



Center for
**LifeLong
Learning
& Design**

University of Colorado at Boulder

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

Building New Worlds Together:

Meta-Design and Social Creativity

Gerhard Fischer

Center for LifeLong Learning & Design (L³D)

Department of Computer Science and Institute of Cognitive Science,
University of Colorado, Boulder

Google Boulder Engineering Open House, November 14, 2007

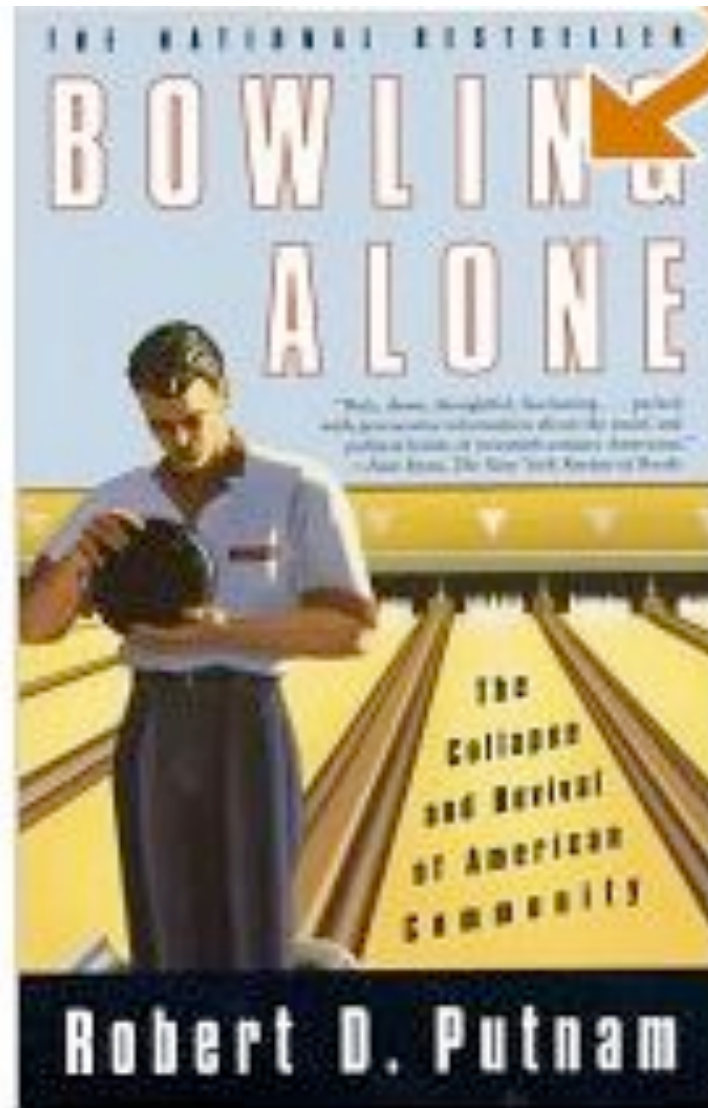
Acknowledgements

- colleagues and friends at **Google Boulder** who invited me to speak at this event
- colleagues and friends at the **Center for LifeLong Learning & Design (L3D)**, Computer Science Department, and Institute of Cognitive Science at CU
- thanks to **all of you who came tonight** (including many friends who are not “computer people”)

Outline

- basic message
- meta-design
- social creativity
- research challenges

Basic Message



Building New Worlds Together

(Designing the Future Together)

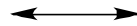
- while “Bowling communities” are on the decline → **new communities are forming**:
 - Facebook,
 - Flickr and YouTube,
 - Second Life,
 - Wikipedia,
 - 3D Warehouse
- create an **analytic framework** to understand these new communities:
 - meta-design = design for designer
 - social creativity = to transcend the limitations of the individual human mind
- the **new Web** (Web 2.0 technologies) — harness collective intelligence and social creativity
 - from broadcast to **participation**
 - all people can become **active contributors** in personally meaningful problems

Local Collaborations

University



Boulder County



Google



City of Boulder



CU's Flagship 2030



Serving Colorado, Engaged in the World

- *Flagship 2030* charts a new course for the University of Colorado at Boulder
 - Leverage our comprehensive and national position to take a leadership role in higher education
 - Collaborate with others in the state to achieve greater success in our collective mission for Colorado



Examples of Local Collaborations: Creating “Win-Win” Situations

▪ Google and CU

- **Google employees** participating in courses at CU
- **CU students** hired by Google modeling CU Campus in 3D
- **Google research awards** (Clayton Lewis and Jim Martin)

▪ City / County / CU / Google

- **Project Spectrum: SketchUp for Autistic Children** (Anja Kintsch, Tom Wyman, and Chris Cronin) → see:
website: <http://www.google.com/educators/spectrum.html>
YouTube Movie: <http://www.youtube.com/watch?v=k7PlwSnKq7E>
- **Community of Soundscapes**: “Capturing and Sharing Sonic Experiences (Elisa Giaccardi) — website: <http://www.thesilence.org/>
- **Envisionment and Discovery Collaboratory** (Hal Eden and Ernesto Arias)

Question from UC Davis Student (Nov 12, 2007)

I read an online article today about the use of 3D drawing programs by children on the autism spectrum, and am very interested in obtaining more information about any research that is in progress that concerns this topic.

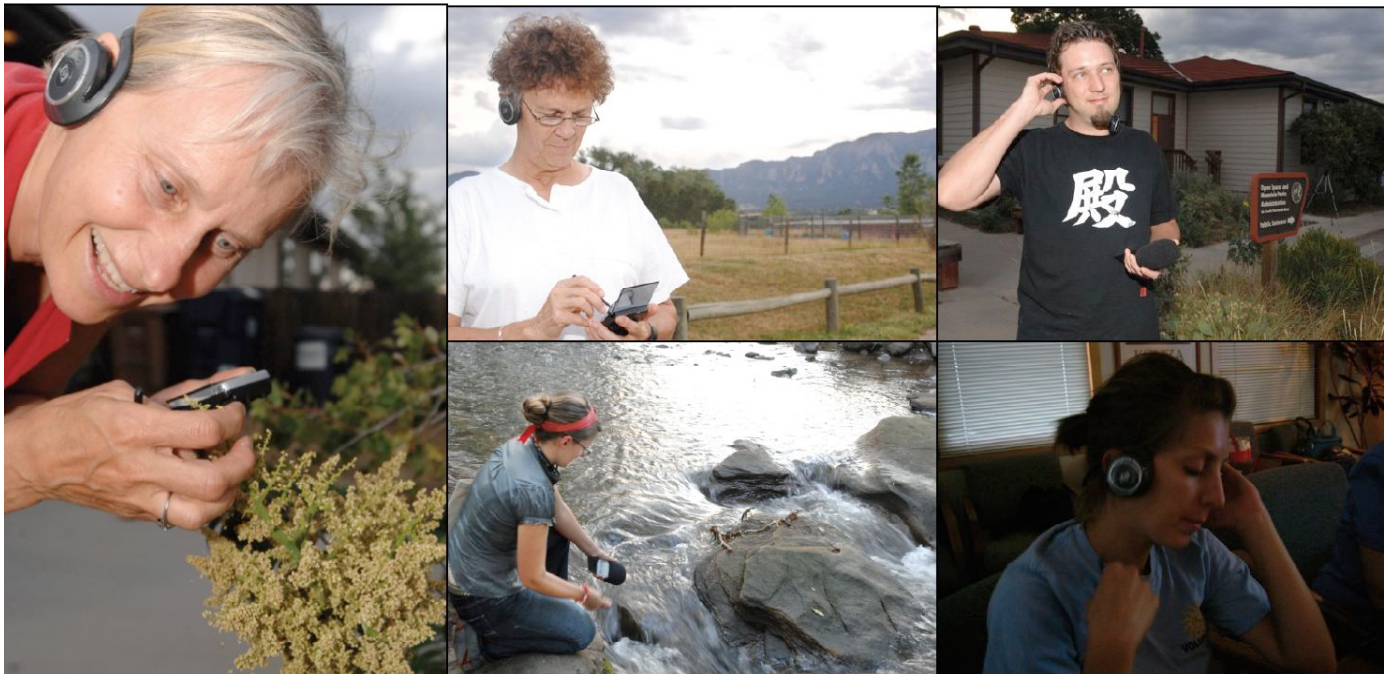
The Center for Lifelong Learning and Design at the University of Colorado at Boulder was listed as the institution involved with this research.

I am a doctoral student at the University of California at Davis in Human Development and my focus is on interventions for children with autism.

If there is any way that you can connect me with any resources that are related to this line of research, it would be incredibly helpful to me.

Community of Soundscapes

- Sounds are used to engage local communities in the **interpretation** and **management** of their urban and natural environment.



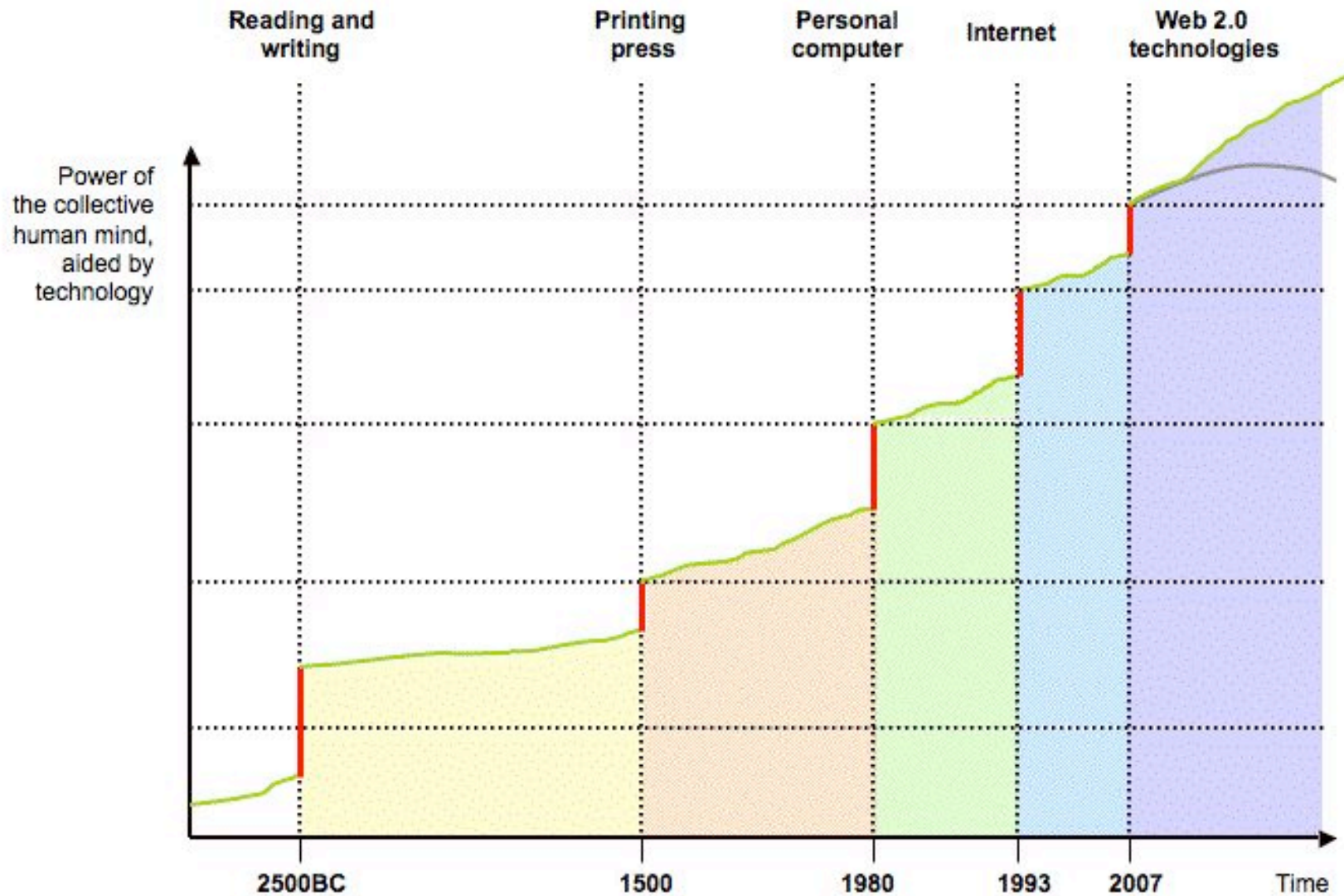
Global Collaboration: Social Production and Mass Collaboration in Web 2.0 Environments



A Transformational Framework

- **established frameworks** → **frameworks for the future**
- school learning → **lifelong learning**
- unaided individual human mind → **distributed intelligence**
- consumers → **active contributors (meta-design)**
- learning when the answer is known → **learning when no one knows the answer (social creativity)**

Beyond the Unaided, Individual Human Mind



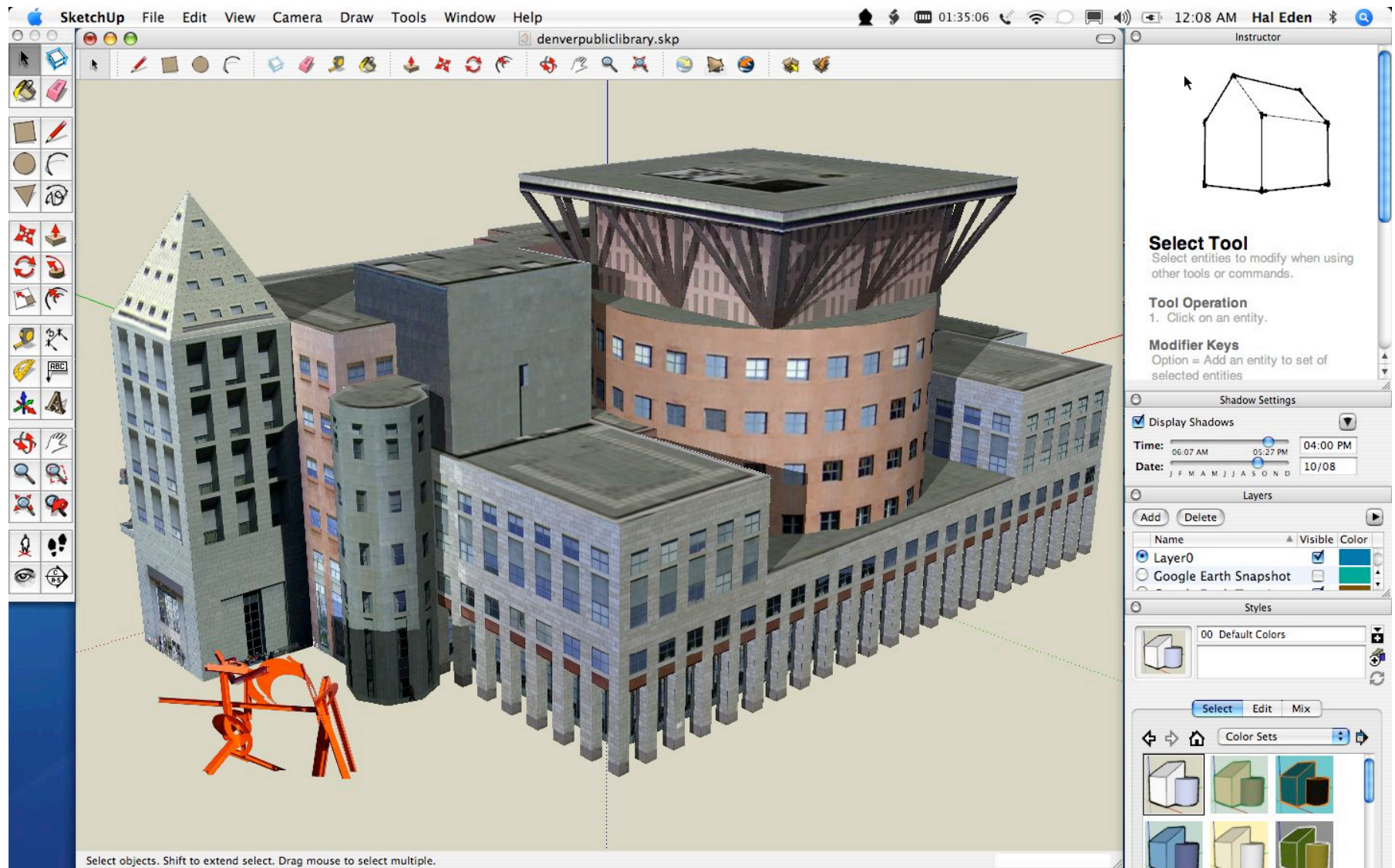
Meta-Design = Design for Designers

- **meta-design explores:**
 - a culture in which participants can **express themselves** and engage in personally meaningful activities
- **meta-design requires**
 - designers giving up some **control** at design time
 - **active contributors** (and not just passive consumers) at use time
- **meta-design raises research problems of fundamental importance** including
 - new **design methodologies**
 - a new understanding of **collaboration, motivation, and creativity**
- **meta-design** provides a theoretical framework for **Web 2.0 technologies**

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
 - by creating **technical** and **social** conditions for broad participation in design activities
 - by supporting '**hackability**' and '**remixability**'
- **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
- share 3D models by uploading them from SketchUp

▪ 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



Motivational Aspects and Meta-Design

- **what will make humans want to become designers/active contributors over time?**
 - serious working and learning does not have to be unpleasant but can be personally meaningful, empowering, engaging, and fun

- **what will make humans want to share? → requires:**
 - cultural change
 - gift cultures
 - social capital
 - reputation economy

$$\text{Utility} = \text{Value} / \text{Effort}$$

- **increase in value:** motivation and rewards for being a designer
 - feeling in control
 - being able to solve or contribute to the solution of a problem
 - mastering a tool in greater depth
 - making an ego-satisfying contribution to a group
 - enjoying the feeling of good citizenship to a community (“social capital”)

- **decrease in effort:**
 - creating support for learning to become an active contributor (= learning SketchUp)
 - extending meta-design to design for design communities
 - exploit automatically collected information sources (e.g.: collaborative filtering = “customers who bought this book also bought”)

“Tip of the Day” in Google Earth



Existing Environments for Learning and Using SketchUp

Resource	Concept	Weaknesses
Tip of the Day	informal instruction	easily dismissed, irrelevant, not context aware
Help Center	self-directed, inquiry-based	not context aware
SketchUp Help	self-directed	not context aware
Tooltip	just-in-time, on demand	terse, too tightly focused
Instructor	just-in-time, on demand	tool context only
User Forums	community, apprenticeship	no immediate response
Video Tutorials	programmed	passive
Self-Paced Tutorials	self-directed, learning by doing	mistakes can derail learning
Live Training	formal instruction	expensive, strict schedule
Tech Support	inquiry-based, constructionist	have to ask the right question
Error Messages	learning by being told	often too cryptic
Toolbars	discovery	terse

Research Challenge

Avoid Information Overload with Context Awareness

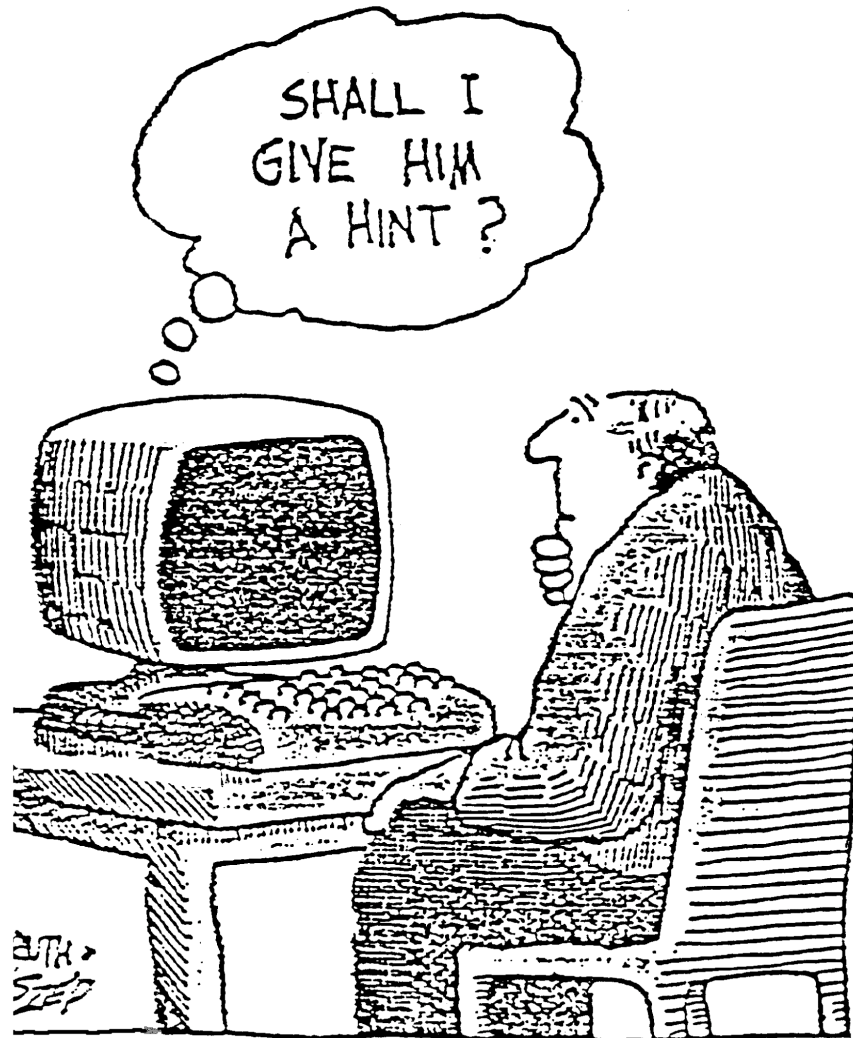
From “Anywhere, Anytime, Anyone”



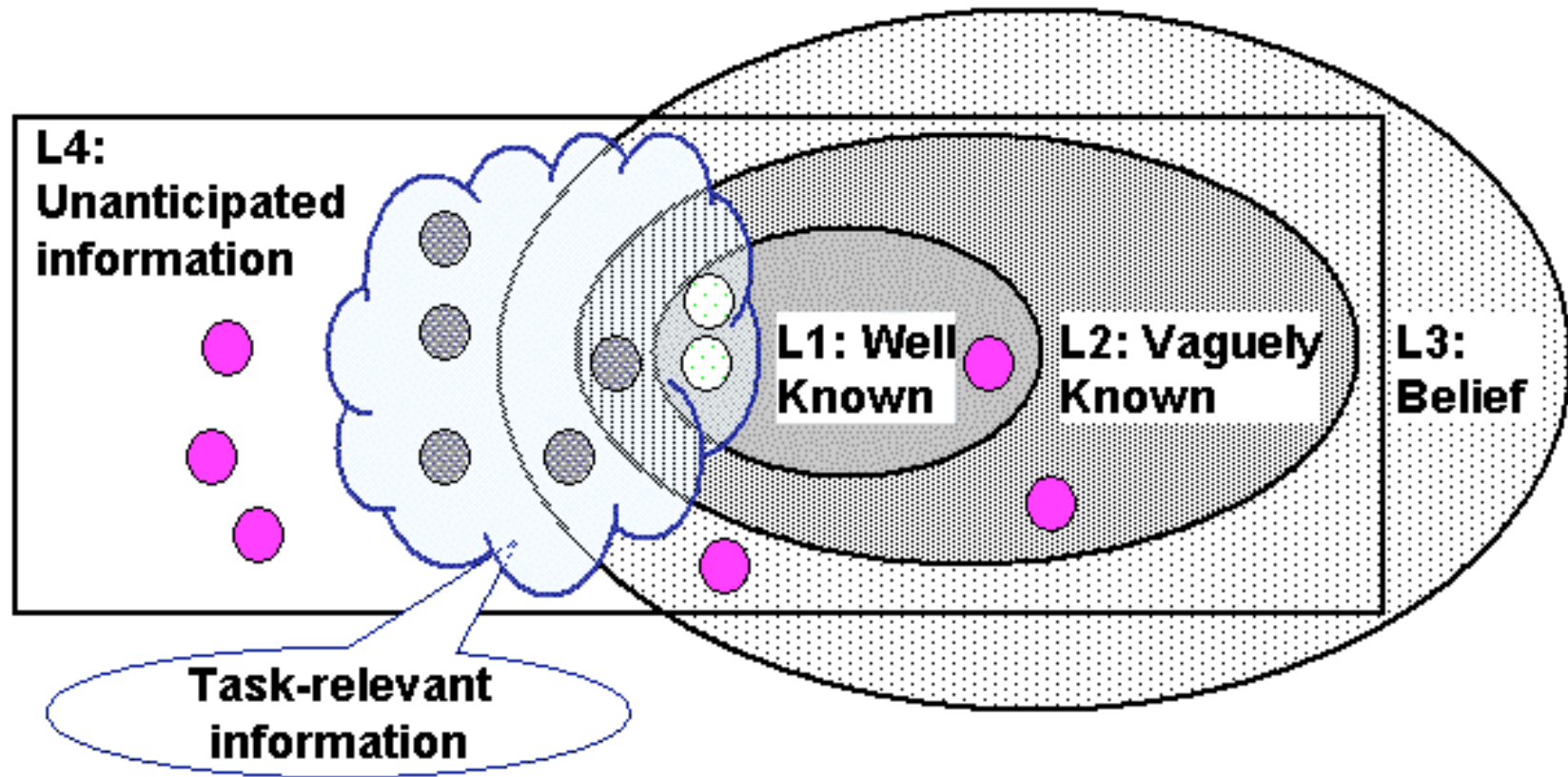
“The ‘**Right**’ Information at the ‘**Right**’ Time, in the ‘**Right**’ Place, in the ‘**Right**’
Way to the ‘**Right**’ Person”

Human attention — not information — is the scarce resource

Information Delivery, Contextualization, and Intrusiveness



Identification of **User Background Knowledge** and of the **Task at Hand** in High-Functionality Environments



Creativity – For All of us?

- a **great interest** in recent years
- creativity: **beyond productivity**
- **new National Science program**: “Creativity and Information Technology (IT)”
- **L3D’s research projects** in this area:
 - A Next Generation Wiki for Creativity and IT (funded)
 - Democratizing Design to Unleash Social Creativity (pending)

Creativity —The “Wrong” Image?

“The Thinker” by Auguste Rodin



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
- **distinct domain of human knowledge exist** → of critical importance: mutual appreciation, efforts to understand each other
- **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

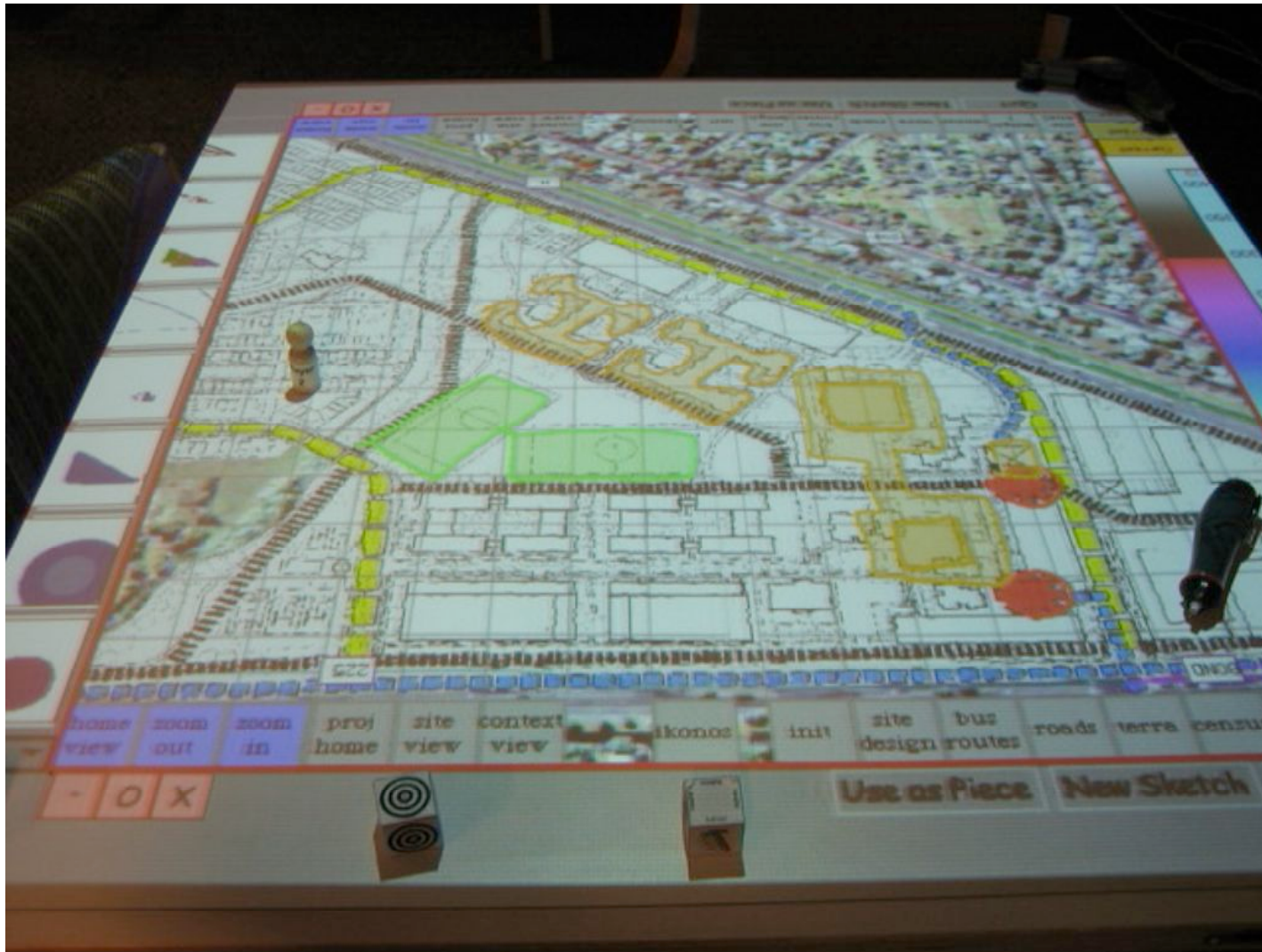
The Envisionment and Discovery Collaboratory



Boulder City Council and University of Colorado Regents



Sketching Support in the EDC



Buildings Sketched into a Google-Earth Client



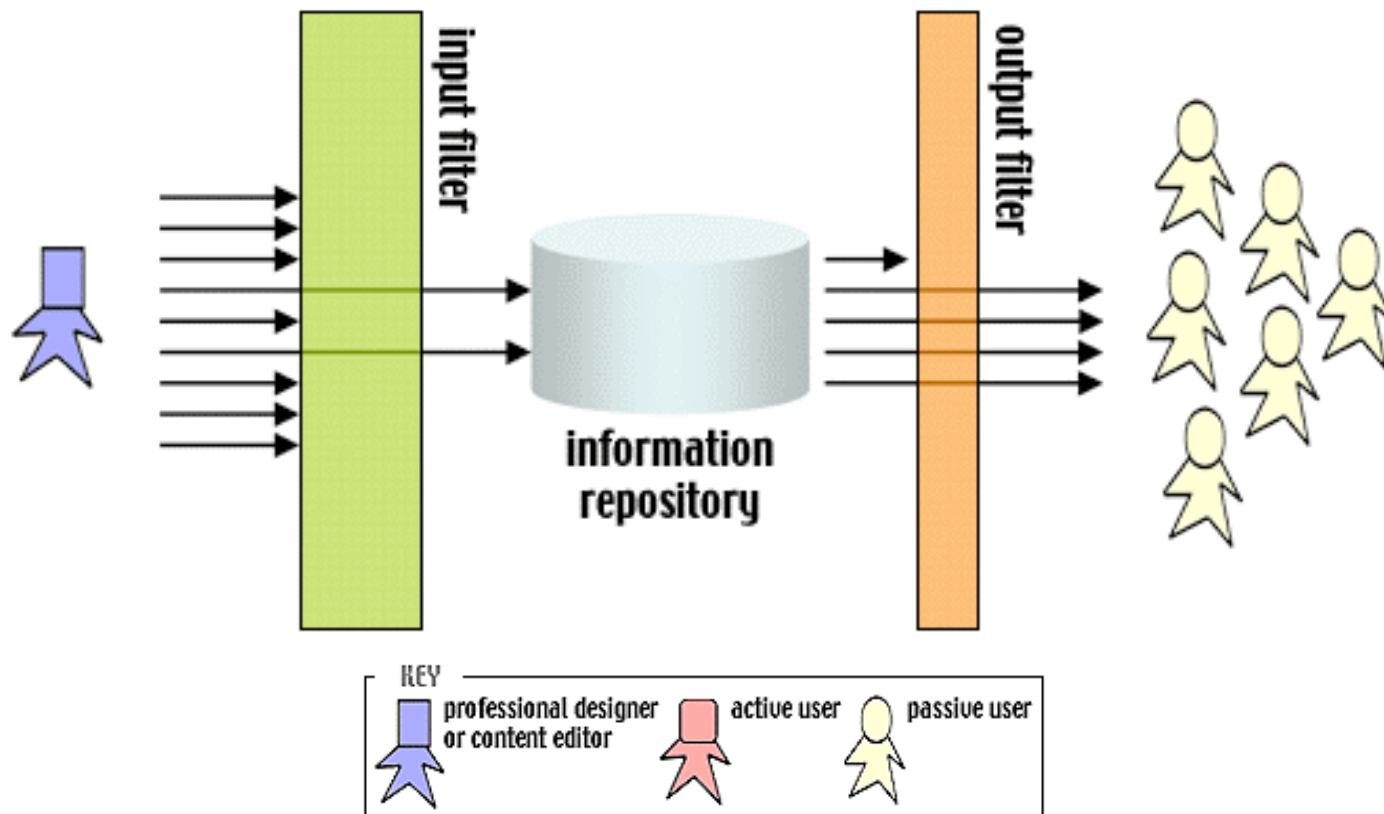
Research Challenge

Understanding New Relations between Consumers and Producers

- Consumer Culture (“Access”) and Design Culture (“Participation”)
- Exploiting “Long Tail” Opportunities

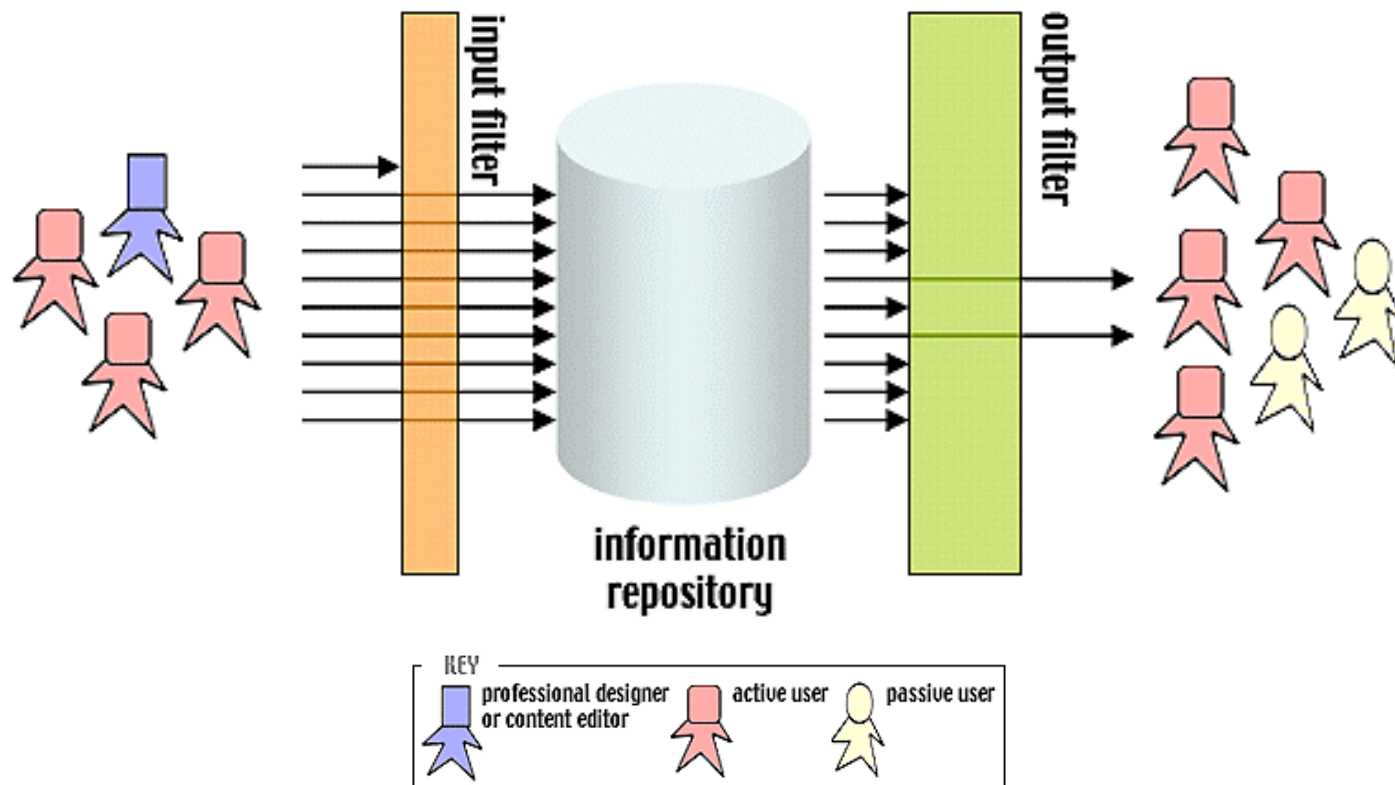
Producer/Consumer Models in a **Consumer** Culture

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



Producer/Consumer Models in a **Design** Culture

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



Exploiting “Long Tail” Opportunities



The Long Tail

TOTAL INVENTORY

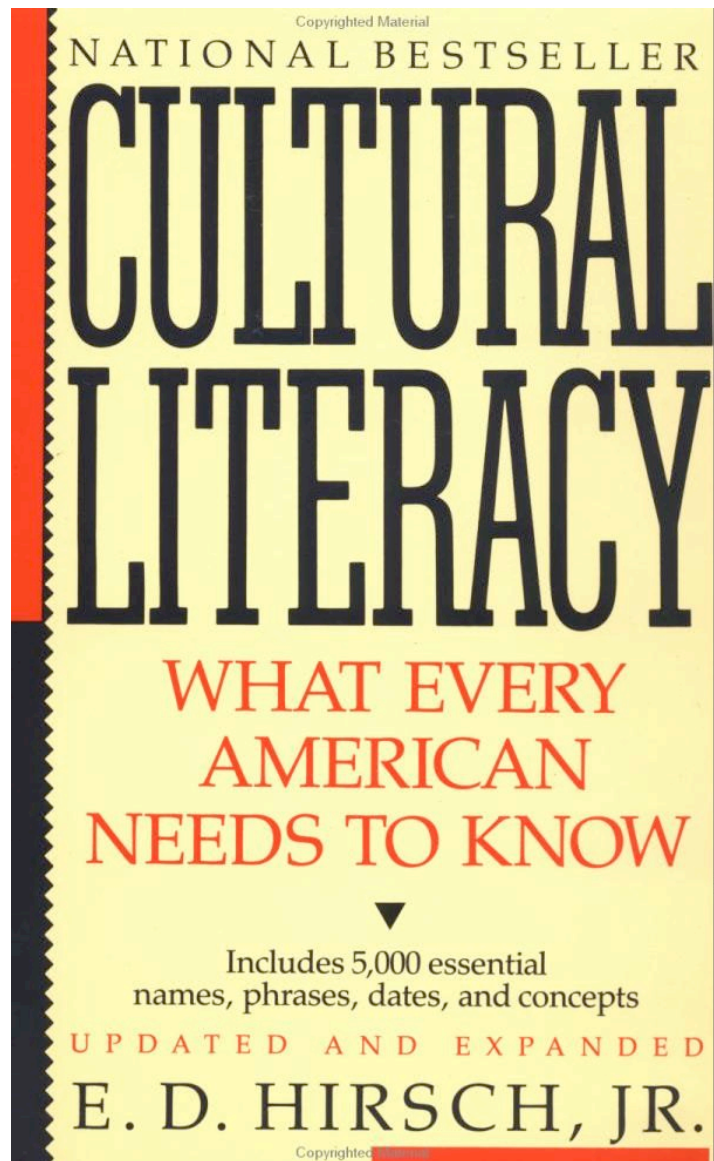
* inventory in a typical store



Exploiting the “Long-Tail” in 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 learningscapes
- **basic knowledge and skills**: learning to learn, learning on demand, preparation for future learning, soft skills,
- **long-tail**:
 - interest and passion
 - self-directed learning and intrinsic motivation
 - personally meaningful problems
 - interesting example → movie: “October Sky”
- **extensive coverage** needed for supporting the infinite numbers of interesting topics — will be facilitated by a “meta-design” culture (Wikipedia)

The Other End: Cultural Literacy



Conclusion: “Building New Worlds Together”

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