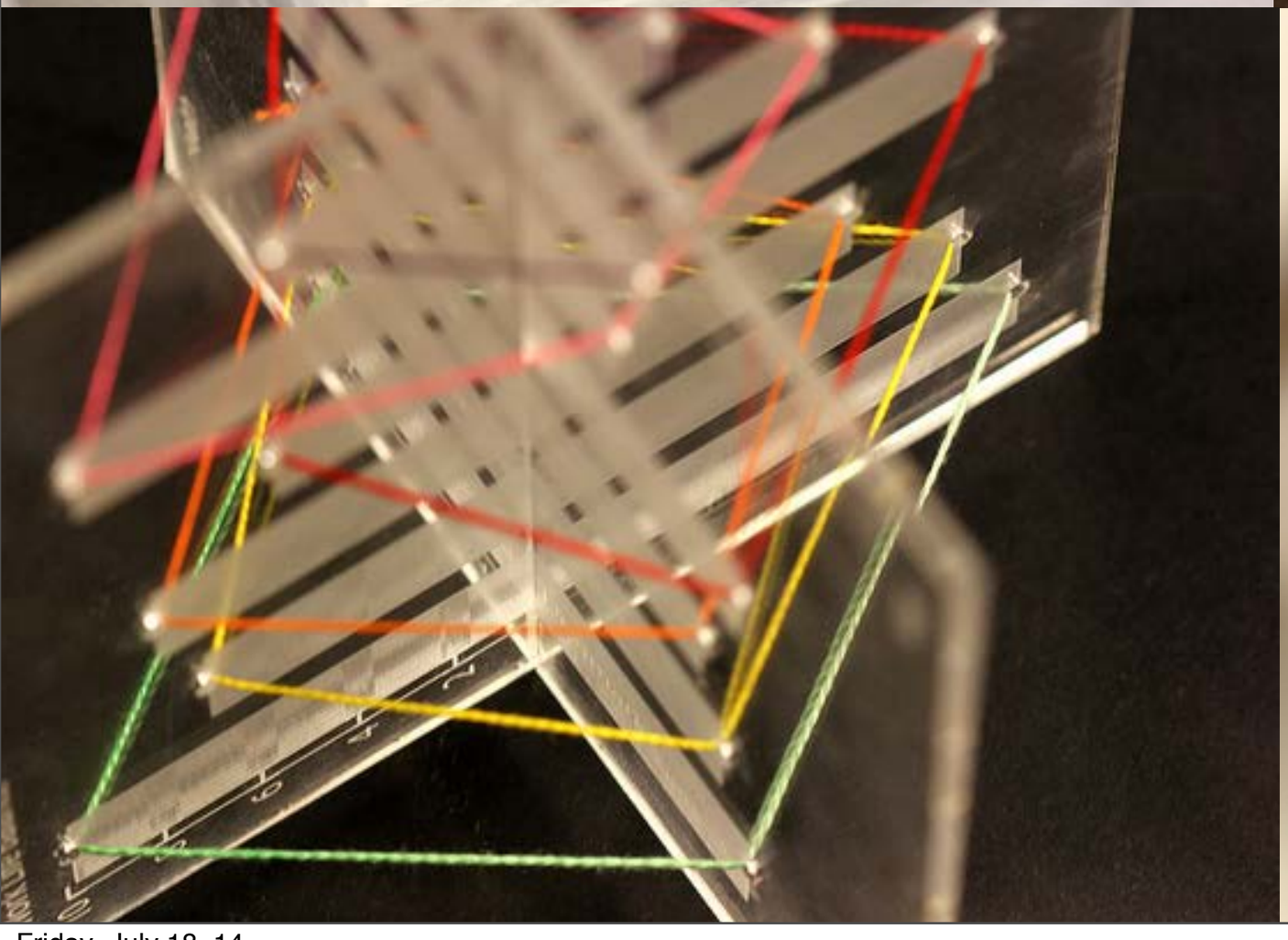
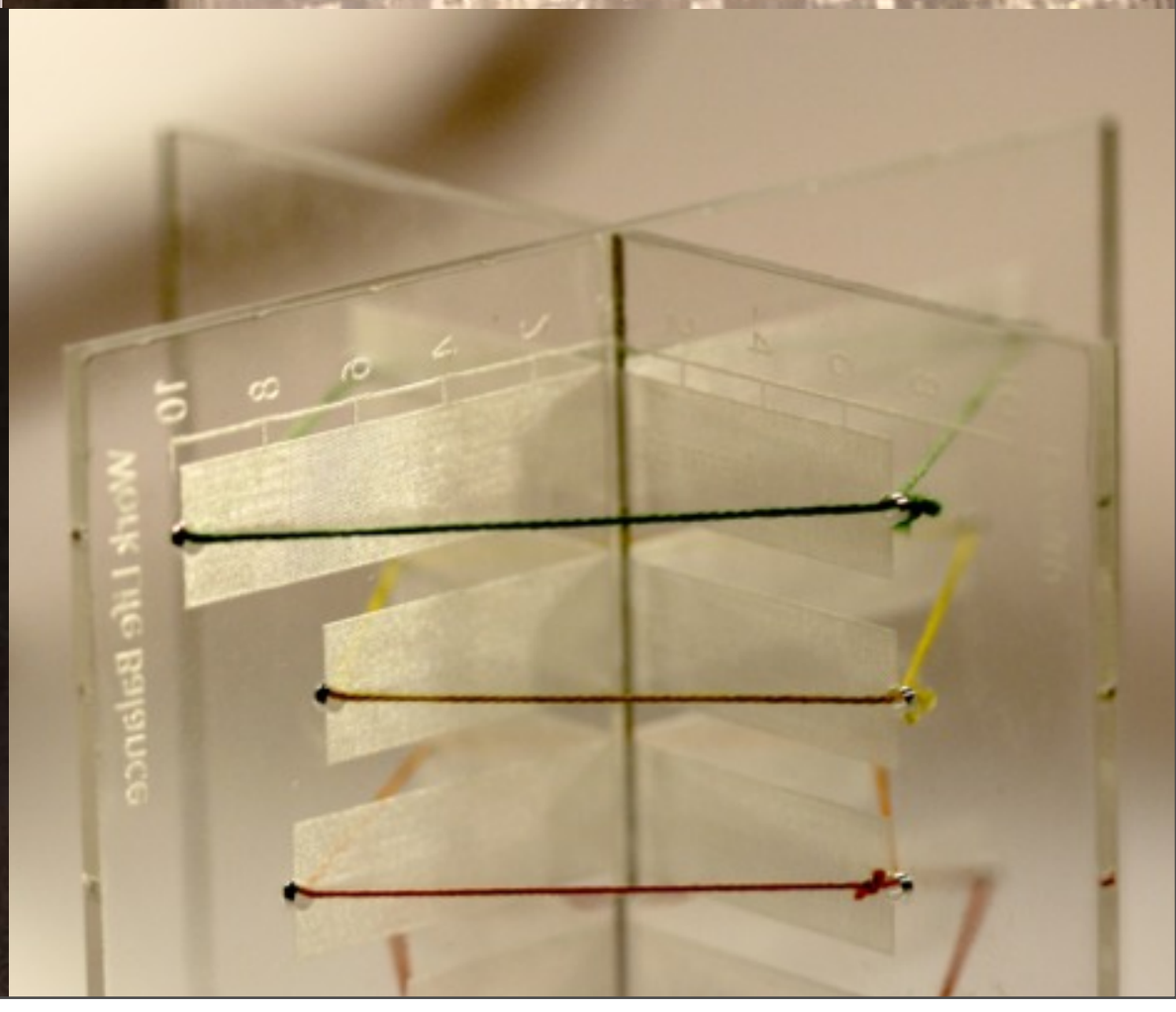
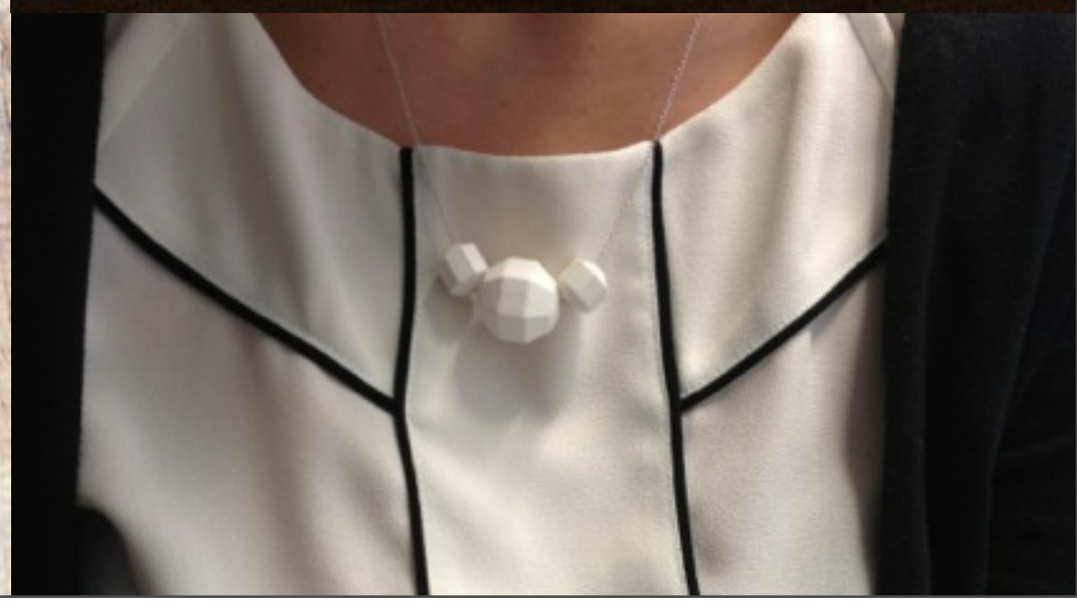



Work Life Balance

- Endomondo-daten
- Sport Training
- Gruppendynamik



Shapeshifting Displays

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Public Displays

http://labs.sifteo.com

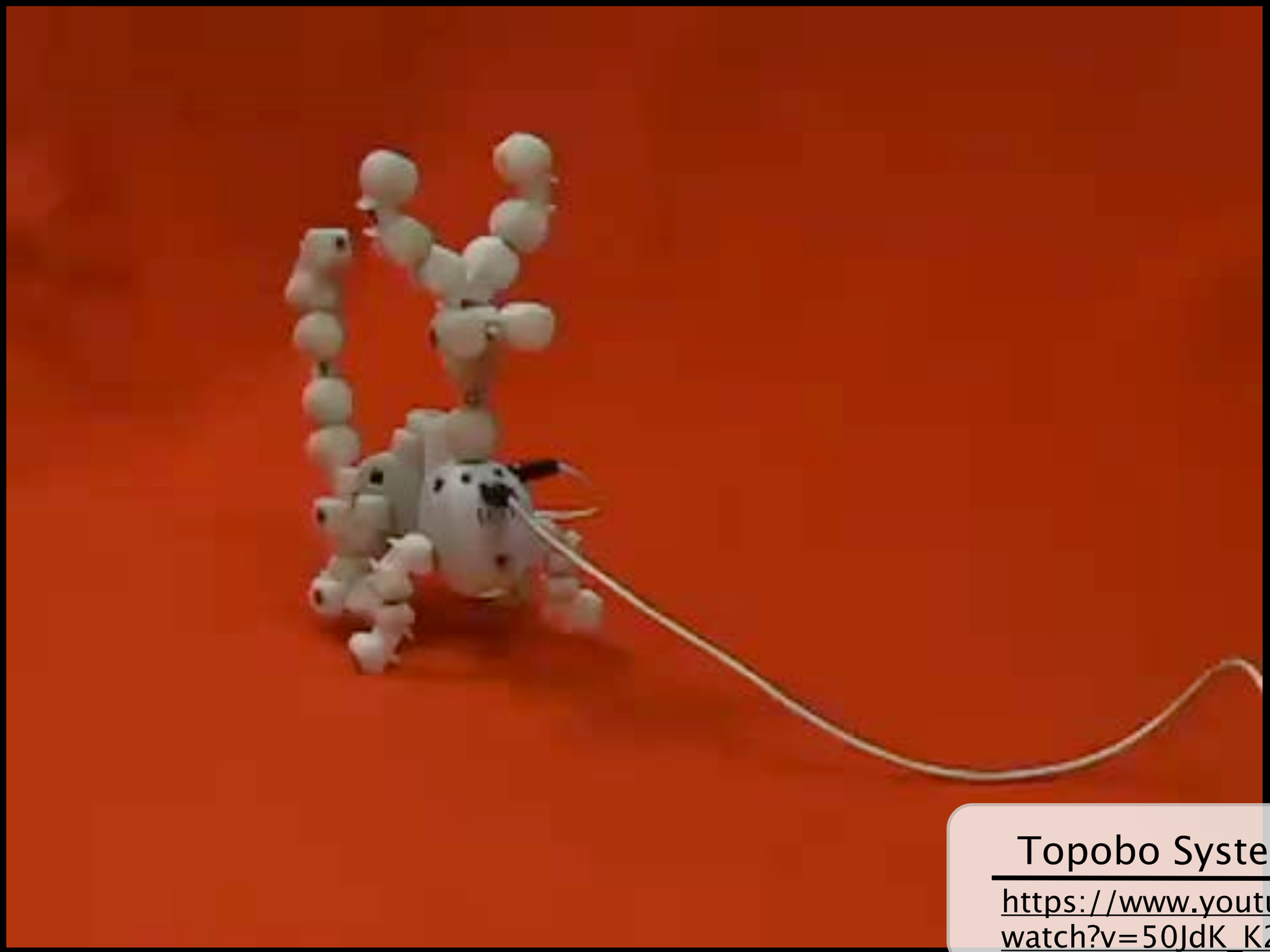
- “Learning by Exploration”
- “Programming by Demonstration”
- für den Mensch verständliche Aufbereitung von Informationen (Informationsvisualisierung)

Learning by Exploration

Sifteo

https://www.youtube.com/watch?v=rNZ1pNeBCRI

Programming by Demonstration

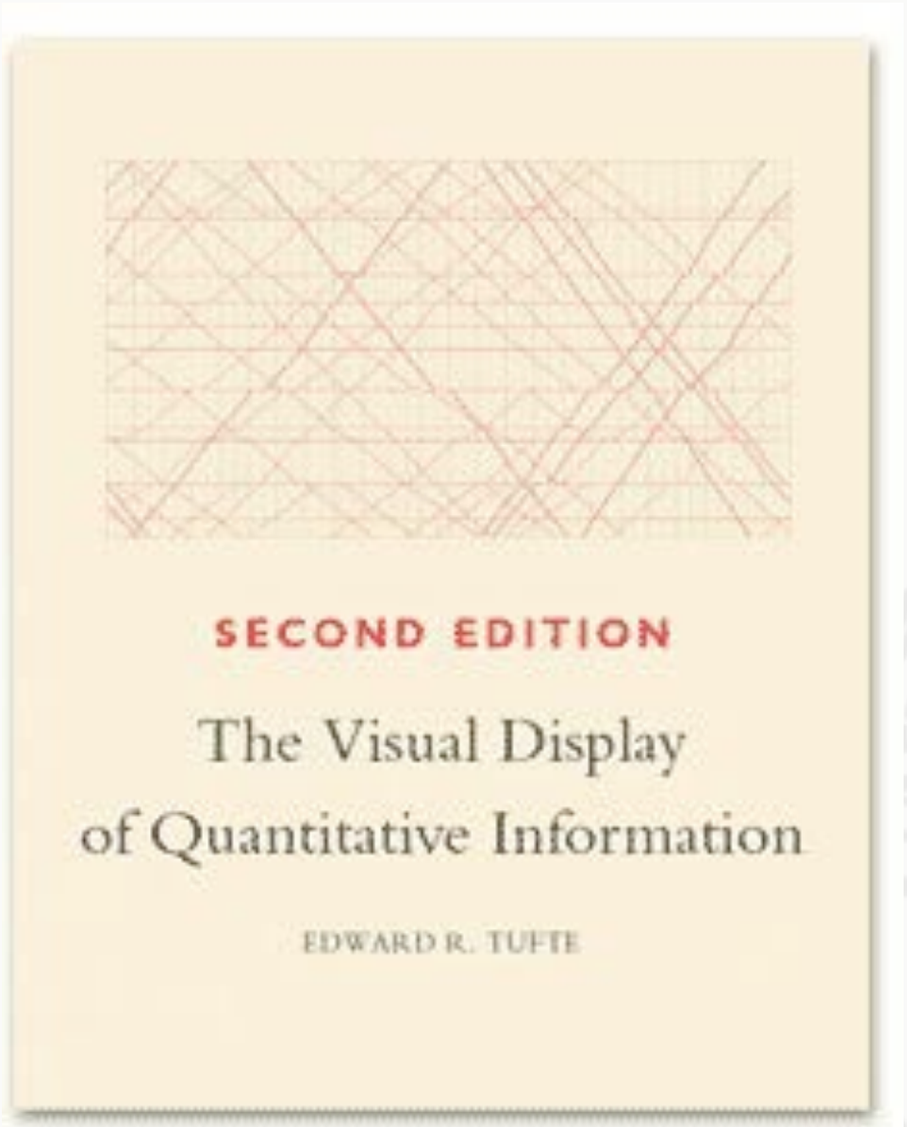


Topobo System

https://www.youtube.com/watch?v=50JdK_K2NWk

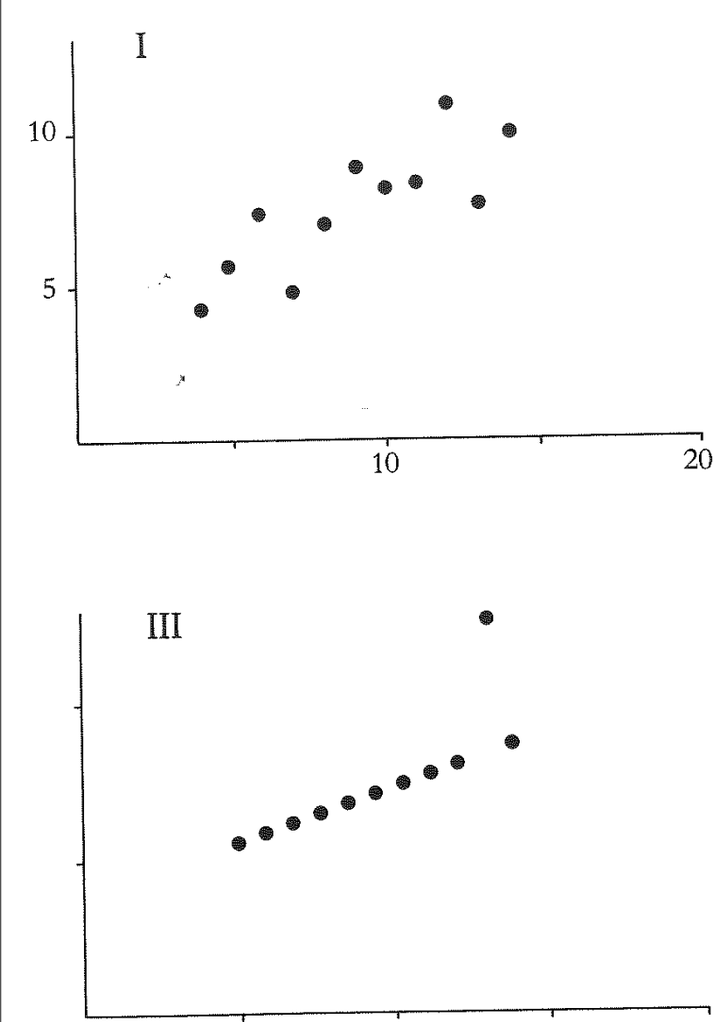
Information Visualization

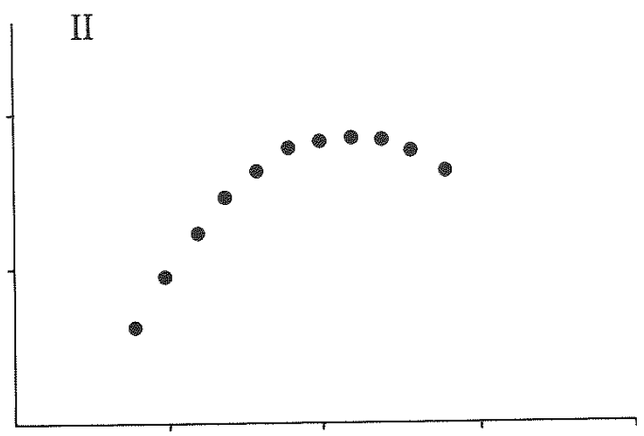
- Edward Tufte

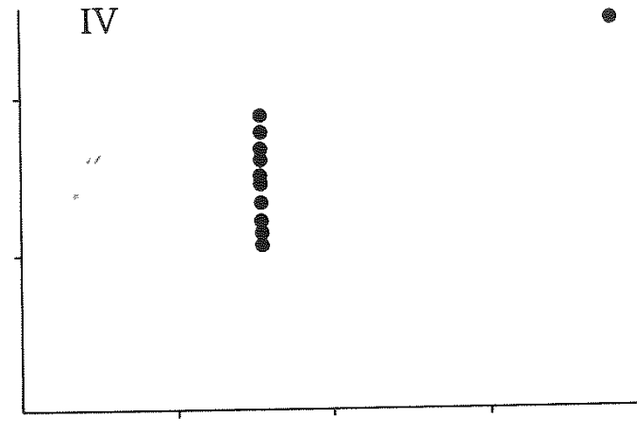


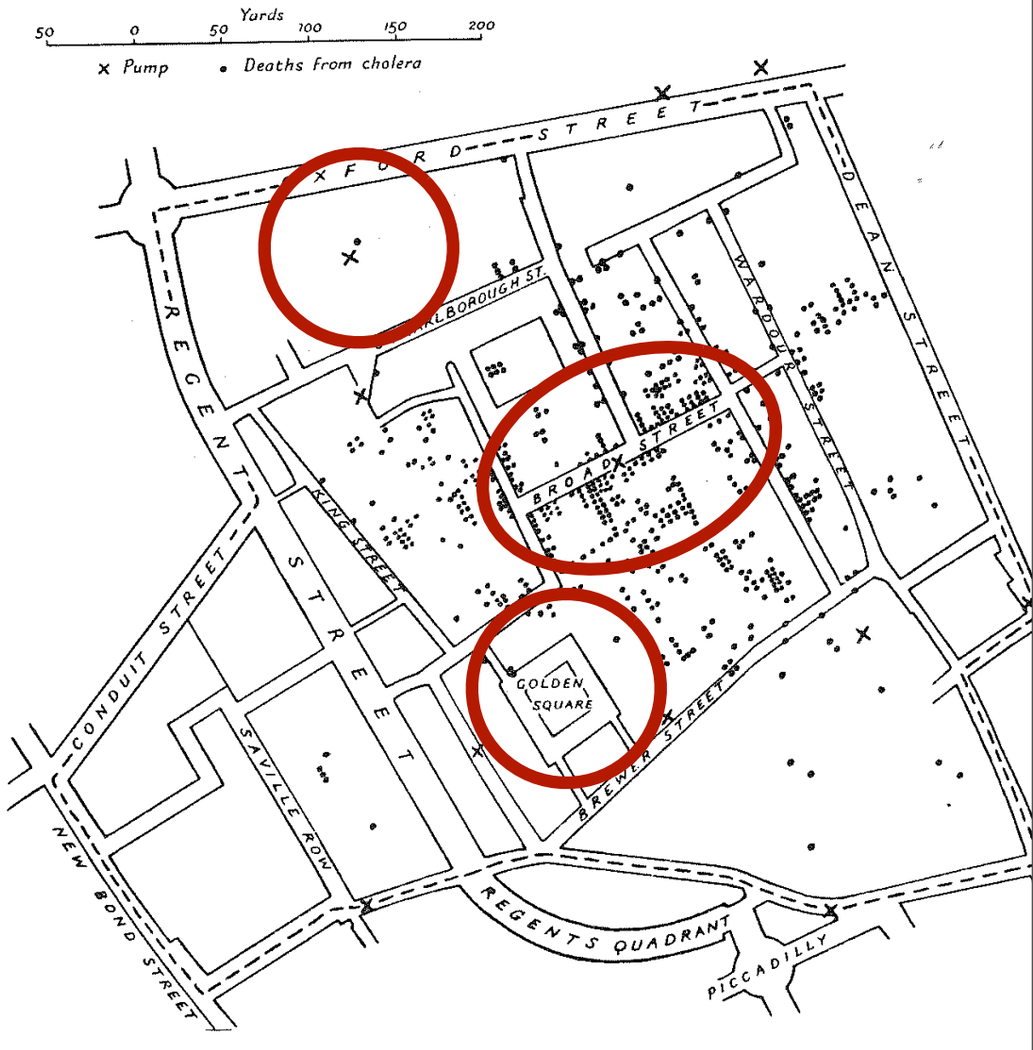
I		II		III		IV	
X	Y	X	Y	X	Y	X	Y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

N = 11
mean of X's = 9.0
mean of Y's = 7.5
equation of regression line: $Y = 3 + 0.5X$
standard error of estimate of slope = 0.118
t = 4.24
sum of squares $X - \overline{X} = 110.0$
regression sum of squares = 27.50
residual sum of squares of Y = 13.75
correlation coefficient = .82
$r^2 = .67$









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Was ist Mensch-Machine Interaktion?

- interdisziplinär arbeiten
- user-centered design
- participatory design strategies
- prototyping and testing with users
  - –Feld-Studien
  - –Kontrollierte Experimente

http://randydeutsch.files.wordpress.com/2013/11/

The WILD Room

http://insitu.lri.fr/Projects/WILD

WILD: Wall-sized interaction with large datasets

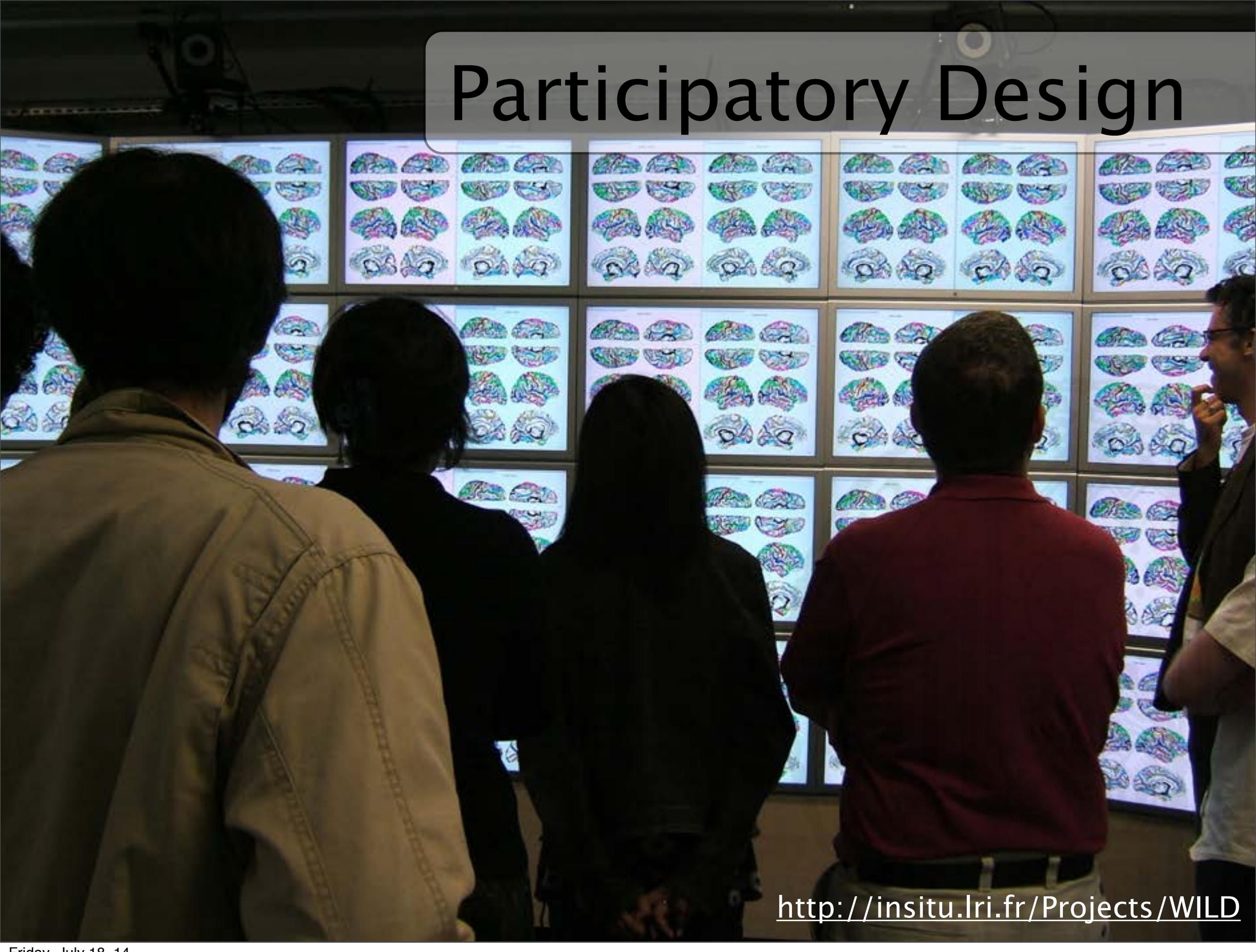
- 5.5m breit x 1.8m hoch
- 32 30-zoll displays in einer 8 x 4 Matrix
- 131 million pixel
- cluster von 16 computer
- 3D motion capture system

WILD: Wall-sized interaction with large datasets

Participatory Design

http://insitu.lri.fr/Projects/WILD

Participatory Design



http://insitu.lri.fr/Projects/WILD

Participatory Design

http://insitu.lri.fr/Projects/WILD

Outcome

http://insitu.lri.fr/Projects/WILD

Multisurface Interaction in the WILD room

Video supplement

IEEE Computer, April 2012

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Was ist Mensch-Machine Interaktion?

- interdisziplinäres Feld
  - neue Technologien
  - User, Task und Kontext verstehen
  - designing interaction techniques

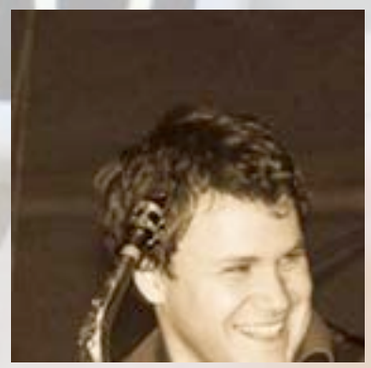
Einige Ziele...

- easy preparation of teaching material
- improved learning for kids/young adults
  - engaging presentation of information
  - interactive exploration of knowledge

How will teaching and learning in schools look like in 2030?

“The future cannot be predicted, but futures can be invented”
(Alan Kay)

How will teaching and learning will look like in 2030?



Simon Stusak

Dr. Julie Wagner

Prof. Andreas Butz

Let’s find out!

julie.wagner@lmu.de