



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**

New Mindsets and New Cultures

**Discovery Learning, Lifelong Learning, Learning Communities, and
the University of the Future**

Gerhard Fischer

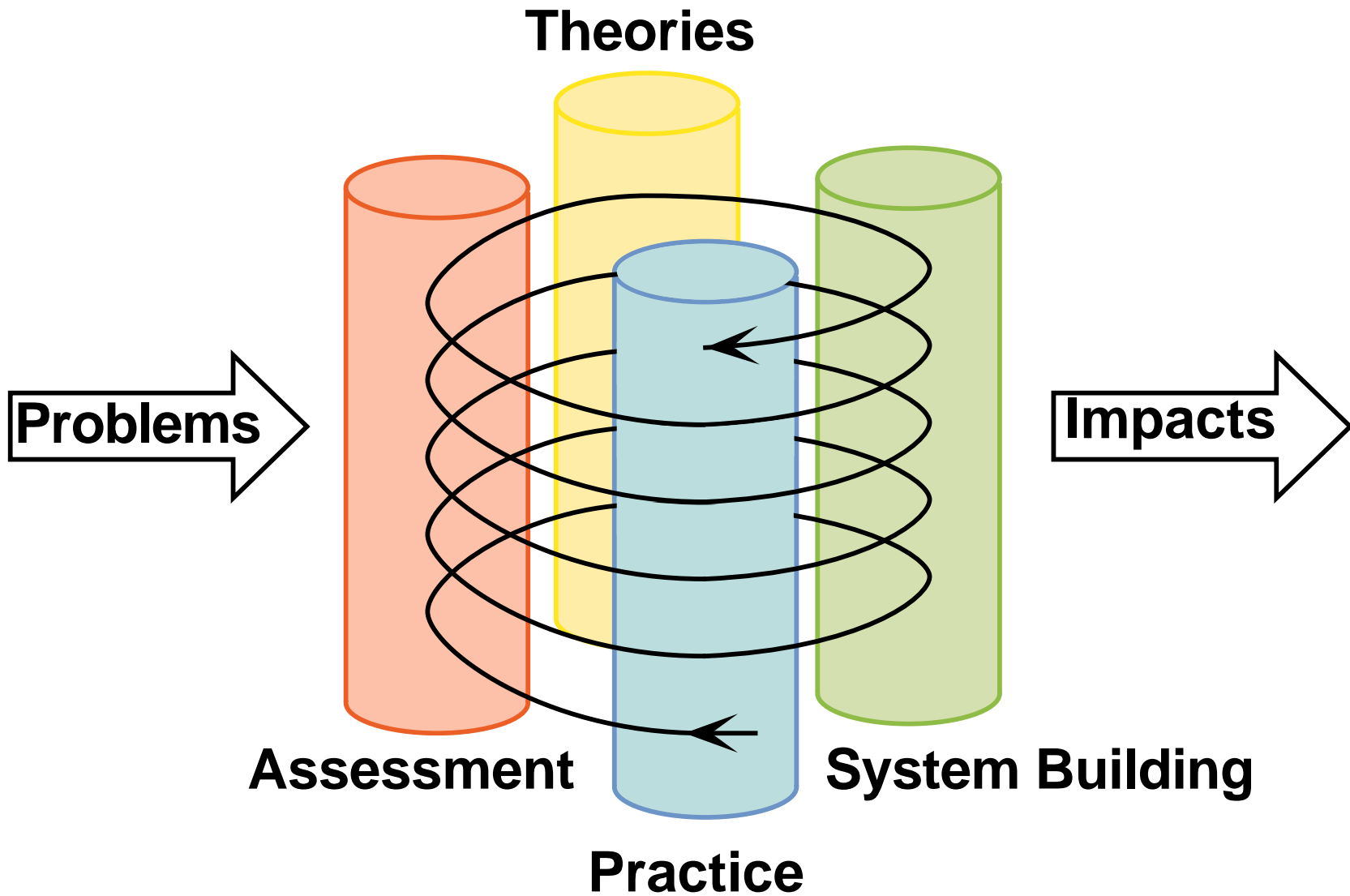
Center for LifeLong Learning & Design (L3D)

<http://www.cs.colorado.edu/~l3d/>

Department of Computer Science and Institute of Cognitive Science

Presentation, Discovery Learning Conference, May 2000

An Integrated Approach



Problems

- **learning in schools and universities → making learning a part of life**
 - lifelong learning: more than adult education
 - change in student body at universities
- **learning / education as a market → competition**
 - for-profit sector, virtual universities, corporate universities
- **new media → new literacies, new demands for lifelong learning**
 - from atoms to bits → intellectual property rights
 - beyond “gift-wrapping” (“webify your courses”)
- **changing demands** (e.g., quality workforce in Information Technology, a world-wide phenomena; see German “green-card” initiative)
 - Technology, Arts and Media (TAM) program at CU
 - Colorado Institute of Technology (CIT), Colorado
 - Information Technology Research (ITR) Program, NSF
- **assessment**
 - test-related improvements ↔ passion for learning

Theories — New Forms of Learning Contributing to Lifelong Learning

Form	Comple- menting Form	Contribution toward Mindset Creation	Major Challenges	Media Requirements
discovery learning	prescribed learning	authentic problems culture of inquiry	problem framing purposive activities	understanding evolving tasks information access and delivery
learning on demand	learning in advance	coverage is impossible obsolescence is guaranteed	identifying breakdowns integration of working and learning	critics support for reflection- in-action
collaborative learning	individual learning	community social capital	shared understanding informed participation	externalizations understandable by all stakeholders group memories

Systems — An Example: The Envisionment and Discovery Collaboratory (EDC)

major contributors: *Ernesto Arias, Hal Eden, Andy Gorman, Eric Scharff*

- **creating shared understanding through collaborative design** → learning is more than being taught
- **integration of physical and computational environments**
- **support for reflection-in-action** → integration of working and learning
- **open system:** an emerging environment evolved by its users acting as active contributors
- **beyond “gift-wrapping”:** explores *innovative* uses of new media and technologies

support: several major research grants from different programs of the National Science Foundation (Education, Computer Science, Computational Infrastructure programs)

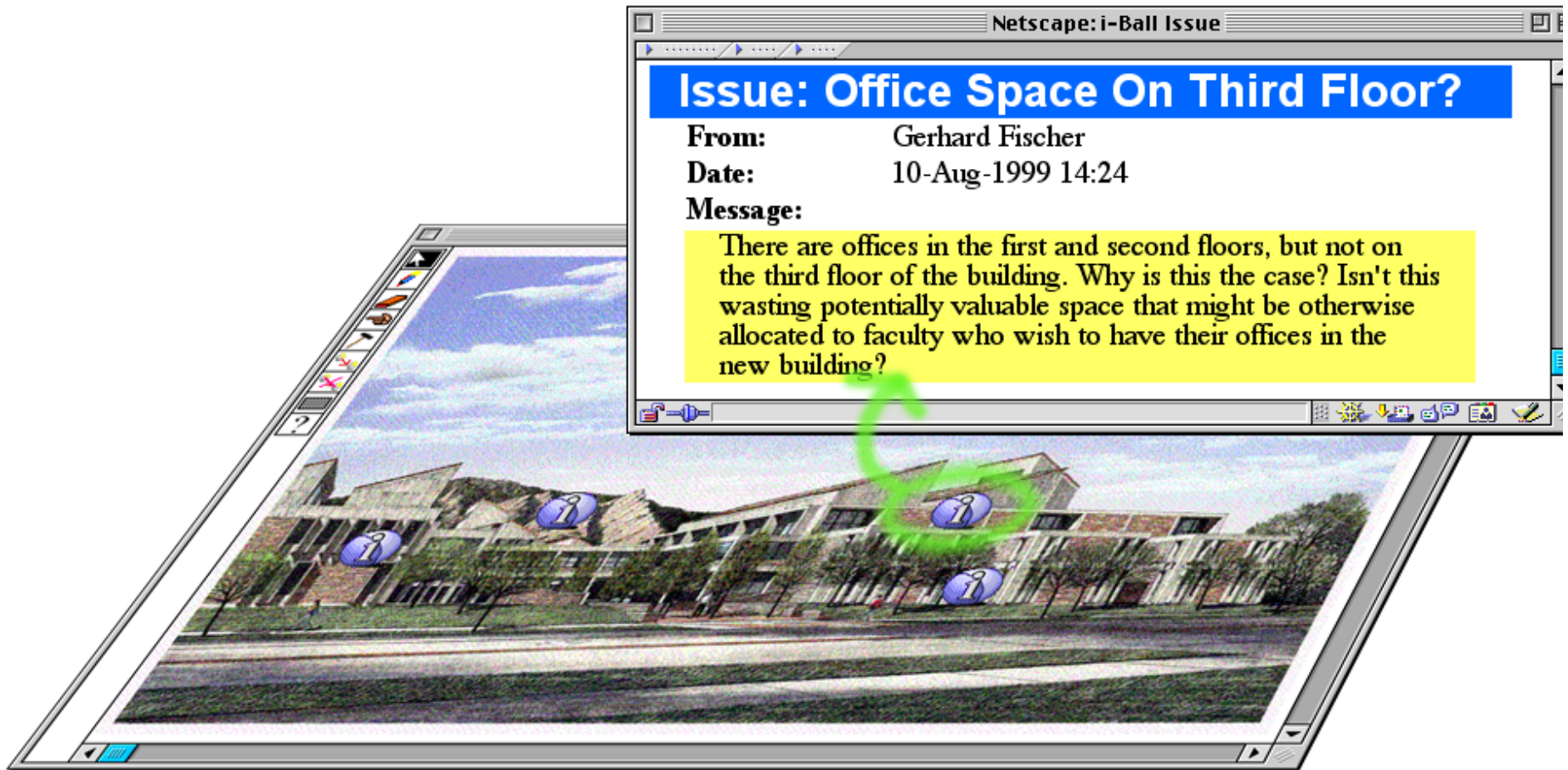
The Envisionment and Discovery Collaboratory



The Envisionment and Discovery Collaboratory: A “Model” and “Paradigmatic Example” for the DLI/DLC

- a “model” for the DLI and DLC:
 - build the conceptual mapping between DL-*Initiative* and DL-*Center*
 - *vertical integration* (undergraduate research apprentices, graduate students, post-docs, faculty, community members)
 - *horizontal integration* (collaborative design, shared understanding, overcome “symmetry of ignorance”)
 - *innovative* uses of new media and technology serving these goals
- **informed participation** (by all stakeholders: architects, administrators, faculty members, students,)
- **beyond “gift-wrapping” → new discourses:**
 - claim:* one of the major roles for new media and new technologies is not to deliver predigested information to individuals, but to provide the opportunity and resources for social debate and discussion (from consumers to designers, from users to co-developers)

Using the EDC to Contextualize Information

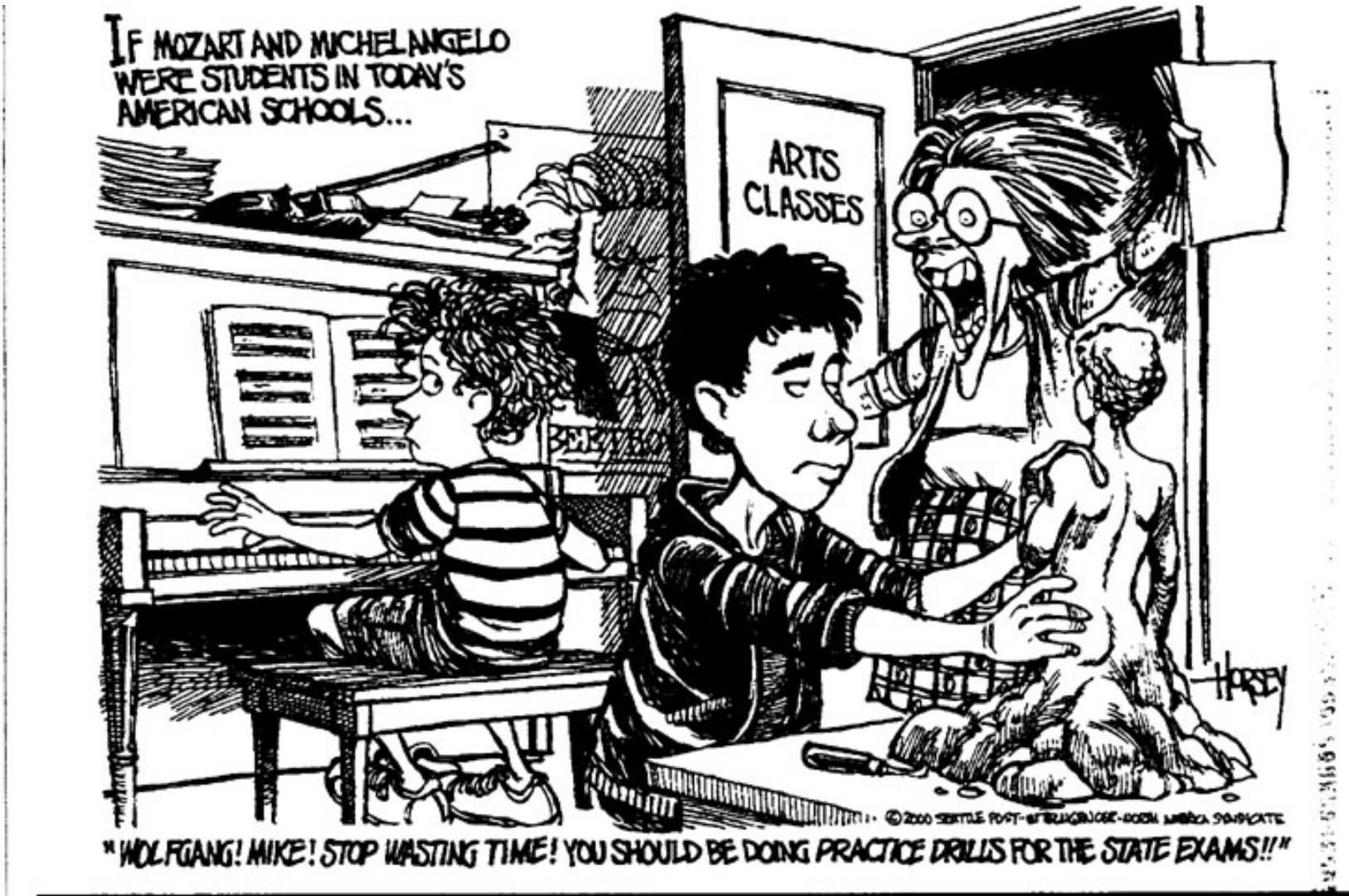


Practice

- **new learning experiences: *learning about* → *learning to be***
 - model: community feeling in sports
 - L3D's "Undergraduate Research Apprenticeship Program (URAP)" and Clayton Lewis' "Educational Technology House" (both will have space in the DLC) → culture of inquiry
 - challenges: scalability, cost-effectiveness

- **courses of the future: *supporting evolving learning communities***
 - lessons learned: to create a community requires more than using collaborative technologies → change of mindsets
 - mismatches between
 - * active, self-directed learners and "sage on the stage" teachers
 - * passive learners and "guide on the side" teachers

Assessment



Assessment: Understanding the Mindsets of Students

Feedback from Students Taking one of Our Courses

- **a negative comment :** *“I will not ever take a course of this nature again in my undergraduate career, and I hope to find a more structured graduate program. I will reinforce my strengths by continuing to study in the method that I have developed over the past 15 years. I will avoid unstructured class environments.”*
- **a positive comment:** *“When I signed up for this class I had no idea what it was going to be about. Once I started understanding the material, however, I was extremely thrilled and interested to be a part of one of the most progressive courses on campus. I'm not sure what specifically to say except that I rank this class in the top three that I've taken at CU. The self-directed nature of the work ensured that I wouldn't be bored or unchallenged, and the interplay between all of us was a lot of fun. After four and a half years in college, I can honestly say that this is one of the first courses where I was treated as an adult, a fact which means more to me than I can describe.”*
- **the fundamental challenge:**
 - test-related improvements ↔ passion for learning

“Open Source” and “Open Systems”

- an **intellectual paradigm requiring a new mindset**
 - objective: leverage is gained by engaging the whole world as your talent pool
 - from users/consumers → co-designers/active contributors
- **some examples:**
 - open source: collaborative development of software
 - Educational Software Components of Tomorrow (ESCOT): digital libraries of sharable educational software (NSF funded project) → <http://www.escot.org>
 - the scientific method/enterprise itself → *“software/knowledge is not a commodity to be consumed, but is a collaboratively designed and constructed artifact”*
- **some characteristics:**
 - evolutionary design of complex systems
 - success stories so far: technically sophisticated developers, not end-users
 - social capital = the incentive to be a good colleague, to contribute and receive knowledge as a member of a community

Challenges and Questions

“If you think education is expensive, try ignorance!”

- **costs ↔ quality**: role and value of “residential, research-based universities” in the global, educational market of the future
- **Peter Drucker**: “There is nothing so useless as doing efficiently that which should not be done at all.”
- **“basic” skills**: if most job-relevant knowledge must be learned on demand
→ *what is the role of “basic” skills?*
- **“school-to-work” transition**:
 - if the world of working and living relies on collaboration, creativity, definition and framing of problems, dealing with uncertainty, change, distributed cognition, symmetry of ignorance,
 - *then the world of schools and universities need to prepare students to be able to have a meaningful life in this world*

Conclusions

- move beyond “technology-driven development” and “gift-wrapping” to a **co-evolution** between
 - a new understanding of thinking, working, learning, and collaborating
 - new learning organizations
 - new media and technologies
- **change of mindsets and cultures** (of learners, teachers, researchers, administrators, institutions,
- the future is not out there to be “discovered” — it has to be **invented and designed**

We here at CU want to make — in collaboration with all of you — a major contribution to the future of learning