Wisdom is not the product of schooling but the lifelong attempt to acquire it.
- Albert Einstein

Transcending the Unaided, Individual Human Mind
—
Understanding, Fostering, and Supporting Cultures of Participation

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Acknowledgements

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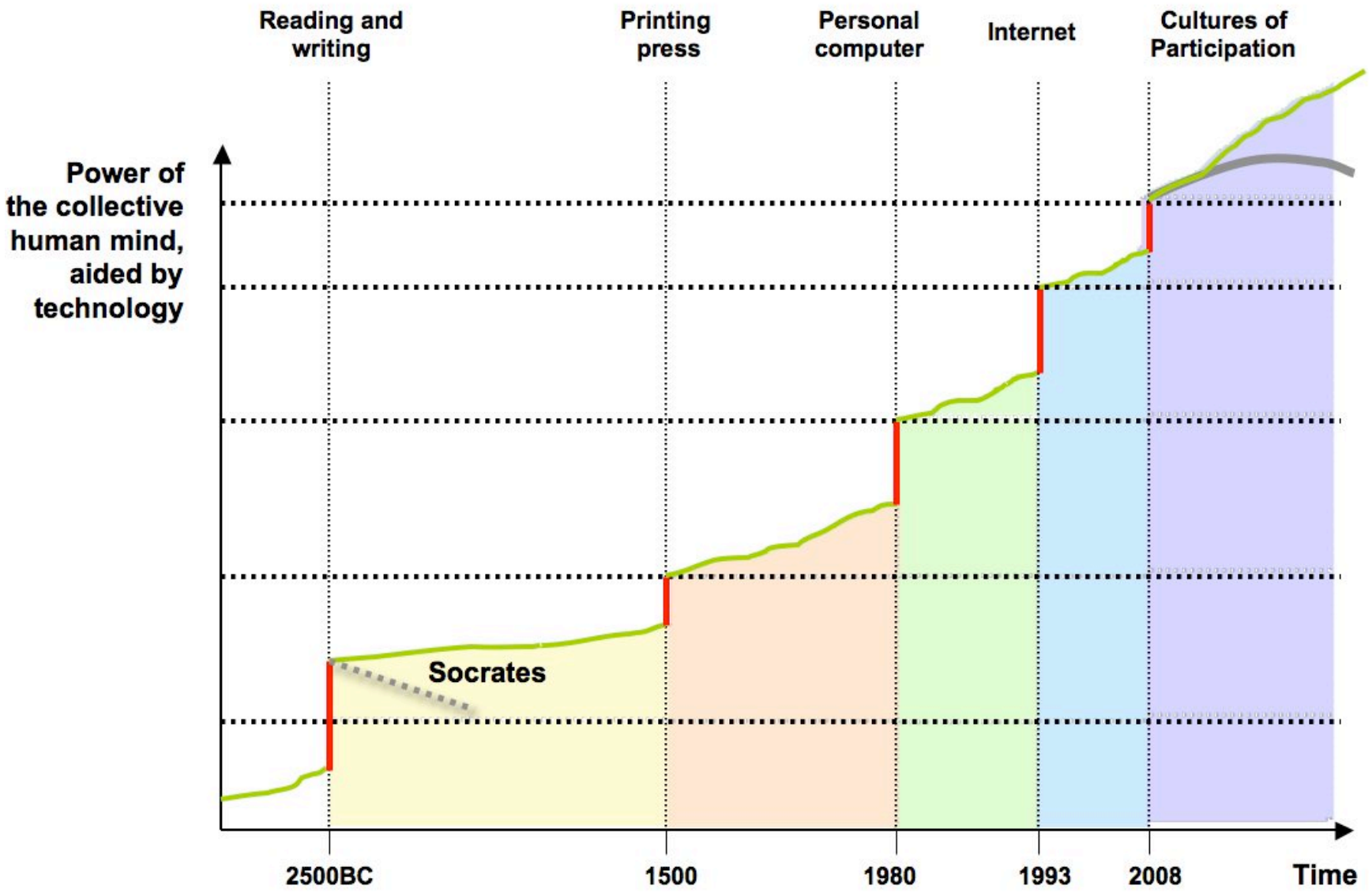
- my **friends and colleagues in Scandinavia** (too many to name them all) from whom I have learnt many things over the last two decades

Outline

- **Basic Message**
- **Context: "Building Bridges"**
- **A Framework for Cultures of Participation**
- **Examples:**
  - Distributed Intelligence
  - Meta-Design
  - Social Creativity
- **Research Challenges**
- **Implications and Conclusions**

Basic Message: Beyond the Unaided, Individual Human Mind



Using Bridges

Building Bridges

"Bridge to Nowhere"

<<1.5 Mio Hits on Google, YouTube Movies, Wikipedia entry>>

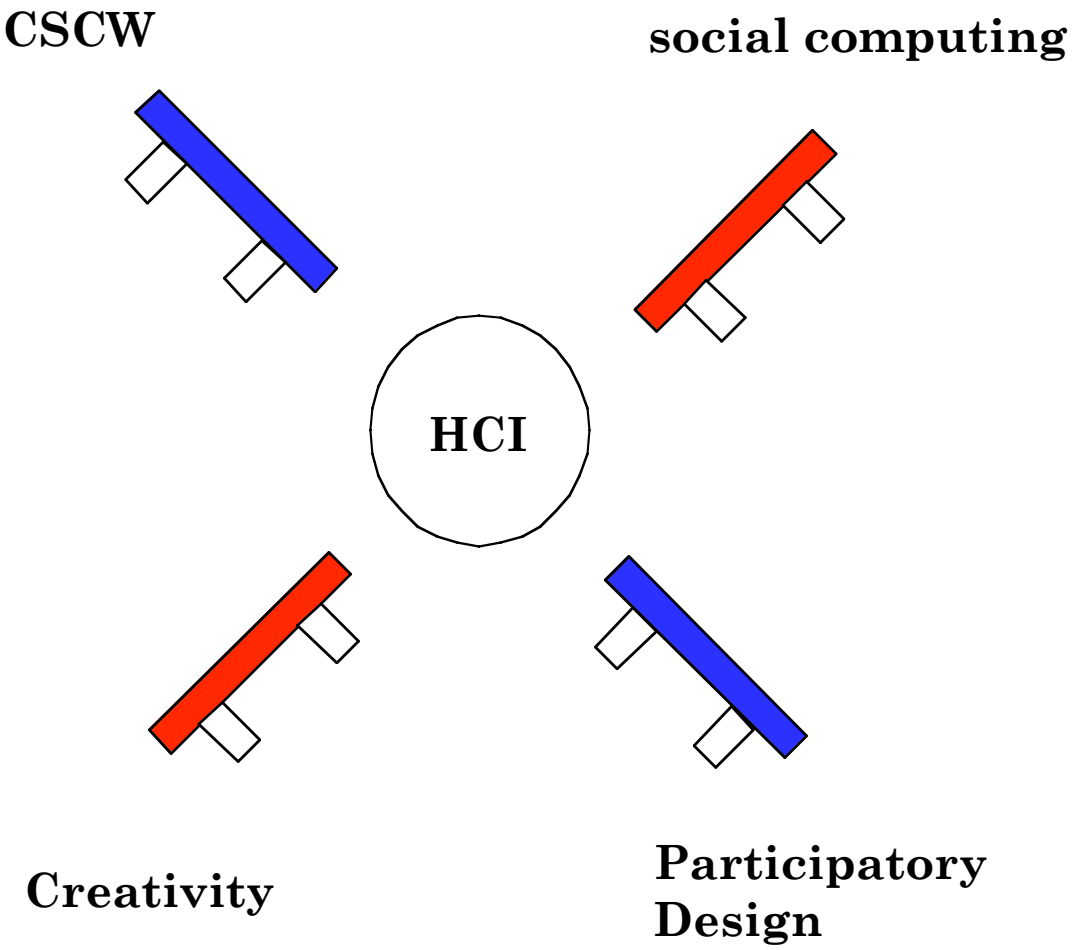
- **controversy**: a proposed bridge to replace the ferry that currently connects Ketchikan, Alaska, to the Gravina Island's 50 residents, and the Ketchikan International Airport

- **projected cost:** $398 million

- Alaskan congressional delegation helped push for **federal funding**

- fierce opposition outside of Alaska → symbol of **pork barrel spending**

Using and Building Bridges



Using and Building Bridges: Some of my Personal Efforts

- **transdisciplinary collaboration**
  - **with**: architects, urban planners, psychologists, educators, researchers and practitioners from the creative practices and from assistive technologies
  - **why:** "reality is not user-friendly" → real world problems do not fall into existing disciplines or existing organizational units

- **multi-sector:** academia, industry, and non-governmental organization (NGO)

- **mediation between HCI and a spectrum of related fields:** AI, Software Engineering, Design of Interactive Systems, Participatory Design, CSCL, CSCW, Creativity, ….

- **integration** of European and American research traditions

The Scandinavian Impact on HCI (and me)

unique contributions beyond the American Imperialism in HCI via CHI

- **Computers in Context**
  - movie from California Newsreel, 1987 (application areas: banking, newspaper graphic design, and jet aircraft maintenance) → **empowering users rather than deskilling them**
  - book "Computers and Design in Context" (eds: Morten Kyng and Lars Mathiassen), 1997 → **designers and users should join forces in the design of computer systems**
  - **Aarhus Conferences** (in ten years intervals)

- **Design at Work** (Greenbaum, J., & Kyng, M. (Eds.) (1991): *"Design at Work: Cooperative Design of Computer Systems"*)
  - *"System development is difficult not because of the complexity of technical problems, but because of the social interaction when users and system developers learn to create, develop and express their ideas and visions"*
  - Henderson, A., & Kyng, M. (1991) *"There's No Place Like Home: Continuing Design in Use"* → **inspiration for our work on meta-design**

The Scandinavian Impact on HCI (and me)

- **Participatory Design (PD):**
  - **using and building bridges** between designers and users
  - negotiation + co-creation + boundary objects + reciprocal learning
  - 1990: first PD conference in association with CHI in Seattle

- **Digital Bauhaus** (Ehn, P. (1998) "Manifesto for a Digital Bauhaus," Digital Creativity")
  - **using and building bridges** between art and science and creative practices and information technologies
  - create socio-technical environments enabling interactions between different cultures (including the two cultures of art and science)
  - panel at NordiCHI'2008 on Wednesday

Frameworks for Effective, Large Scale, Distributed, Collaborative Efforts

- **social production** → Benkler, Y. (2006) "*The Wealth of Networks: How Social Production Transforms Markets and Freedom"*

- **democratizing innovation** → von Hippel, E. (2005) "*Democratizing Innovation"*

- **mass collaboration** → Tapscott, D and Williams, A. (2006): *"Wikinomics: How Mass Collaboration Changes Everything"*

Transcending the Unaided, Individual Human Mind

—

Distributed Intelligence (or Distributed Cognition)

- **claim***:* distributed intelligence
  - **combines** "knowledge in the head" with "knowledge in the world"
  - **transcends** the traditional view that human cognition exists solely 'inside' a person's head

- **forms of distribution**:
  - **human←→ human:** across groups, teams, social networks, communities
  - **human ←→ artifacts:** between ***internal*** (memory, attention, executive function) and ***external*** (artifacts, tools) structures and resources

Distances and Diversity: Limitations or Opportunities?

- **spatial dimension:** shared location → shared concerns — *success model:* open source communities, Wikipedia

- **temporal dimension:** learning from the past — *success model:* reuse and redesign,

- **conceptual dimension**: exploiting symmetry of ignorance — success model: Communities of Interest

Differentiating Communities: Understanding and Fostering Different Cultures of Participation

- ***Communities of Practice (CoPs):*** homogenous design communities

- ***Communities of Interest (CoIs):*** heterogeneous design communities

- **source:** Fischer, G. (2001) "Communities of Interest: Learning through the Interaction of Multiple Knowledge Systems," 24th Annual Information Systems Research Seminar In Scandinavia (IRIS'24), Ulvik, Norway, pp. 1-14.

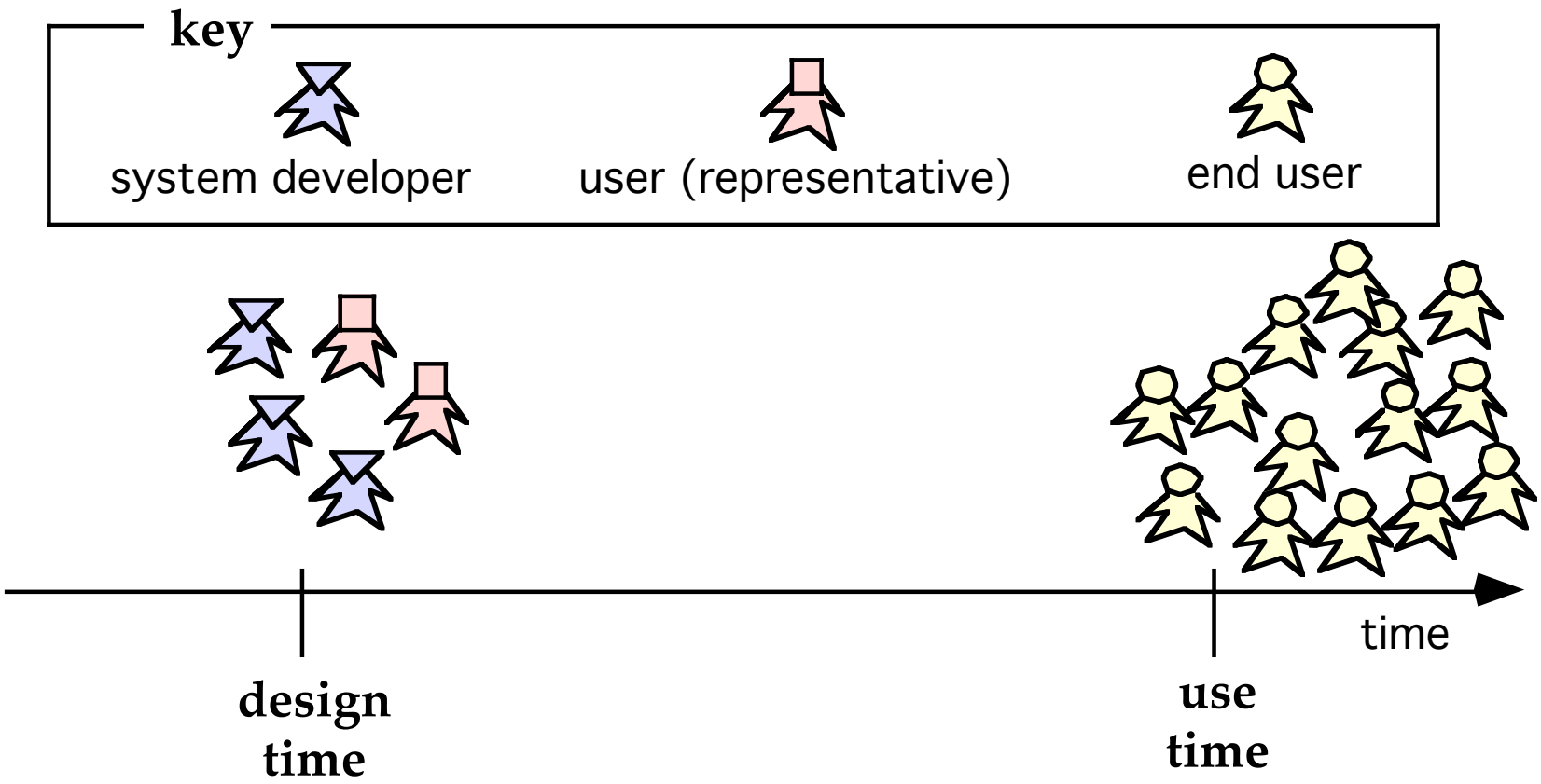
Meta-Design = Design for Designers

- **meta-design explores:**
  - cultures in which participants can **express themselves** and engage in personally meaningful activities

- **meta-design requires**
  - designers giving up some **control** at design time to contributors at use time

- **meta-design** provides a theoretical framework for **cultures of participation and Web 2.0 technologies** → for example: it blurs the distinctions
  - between consumers and producers → **"prosumers"**
  - between professionals and amateurs → **"pro-ams"**

Design Time and Use Time



world-as-imagined
prediction
planning

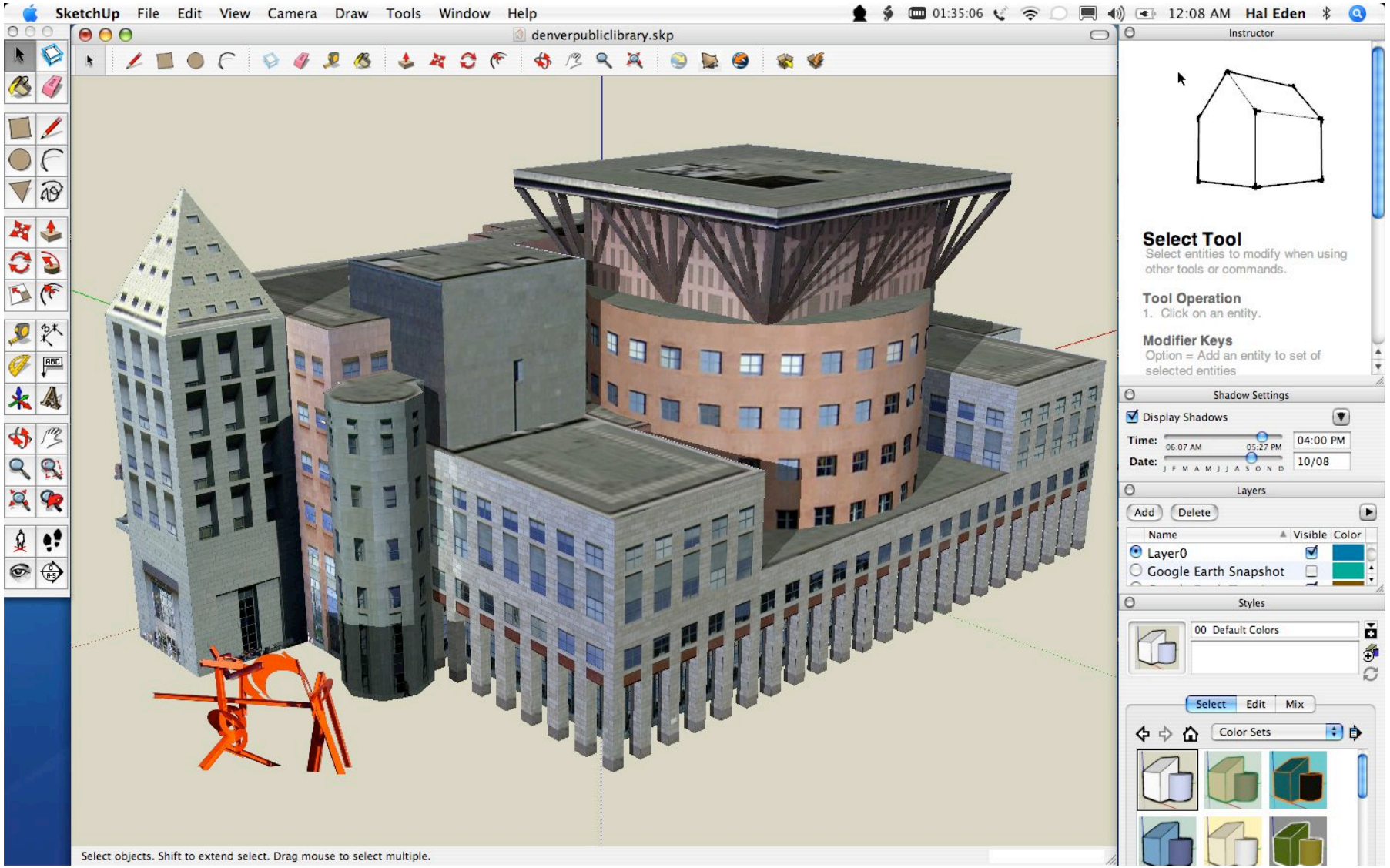
world-as-experienced
reality
situated action

What Do Meta-Designers Do?

- they use their own creativity to create socio-technical environments in which **other people can be creative** by creating
  - **contexts** and **content creation tools** rather than content
  - **technical** and **social** conditions for broad participation in design activities

- **meta-design examples:** Web 2.0 Technologies supporting user-generated content
  - Wikis (Wikipedia)
  - **Google-SketchUp + 3D Warehouse + Google Earth**
  - Second Life
  - Open Source

SketchUp — a high-functionality 3D Modeling Environment



3D Warehouse: a Web 2.0 Environment

http://sketchup.google.com/3dwarehouse/

- **features:**
  - search, share, and store 3D models created in SketchUp
  - models include: buildings, houses, bridges, sculptures, cars, people, pets, …
  - download the 3D models to be modified in SketchUp
  - if the model has a location on earth → download it and view it in Google Earth

- **challenges:**
  - what will **motivate** people to participate?
  - participation requires acquiring skills in using SketchUp → create **learning environments** for SketchUp

3D Warehouse

Tsim Sha Tsui Clock Tower
by Google
★★★★☆ (1 rating)
Tsim Sha Tsui Clock Tower,...
View in Google Earth

Figueroa at Wilshire
by Google
Albert C. Martin and...
View in Google Earth

1500 Walnut Street
by Google
This building located at 1500...
View in Google Earth

CPL Harold Washington Library Center
by Google
★★★★★ (6 ratings)
This monumental building,...
View in Google Earth

Marriott Marquis
by Google
This Hotel in Atlanta rises...
View in Google Earth

Hearst Residence (Hearst Castle)
by Google
★★★★★ (2 ratings)
San Francisco architect Julia...
View in Google Earth

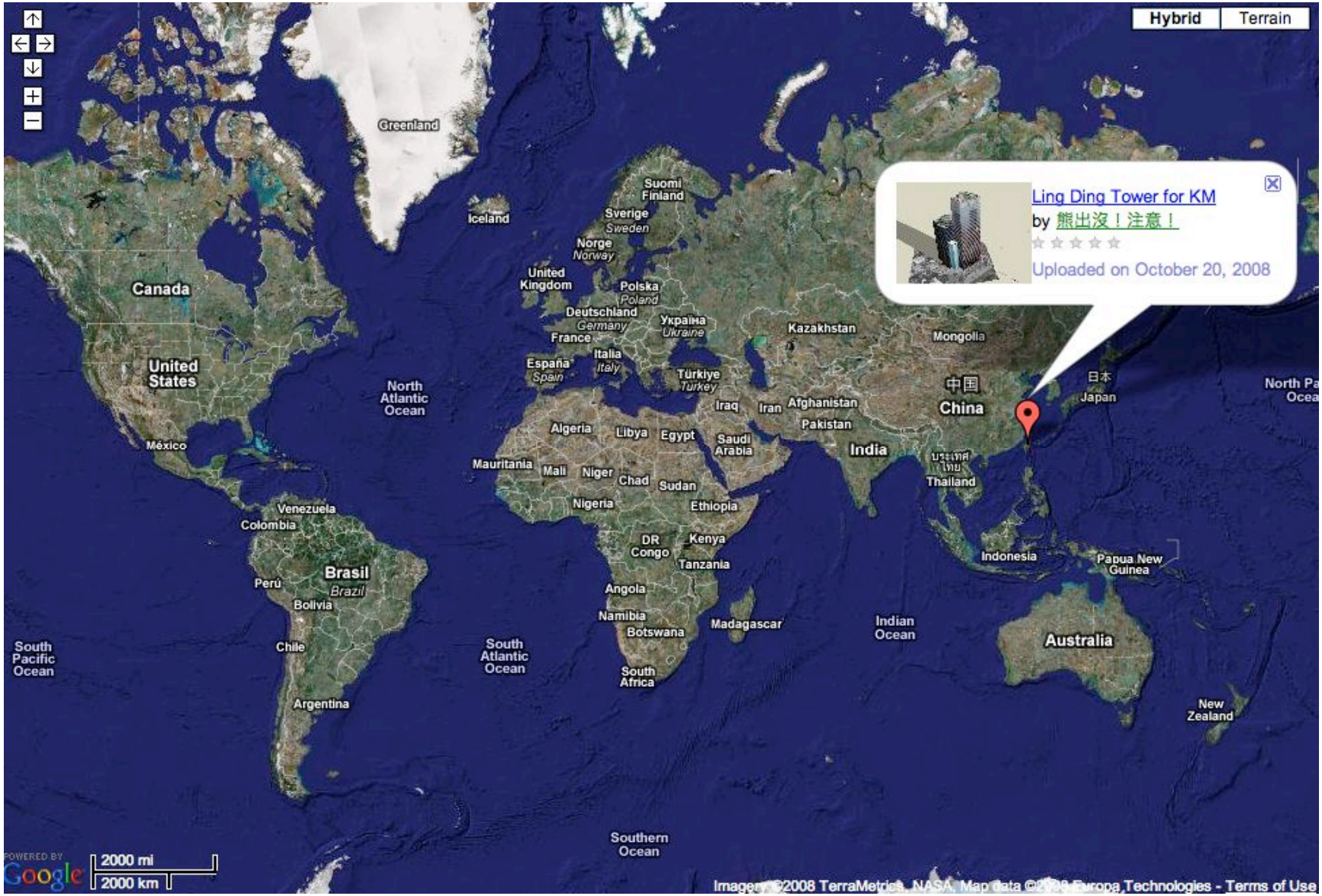
Milwaukee Art Museum
by Google
★★★★★ (6 ratings)
The history of the Milwaukee...
View in Google Earth

CitySpire Center
by Google
★★★★★ (2 ratings)
Designed by Murphy/Jahn, Inc....
View in Google Earth

CU Boulder in 3D

Downtown Denver in 3D

A Tiny Percentage of a Very Large Population



Social Creativity

- a **great interest** in recent years in the USA (and EU)

- **creativity: beyond productivity** — National-Research-Council (2003): "*Beyond Productivity: Information Technology, Innovation, and Creativity*", National Academy Press, Washington

- **new National Science Foundation (NSF) programs**:
  - "Science of Design"
  - "Creativity and Information Technology (IT)"

- **L3D's research project** in this area: "A Next Generation Wiki for Creativity and IT"; http://l3dswiki.cs.colorado.edu:3232/CreativeIT/

The CreativeIT Wiki

Social Creativity

"The strength of the wolf is in the pack, and the strength of the pack is in the wolf."
Rudyard Kipling

- the **Renaissance scholar** (who knows "everything") does **not** exist anymore in the 21st century

- **complex design problems** are systemic problems; *they seldom fall within the boundaries of one specific domain* → they require the participation and contributions of several stakeholders with various backgrounds

- *"An idea or product that deserves the label 'creative' arises from the synergy of many sources and not only from the mind of a single person"*
  — Mihaly Csikszentmihályi

A Socio-Technical Environment

Envisionment and Discovery Collaboratory (EDC)

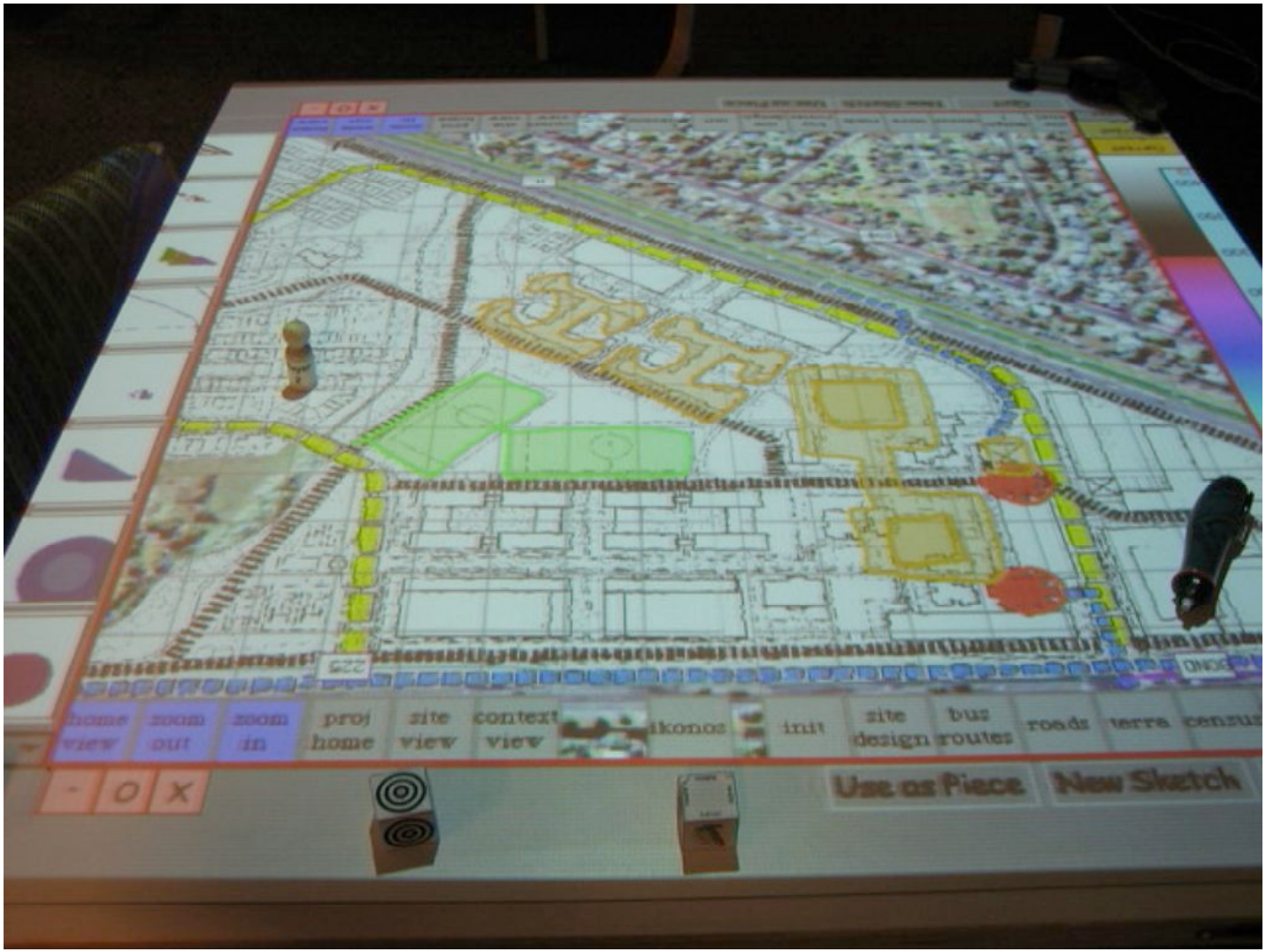
- **the EDC supports:**
  - **collaborative design** (e.g. in: urban planning, emergency management)
  - **social creativity** → learning when no one knows the answer
  - **meta-design** → a version of SimCity in which content is generated by users

- **the EDC and HCI**
  - **Computer Science:** table-top, computationally enriched physical objects, visualization, integration
  - **Cultures of Participation:** Communities of Interest, emergence, boundary objects, reflection in action, reflective communities

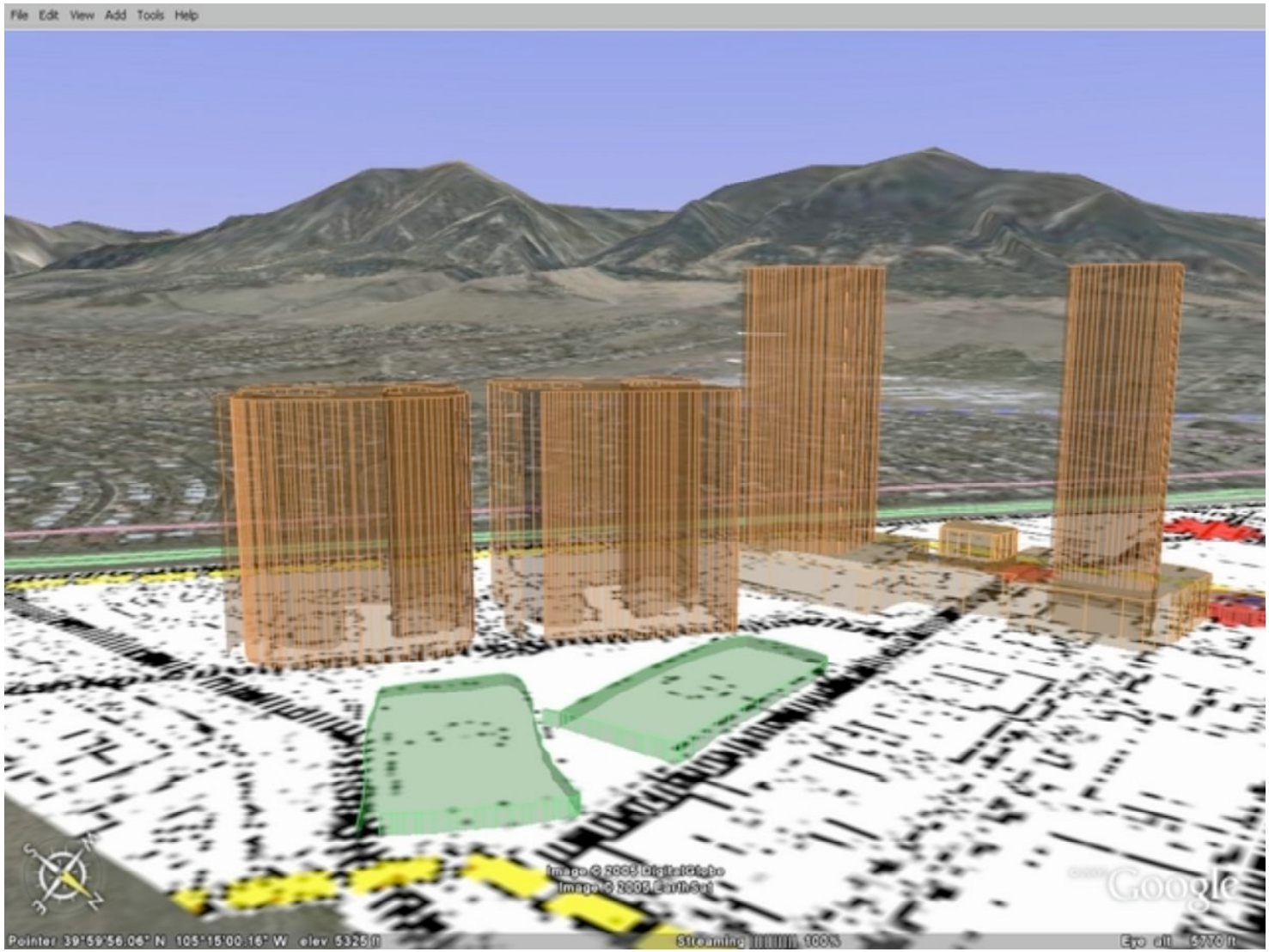
The Envisionment and Discovery Collaboratory

Boulder City Council and University of Colorado Regents

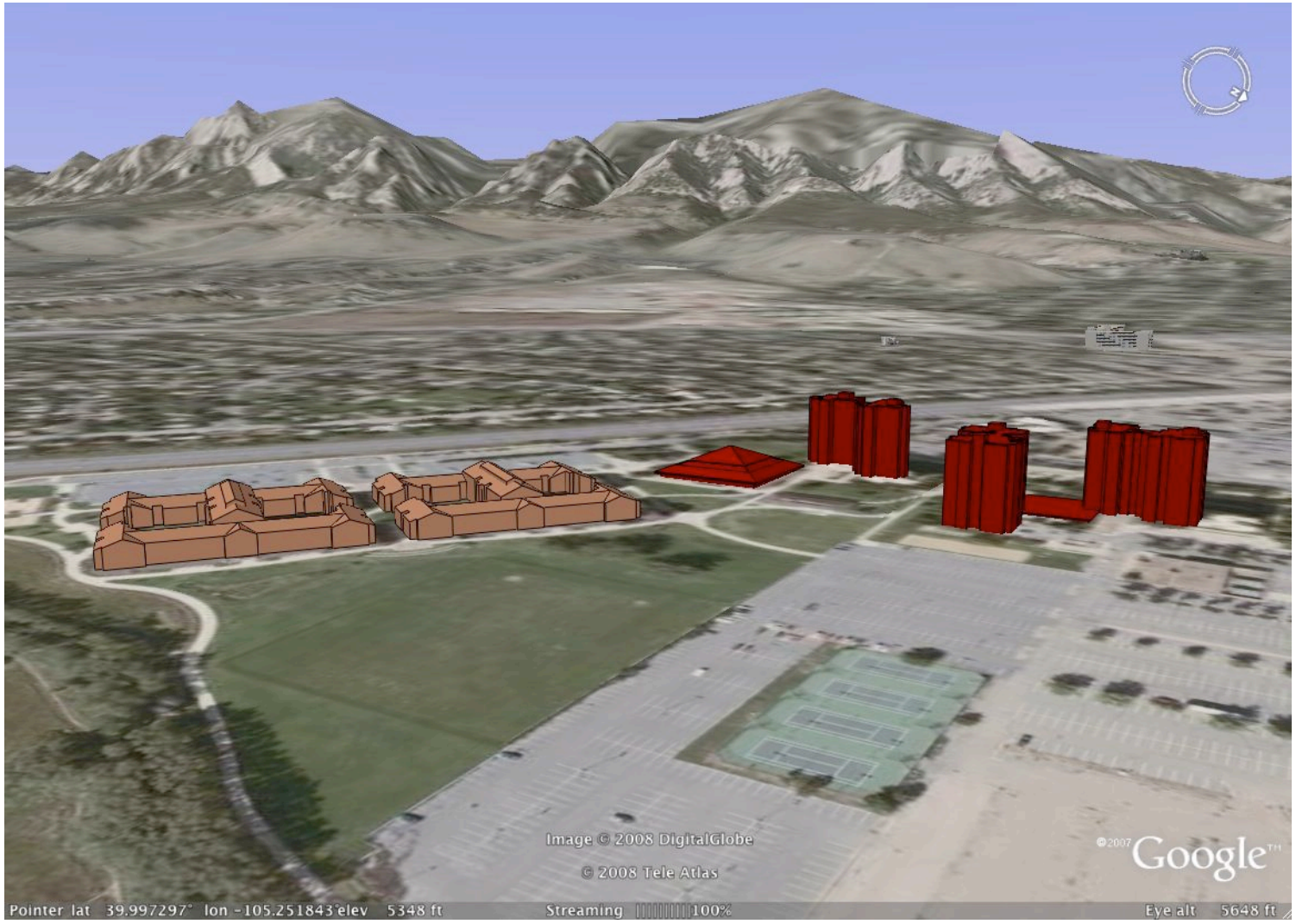
Sketching Support in the EDC



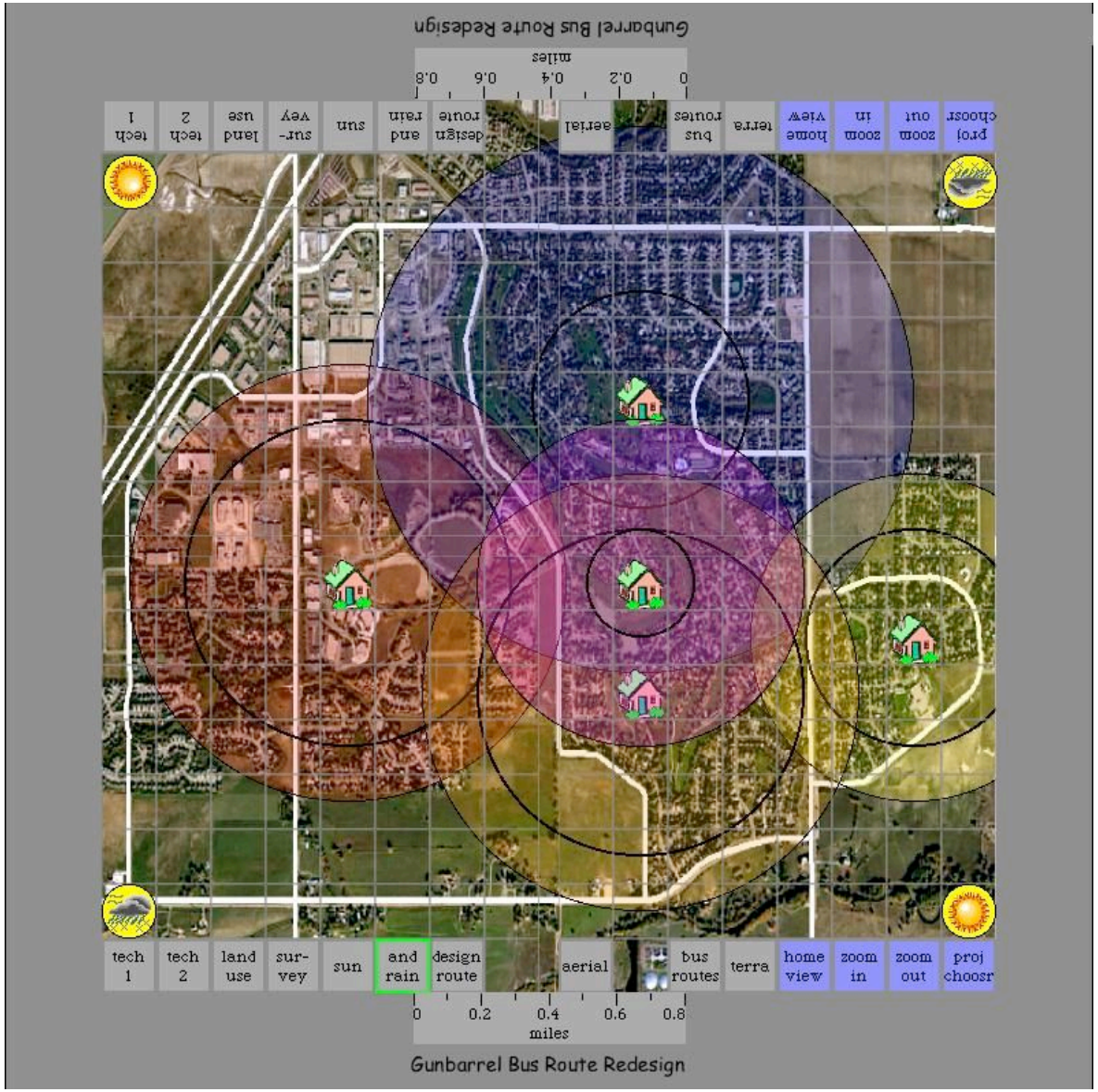
Buildings Sketched into a Google-Earth Client



Fat-Pencil Technologies and Incremental Formalization

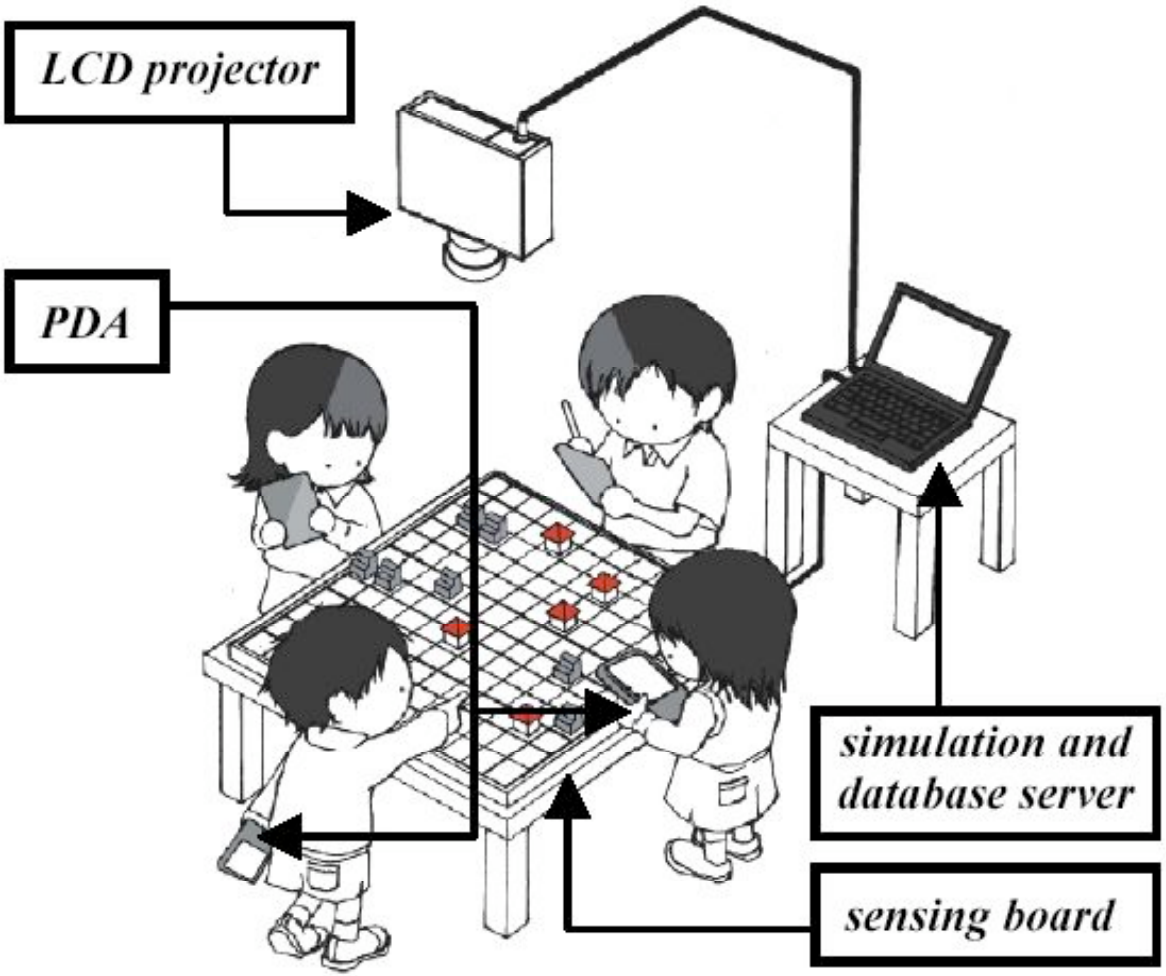


Emerging Insight: Illustrating Multiple Walking Distances



Integrating Individual and Social Creativity: Caretta

(collaboration with Masanori Sugimoto, University of Tokyo)



Research Challenges

- **a Faustian Bargain:** drawbacks of cultures of participation
- **models** for knowledge accumulation and sharing in different cultures
- **"Long Tail"** theory: making all voices heard

A Faustian Bargain: Drawbacks of Cultures of Participation

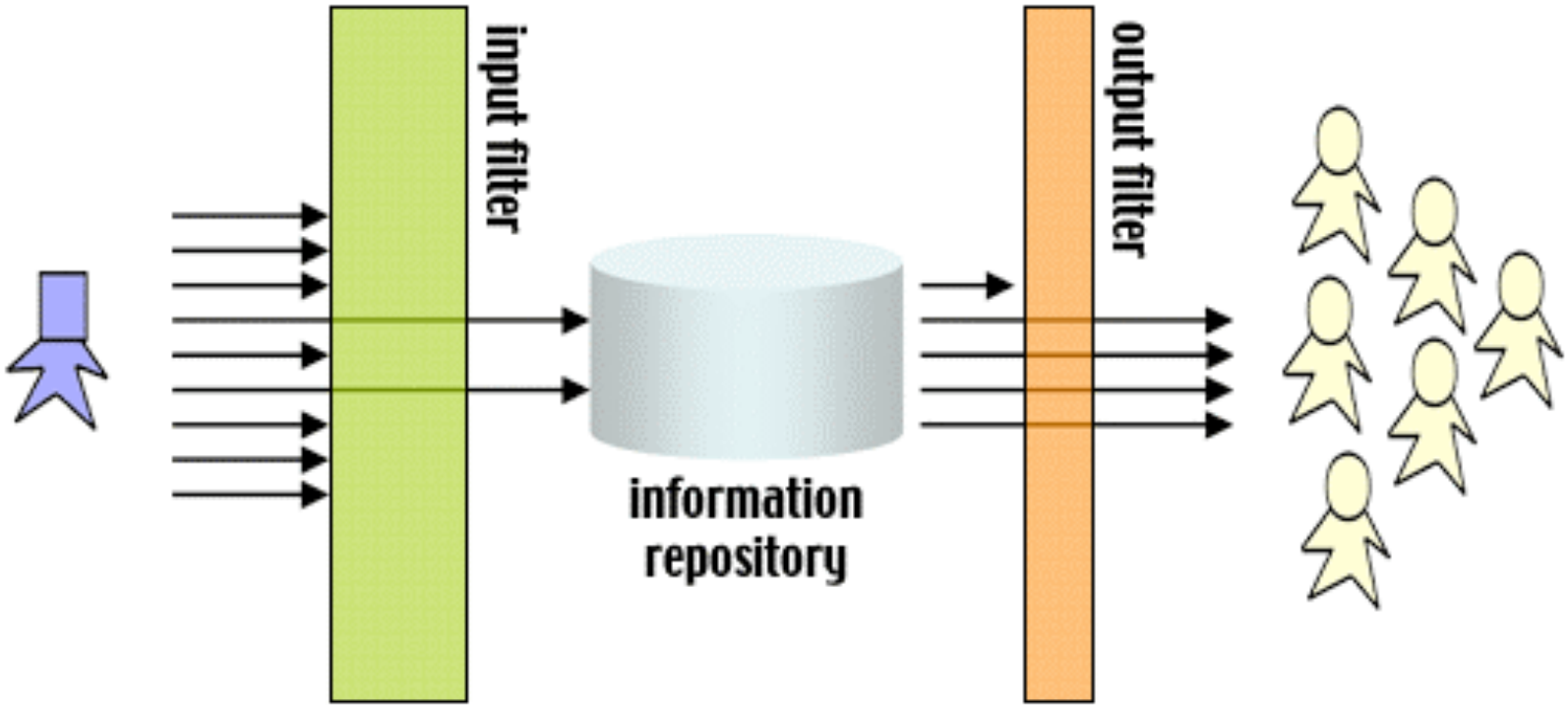
- **claim:** humans may be **forced** to cope with the burden of being active contributors in personally irrelevant activities → *"Do-It-Yourself Societies"*

- through modern tools, humans are empowered to perform many tasks themselves that were done previously by skilled domain workers
  - **advantages**: power, freedom, and control
  - **disadvantages**: forces people to act as contributors in contexts for which they lack the experience and broad background knowledge

- **claim**: cultures of participation lead to **collectivism** that is suffocating authentic voices in mass mediocrity (Jaron Lanier)
  - **collectivism**: involves coercion and centralized control
  - **collective action**: involves self-selection and distributed coordination
  - **examples**: Wikipedia ←→ KNOL

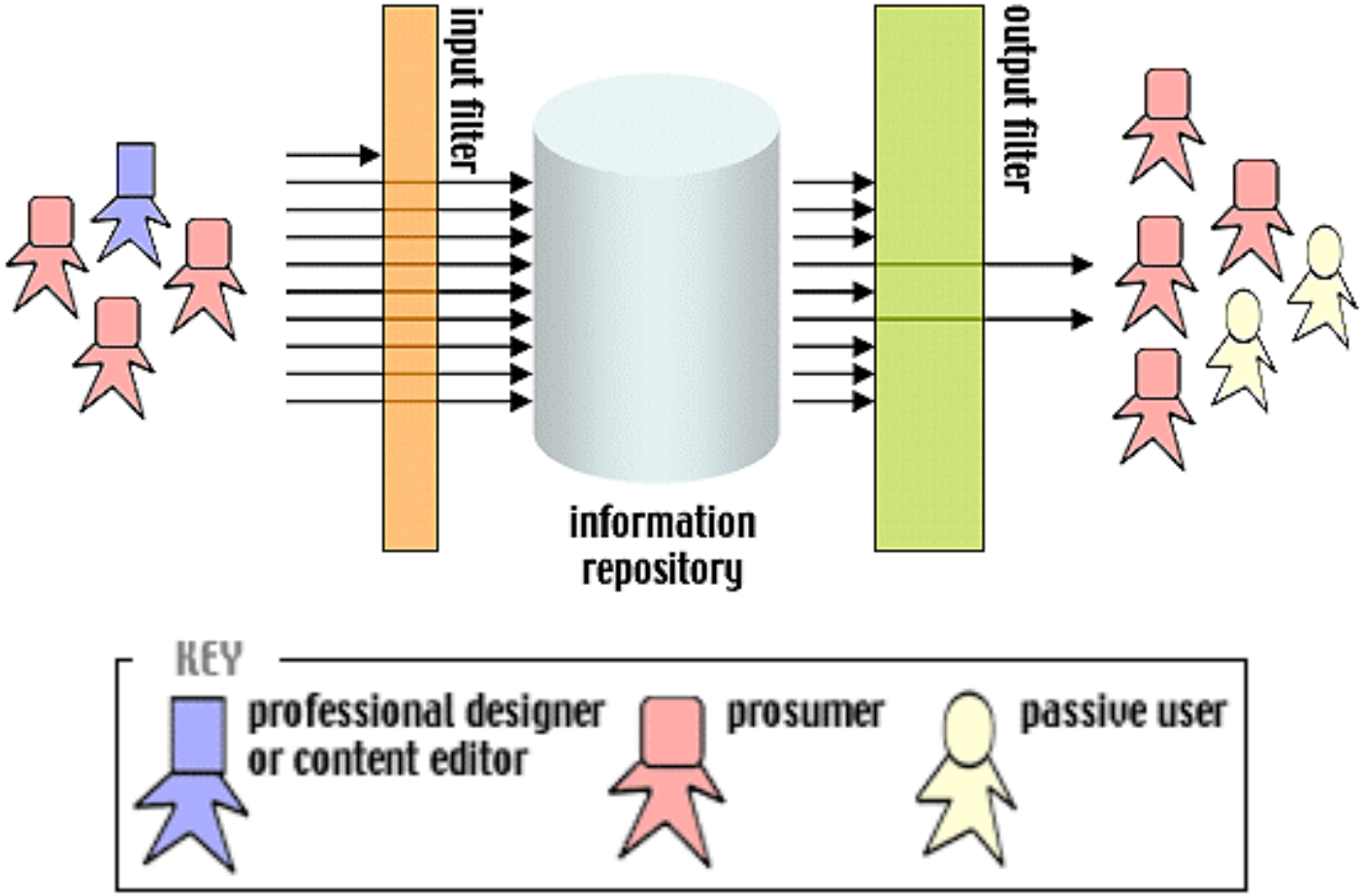
Model Authoritative underlying Consumer Cultures

- Strong Input Filters, Small Information Repositories, Weak Output Filters
- Limitation: Making All Voices Heard



Model Democratic underlying Participation Cultures

- Weak Input Filters, Large Information Repositories, Strong Output Filters
- Limitation: Trust and Reliability of Information



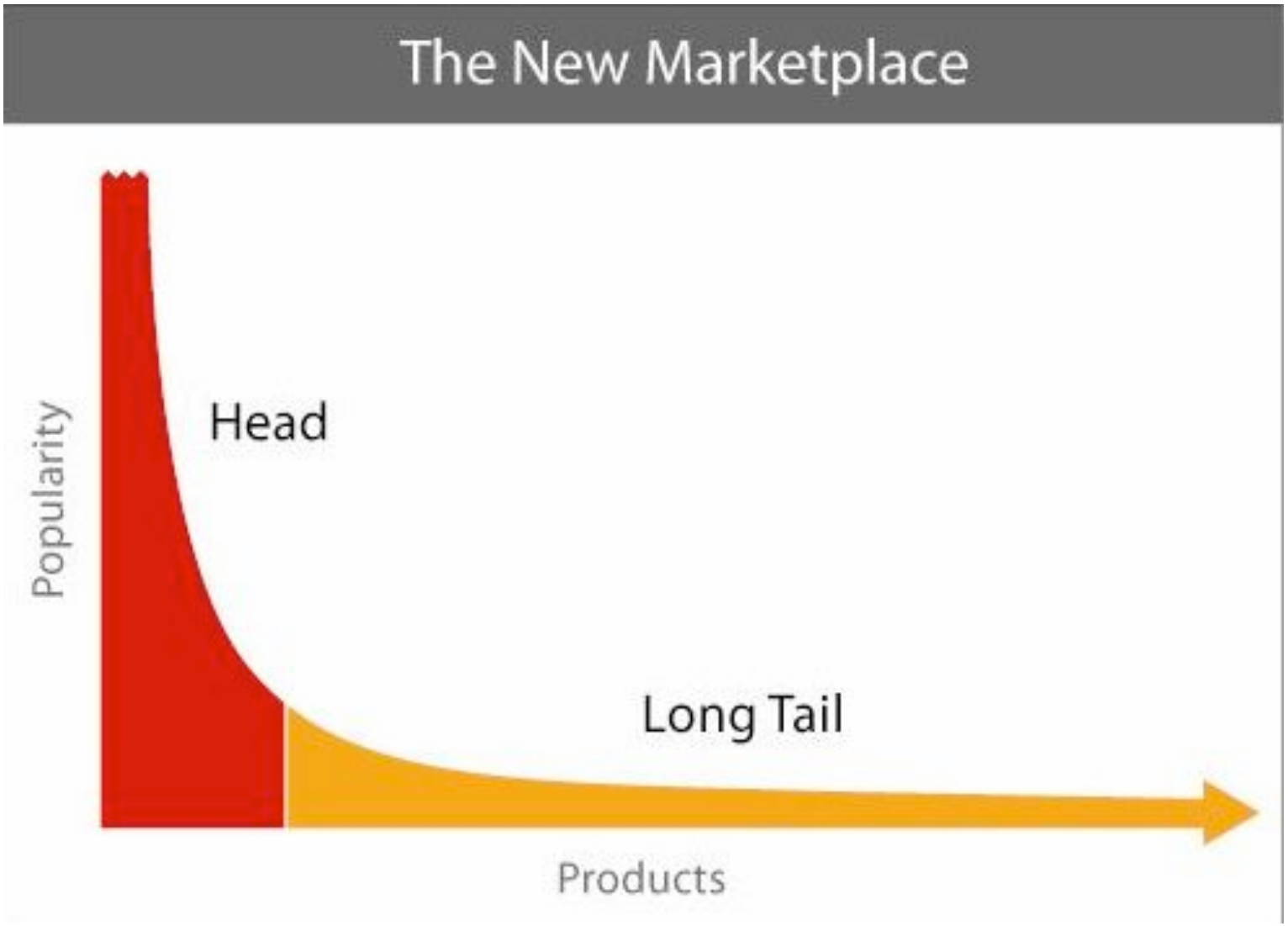
The Long Tail

- **theory of the Long Tail:** our culture and economy is increasingly shifting away from a focus on a relatively small number of "hits" (mainstream products and markets) at the head of the demand curve and toward a huge number of niches in the tail

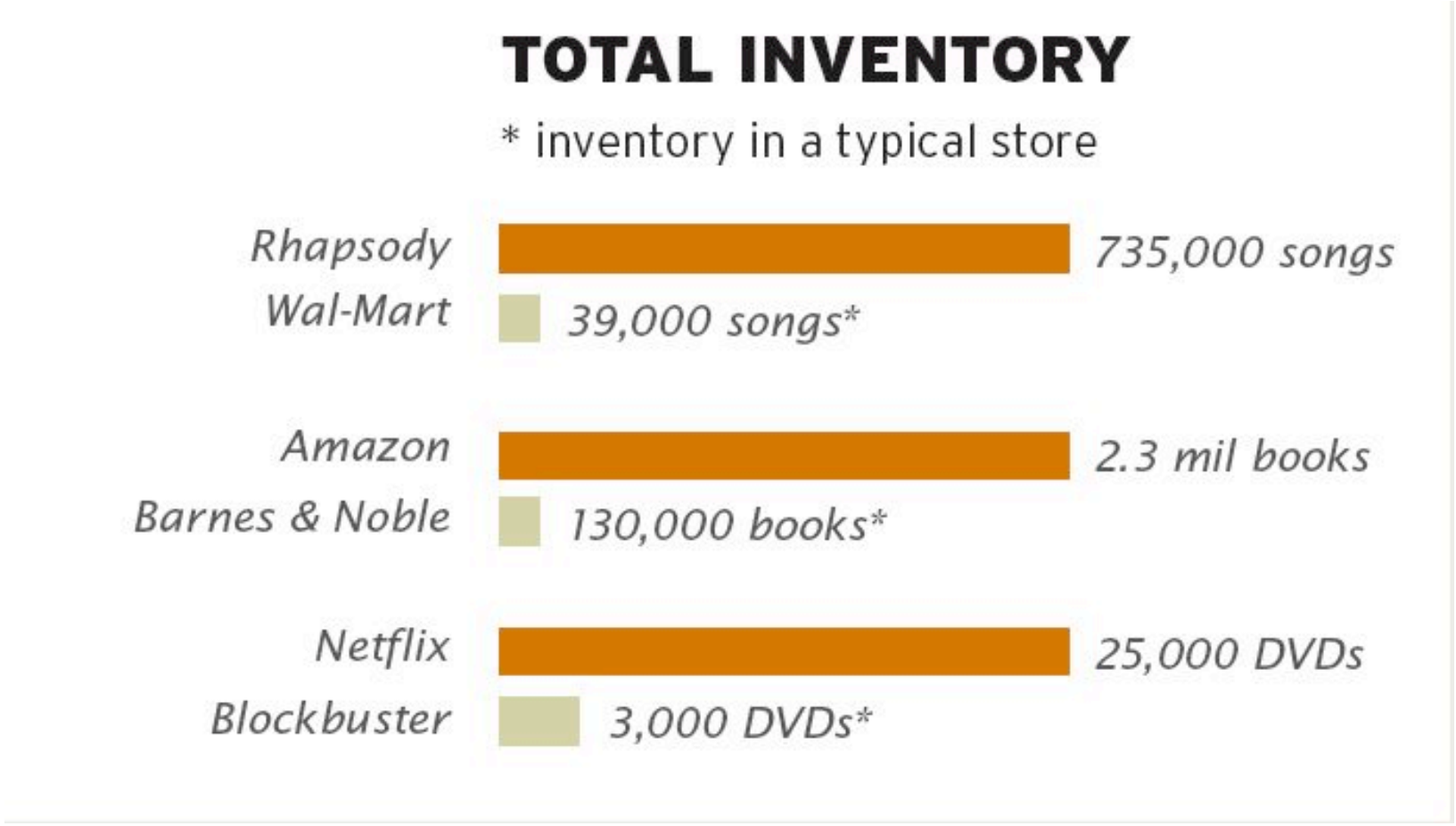
- **main opportunity — digital artifacts:** computer programs, movies, books, 3D models of buildings, …. → as the costs of production and distribution fall, there is less need to lump products and consumers into one-size-fits-all containers

- **hypothesis:** without the constraints of physical shelf space and other bottlenecks of distribution, narrowly-target goods and services can be as economically attractive as mainstream fare.

Exploiting "Long Tail" Opportunities in Business



Specific Examples of the Long Tail



Exploiting the "Long-Tail" in Education

- **basic belief:** all people are interested in something (Viking Ships, Dinosaurs, gambling, ……..)

- **head — basic knowledge and skills:** learning to learn, learning on demand, preparation for future learning, soft skills, digital fluency, …….

- **tail —** personally meaningful problems: interest and passion, self-directed learning and intrinsic motivation, interesting example → movie: "October Sky"

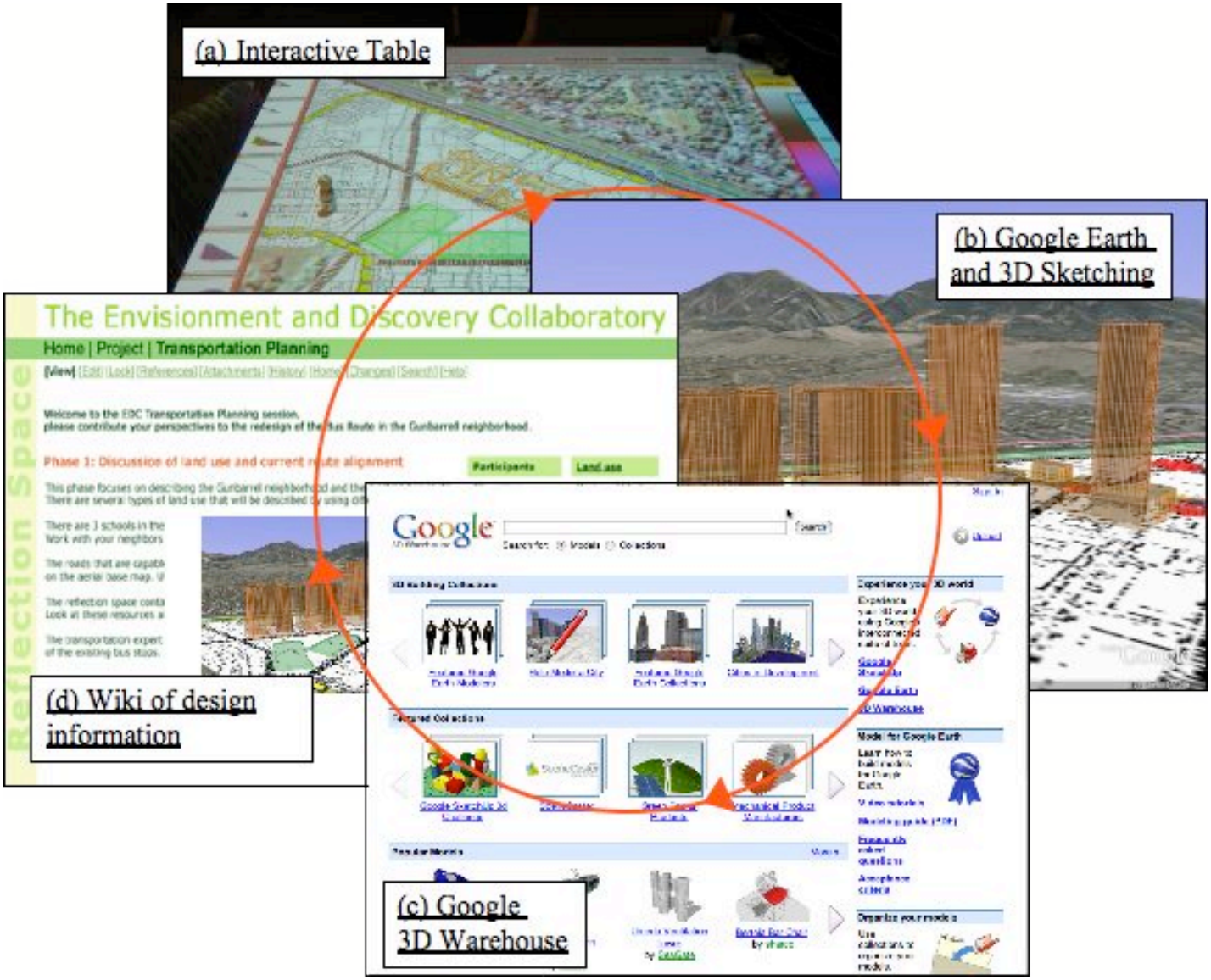
- **extensive coverage** needed for supporting the infinite numbers of interesting topics — will be facilitated by a "meta-design" culture

Implications

Implications for HCI Research of the Future

layer	objective	requirements
layer-3: motivation ("why")	being interested and willing to participate	motivation, ownership, social capital, reputation economy
layer-2: knowledge and skills ('how')	being knowledgeable in order to participate	substantial learning effort
layer-1: infrastructure ("prerequisites")	hard-and software	availability, access, usability, integration

Implications for Technology: Integration



Implications for Learning and Education

- a **new synergy and hybrid model**: integrate basic knowledge and skills (head of the long-tail) and idiosyncratic interests and passion (tail of the long-tail) → create richer learning environments

- **"putting our money where our mouth is"**: application of our research to our teaching ("courses-as-seeds")

Implication: Making Different Voices Heard

Batya Friedman

International Criminal Tribunal for Rwanda

- the **information heritage** for justice: design judicial records of genocide
- document the **personal** experiences, knowledge, wisdom and reflections of individuals
- design information systems to support **participation** of (1) Rwandans, (2) the international legal community, and (3) global citizens

Conclusion

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Using and Building Bridges with Cultures of Participation

- the future is not out there to be discovered — it has to be **invented and designed**

- **Machiavelli:** *"People who want to change institutions, have all those as their enemies who have done well under the old conditions"*

- **Winston Churchill:** *"This is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning."*