



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 Forms of Collaborations: Learning Webs, Intensional Networks, Social Navigation, Recommender Systems

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source: Terveen, L. & Hill, W. (2001) "Beyond Recommender Systems: Helping People Help Each Other." In J. M. Carroll (Ed.) Human-Computer Interaction in the New Millennium, ACM Press, New York, pp. 487-509

Learning Webs

source: Illich, I. (1971) *Deschooling Society*, Harper and Row, New York.
Chapter 6: “Learning Webs

- to conceive a different style of learning
- people are learning many things **outside** of schools
- **Illich’s objectives:**
 - we can depend on self-motivated learning instead of employing teachers’
 - to bribe or compel the student to find the time and the will to learn
 - we can provide the learner with new links to the world instead of continuing to funnel all educational programs through the teacher

Criteria for a Good Educational System

- provide all who want to learn with access to available resources at any time in their lives
- empower all who want to share what they know to find those who want to learn it from them
- furnish all who want to present an issue with the opportunity to make their challenge known

Four Approaches

- **reference services to educational objects**
 - Educational Object Economy (EOE) <http://www.eoe.org>
 - Agentsheets Behavior Exchange
<http://agentsheets.cs.colorado.edu/Behavior-Exchange/>
 - ESCOT <http://www.escot.org/overview.html>
- **skill exchange**
 - who do I tell?
 - who do I ask?
- **peer-matching**
 - communities of practice
 - communities of interest
 - social networks
 - Web2gether: <http://www.cs.colorado.edu/~l3d/clever/projects/web2gether.html>
- **reference services to educators-at-large**
 - PHOAKS: <http://www.phoaks.com//index.html>
 - Experts Exchange: <http://www.experts-exchange.com/>

Intensional Networks

source: Bonnie A. Nardi, Steve Whittaker. Heinrich Schwarz, “NetWORKers and their Activity in Intensional Networks”, Computer-supported Cooperative Work, 2001.

- intensional Networks = personal social networks in the workplace
- claim: groups (“collective subjects”) are
 - increasingly put together through the assemblage of people found through personal networks
 - rather than being constituted as teams created through organizational planning and structuring
- questions to be asked:
 - how and why do people get together for collective activity?
 - how do people find and communicate one another for purposes of joint work?

Different Forms of Groups

- communities of practice
 - homogenous groups
 - defined by a shared and well-established practice
- communities of interest
 - heterogenous groups (= communities of communities of practice)
 - form around problems and issues
- teams
 - units in organizations
 - defined by management
- intensional networks
 - “who do I ask” and “who do I tell”
 - cross-organizational collaborations (customers, vendors, contractors, consultants, business alliance partners)
- knotworking
 - knot = important form of work group in which combinations of people, tasks and tools are unique and of relatively short duration
 - examples: airline crews, operating room teams

Social Navigation

source: Dieberger, A., Dourish, P., Höök, K., Resnick, P., & Wexelblat, A. (2000) "Social Navigation: Techniques for Building More Usable Systems," *Interactions*, 7(6), pp. 36-45.

- **original source of the idea:** Bush, V. (1945) "As We May Think," *Atlantic Monthly*, 176(1), pp. 101-108.
 - foundational paper for hypermedia systems ("Memex")
 - concept of a "trailblazer"
- **social navigation**
 - is a closer reflection of what people actually do than it is a result of what designers think people should be doing
 - relies on the way that people occupy and transform spaces
 - history-enriched environments ("read wear" and "edit ware") show visible actions of other users → social affordances
- **design of spaces**
 - without social navigation: mostly done by the designer
 - with social navigation: aggregated behaviors take part in shaping systems

Recommender (or Collaborative Filtering) Systems

source: Terveen, L., Hill, W., Amento, B., McDonald, D., & Creter, J. (1997) "PHOAKS: A System for Sharing Recommendation," Communications of the ACM, 40(3), pp. 59-62.

- when a person is faced with a decision, he or she often seeks the opinions of others, particularly those with relevant expertise who have offered useful advice in the past
- recommender (or collaborative filtering) systems aim to automate this everyday process
- concepts for recommendation
 - based on the preferences of the recommender
 - serves as a view or filter onto the whole, often inaccessible, universe
 - directed to individual or broadcast to anyone who's interested
 - preferences of the recommendation seeker
- examples areas:
 - music, books, movies
 - food, restaurants
 - university courses to take
 -

Research Ideas and Prototypes

- **Active recommending** — a person explicitly looks for interesting items (say, articles in online newspapers), and recommends these items to colleagues and friends
 - **Rating-based systems** — people rate items (such as books they've read), their ratings are compared to those of many other people to find individuals with similar tastes (their "nearest neighbors"), and items that the nearest neighbors rated highly are offered as recommendations.
 - **Social data mining systems** — mine computational activity records (such as conversations in Usenet, message boards, or chat rooms, links between web sites, and website usage logs) for recommendation data.
- **claim:** The recommender systems field has exploded with the rise of the World Wide Web.

Examples of the Different Approaches

- **Active recommending**

- The web provides an outlet for the small, but very active and influential minority of individuals who want to troll for information and share their findings with others.
- The current weblog phenomenon, in which growing numbers of individuals collect and annotated lists of links that reflect their interests and perspectives, is active recommending in the large.

- **Rating-based systems**

- systems meet the desire of individuals to access items they are likely to find interesting, and of merchants to maximize sales.
- They are enabled by the vast databases of customer purchase history and preferences that e-commerce sites like CDNow and Amazon.com collect.

- **Social data mining systems —**

- usage data
- the social data mining approach is beginning to be applied, most notably in systems that analyze links between web sites as a means of clustering and ranking sites

An Example: PHOAKS (People Helping One Another Know Stuff)

—
“Together we know it all”

- **PHOAKS:** <http://www.phoaks.com//index.html>
 - an experimental collaborative filtering site
 - help each other find appropriate and relevant web resources in a simple and timely manner.
- **how it works:**
 - People post their opinions of web resources in Usenet Netnews
 - Around the clock, PHOAKS reads, classifies, abstracts and tallies those opinions automatically
 - PHOAKS filters out most spurious and signature references
 - PHOAKS adds about 4,000 new opinions everyday

Recommender Systems and Approaches

approaches issues	content-based	recommender support	social data mining	collaborative filtering
preference	seeker's preferences only		mines preferences	seekers must state preferences
roles and communication	system automates role asymmetry	systems supports humans recommenders and seekers	system automates potential for community privacy concerns	system automates
algorithm	machine learning and information retrieval		data mining	preference matching and weighting
HCI			visualization	explanation

Current Challenges and New Opportunities

- forming and supporting communities of interest
 - naturally occurring communities as laboratories → <http://slashdot.org/>
 - forming communities automatically (while respecting privacy)
- combining multiple types of information to compute recommendations
 - authority and expertise, not just similarity of taste
 - combining multiple sources of preferences