Introduction to Social Computing

Irwin King

king@cse.cuhk.edu.hk
http://www.cse.cuhk.edu.hk/~king

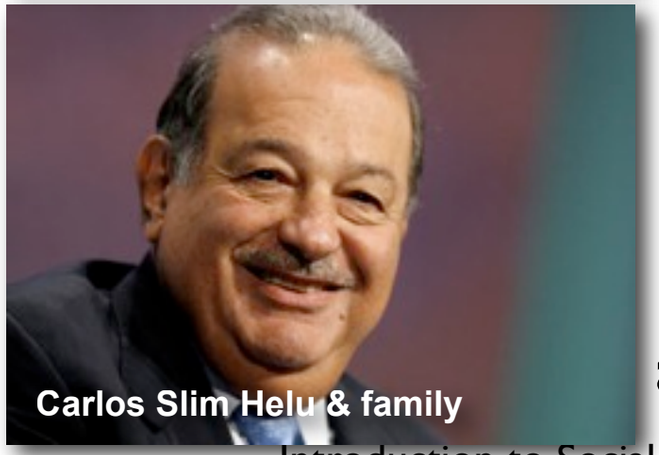
Department of Computer Science & Engineering
The Chinese University of Hong Kong

Introduction to Social Computing, GEN2182 Science and Modern Society, CUHK, April 4, 2009

Social Networking

Billionaires' Shuffle

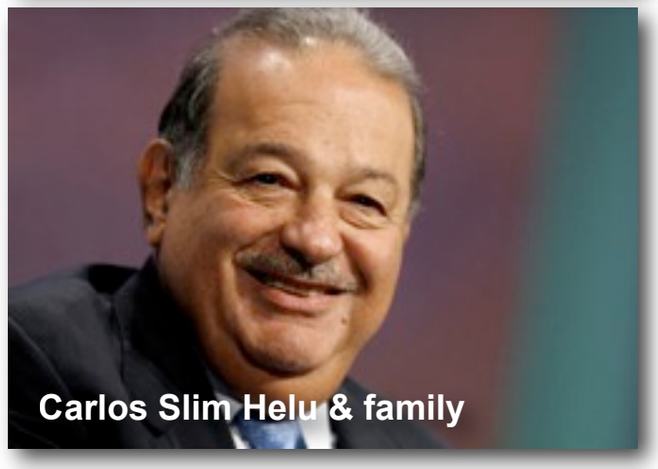
2007



Facebook in 2004.02

2008

at **23** and $**1.5** billion later...

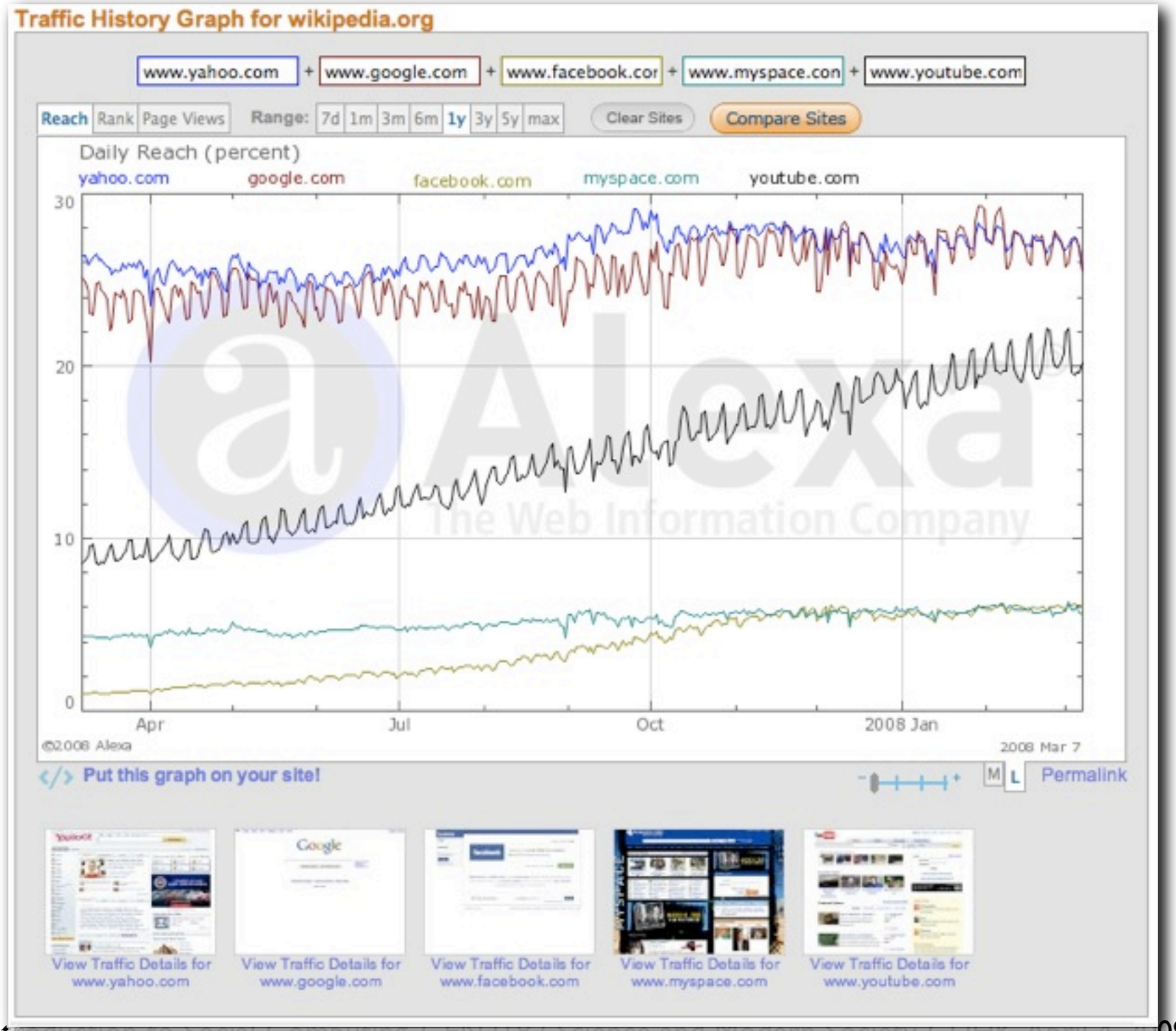


2008

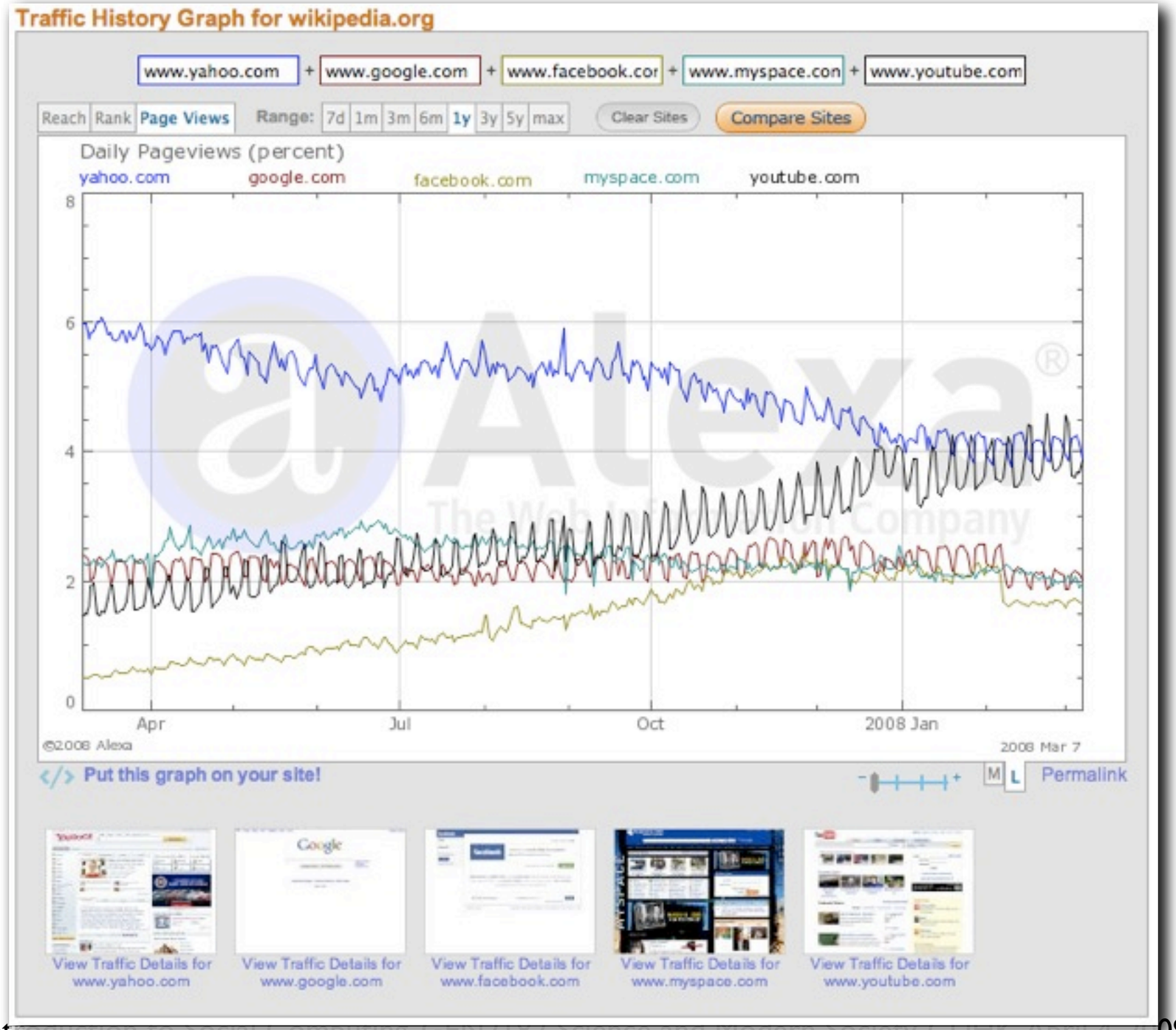
Global Traffic Rankings

Alexa as of Nov. 2008	USA	CHINA	Global
1	Google	Baidu	Yahoo
2	Yahoo	**QQ**	Google
3	**Myspace**	Sina	**YouTube**
4	**YouTube**	Google.cn	Windows Live
5	**Facebook**	Taobao	**Facebook**
6	Windows Live	163	MSN
7	MSN	Yahoo	**Myspace**
8	**Wikipedia**	Google	**Wikipedia**
9	EBay	Sohu	**Blogger**
10	AOL	Youku	Yahoo.jp

Internet Reach



Internet PageView



Web 2.0 Growth

Where Are We Going?

- The Web 2.0 Revolution...
- Social XXX
- What's Cooking...
- Social Computing in Education
- Conclusion

Web 2.0 and Social Computing

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Web 2.0 Manifesto

Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences.

Web 2.0 Cloud

Aggregators
Folksonomy
Wikis
Blogs
User Centered
Joy of Use
Participation
Six Degrees
Usability
Pagerank
XFN
Widgets
Recommendation
Social Software
FOAF
Browser
Simplicity
Sharing
Collaboration
Perpetual Beta
Videocasting
Podcasting
AJAX
Audio
IM
Video
Web 2.0
Design
Convergence
CSS
Pay Per Click
UMTS
Mobility
Atom
XHTML
SVG
Ruby on Rails
VC
Trust
Affiliation
OpenAPIs
RSS
Semantic
Web Standards
SEO
Economy
OpenID
Remixability
REST
Standardization
The Long Tail
DataDriven
Accessibility
XML
Microformats
Syndication
Modularity
SOAP

Web 2.0 Defined

"Web 2.0 is the **business revolution** in the computer industry caused by the move to the **Internet as platform**, and an attempt to understand the rules for success on that new platform."

Tim O'Reilly, 2004

"Web 2.0 is a **knowledge-oriented** environment where human interactions generate content that is published, managed and used through **network applications** in a **service-oriented architecture**."

Dario de Judicibus, 2008

Levels of Web 2.0

	Characteristics	Examples
Level-0	Operate well offline as well as online	MapQuest, Yahoo! Local and Google Maps, etc.
Level-1	Operate offline and gain features online	Google Docs & Spreadsheets, iTunes, etc.
Level-2	Operate offline and gain advantage online	Flickr, YouTube, etc.
Level-3	Exist **ONLY** on the Internet	eBay, Craigslist, Wikipedia, del.icio.us, Skype, AdSense, etc.

Web 2.0

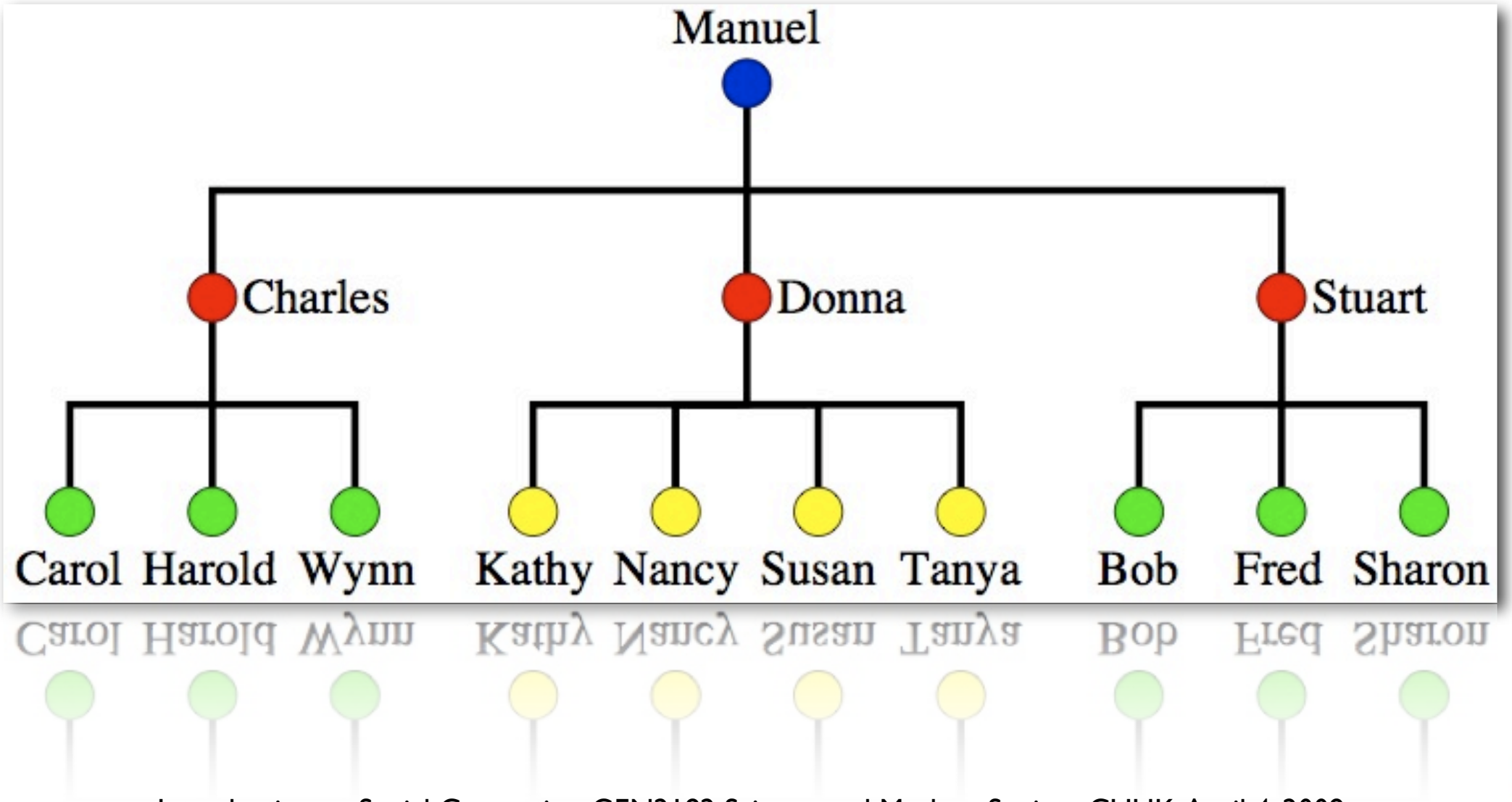
- Web as a medium vs. **Web as a platform**
- Read-Only Web vs. **Read-and-Write Web**
- Static vs. **Dynamic**
- Restrictive vs. **Freedom & Empowerment**
- Technology-centric vs. **User-centric**
- Limited vs. **Rich User Experience**
- Individualistic vs. **Group/Collective Behavior**
- Consumer vs. **Producer**
- Transactional vs. **Relational**
- Top-down vs. **Bottom-up**
- People-to-Machine vs. **People-to-People**
- Search & browse vs. **Publish & Subscribe**
- Closed application vs. **Service-oriented Services**
- Functionality vs. **Utility**
- Data vs. **Value**

Web 2.0 Revolution

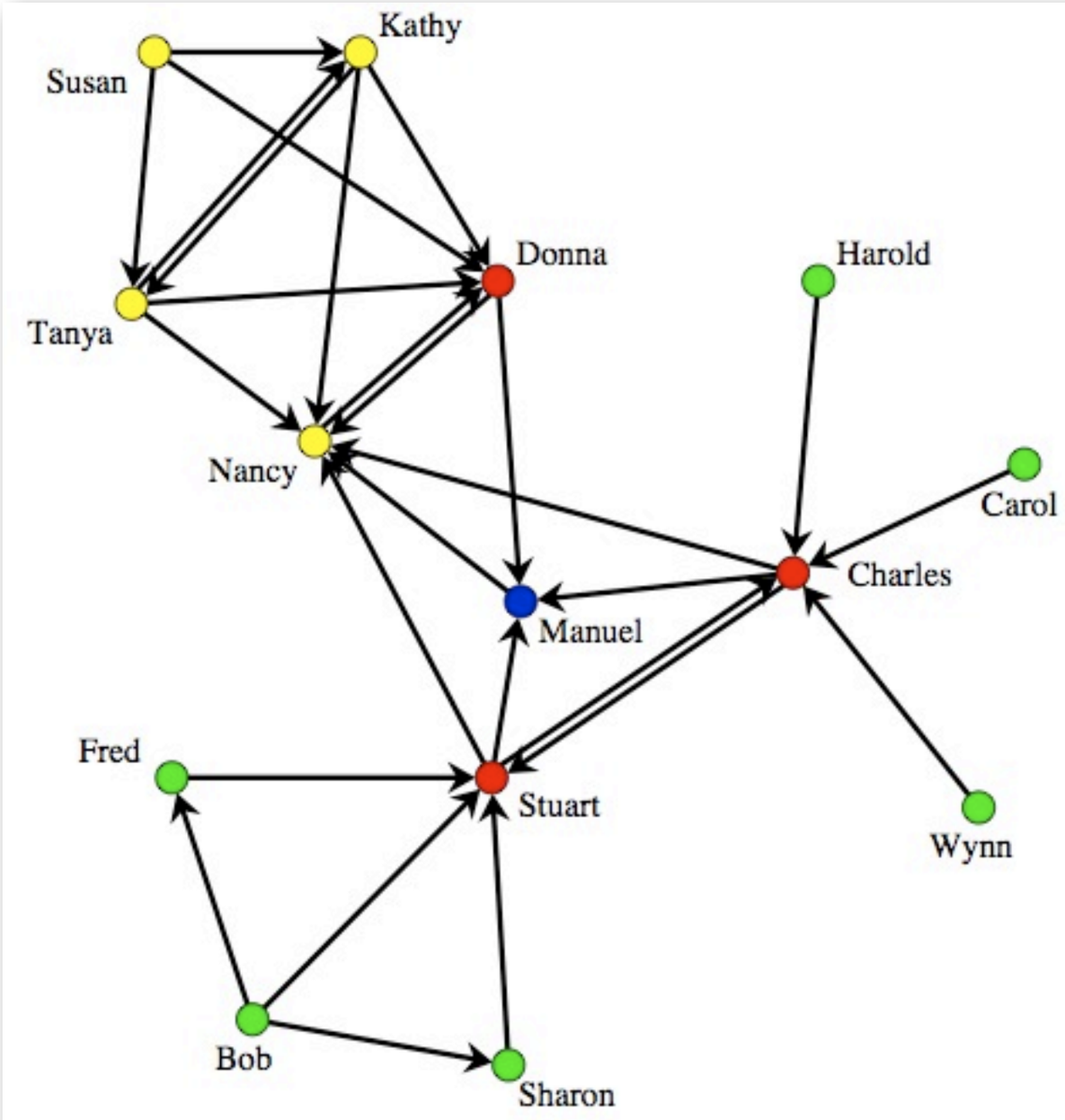
- Glocalization-think globally and act locally!
- Weblication-Web is the application!
- 3 Cs
  - Connectivity
  - Collaboration
  - Communities

The Social Web

Organizational Chart



Social Network Chart



1.00	Nancy	(secretary)
0.66	Donna	(supervisor)
0.57	Manuel	(manager)
0.19	Stuart	(supervisor)
0.17	Charles	(supervisor)
0.08	Kathy	(secretary)
	Tanya	(secretary)
0.02	Fred	(auditor)
	Sharon	(auditor)
0.00	Bob	(auditor)
	Carol	(auditor)
	Harold	(auditor)
	Wynn	(auditor)
	Susan	(secretary)

Social Platforms

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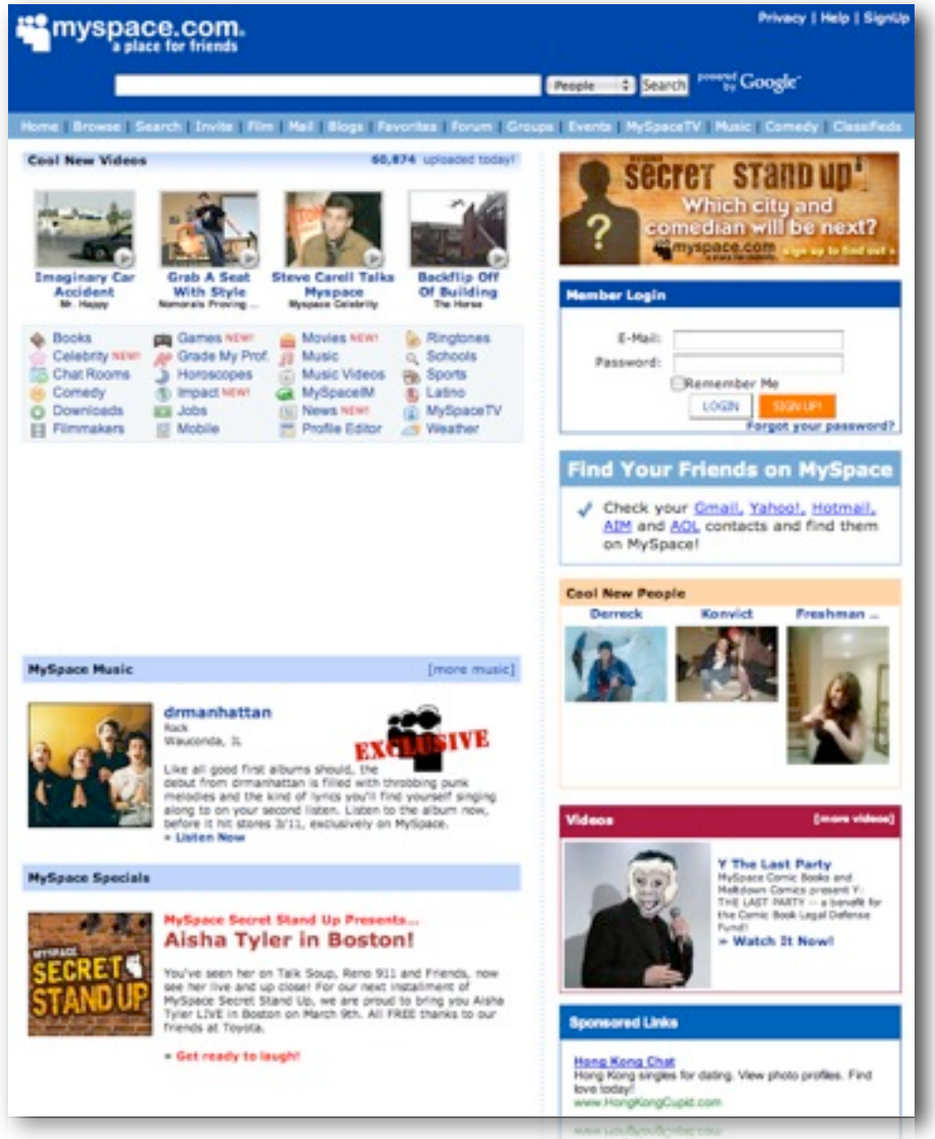
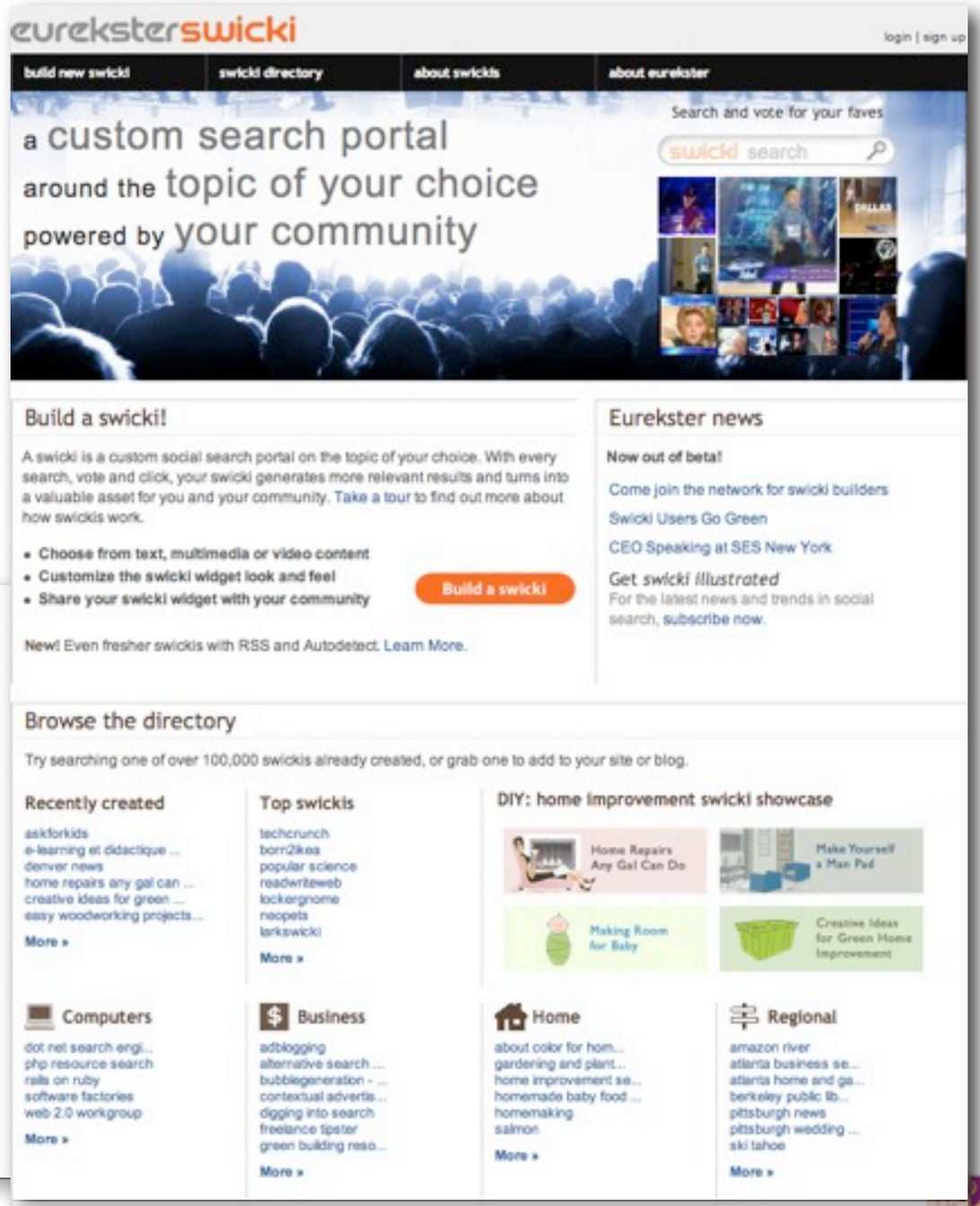
Social Networking



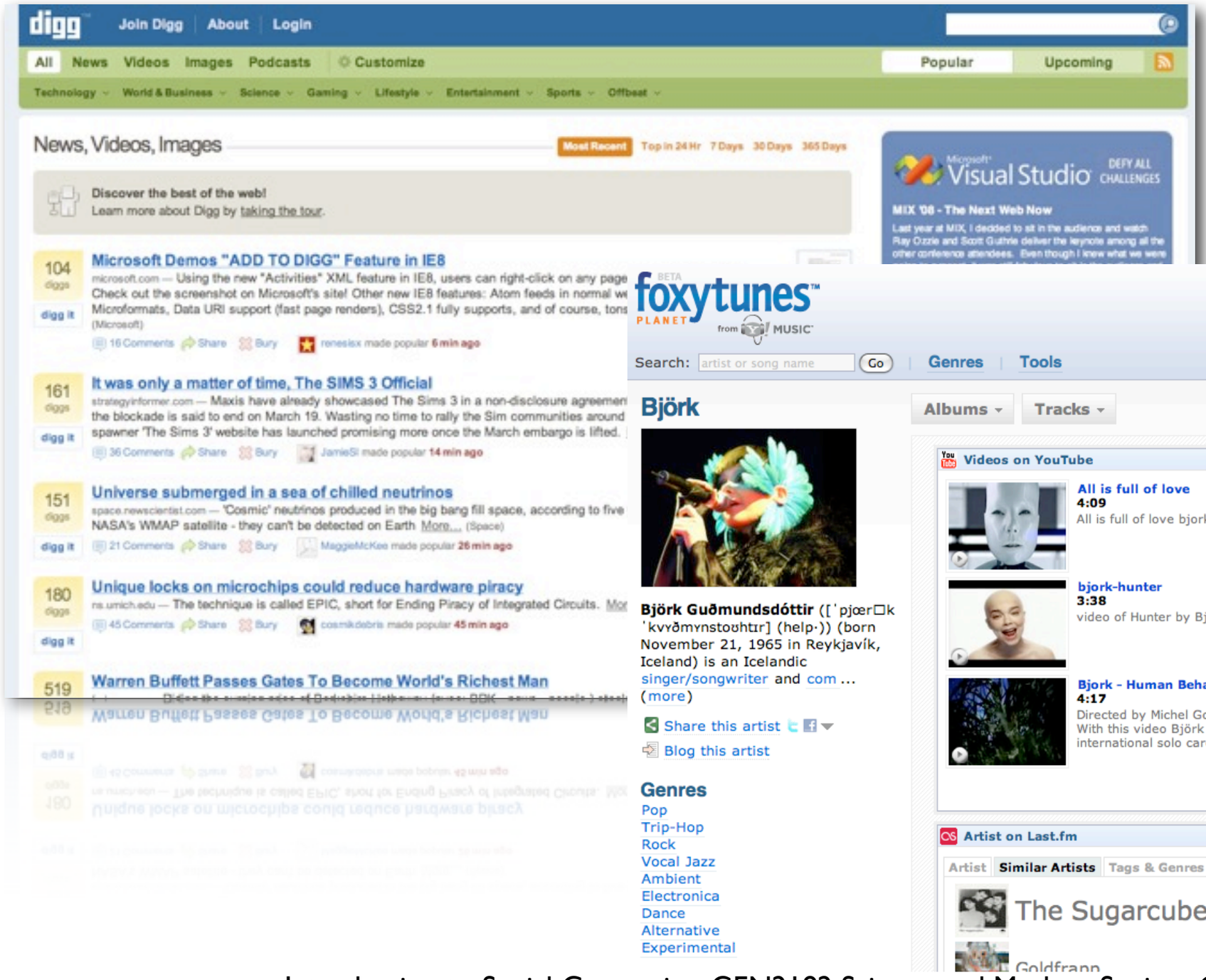
Social Sharing

Social Search

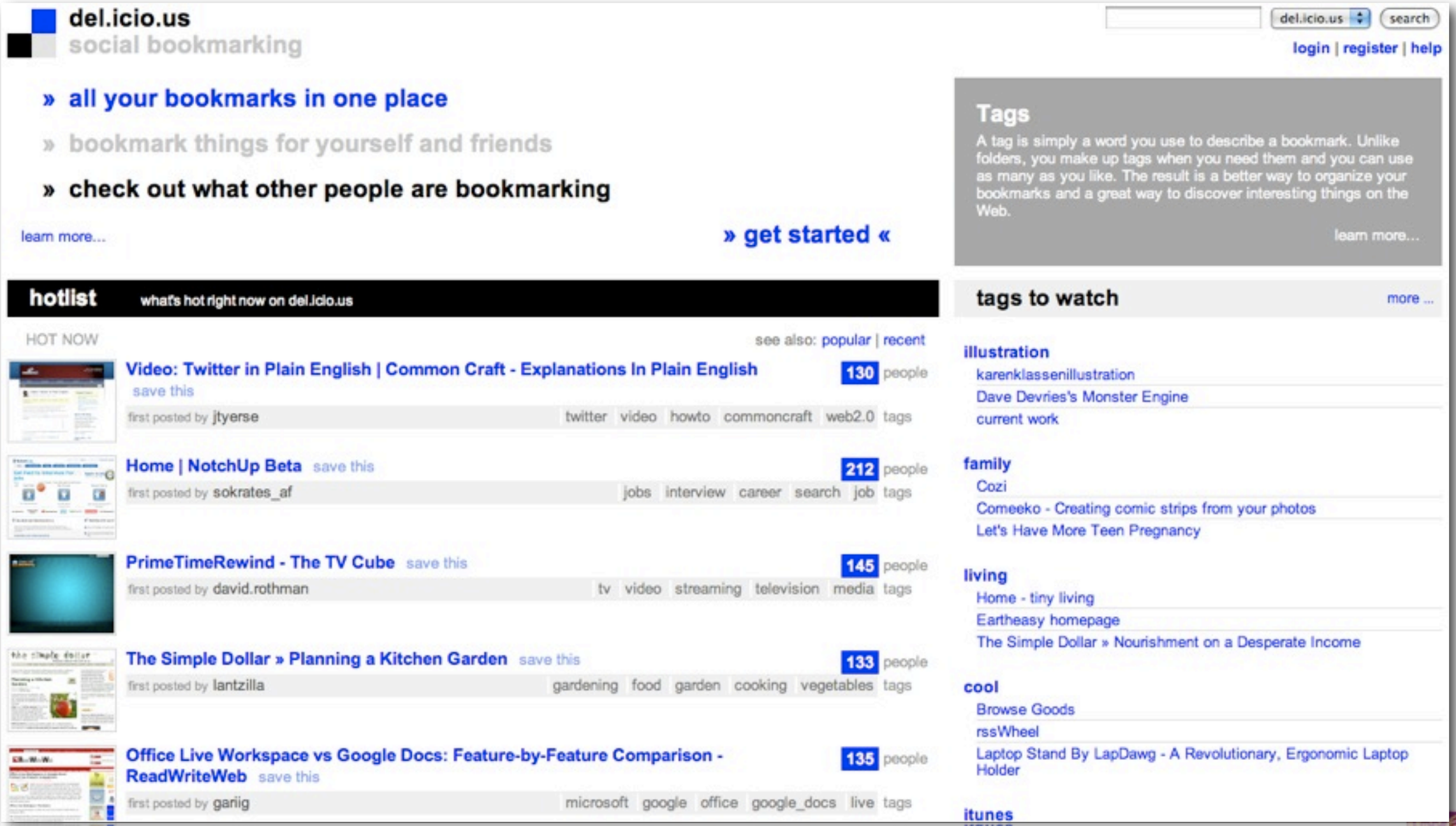
- Social Search Engine
- Leveraging your social networks for searching



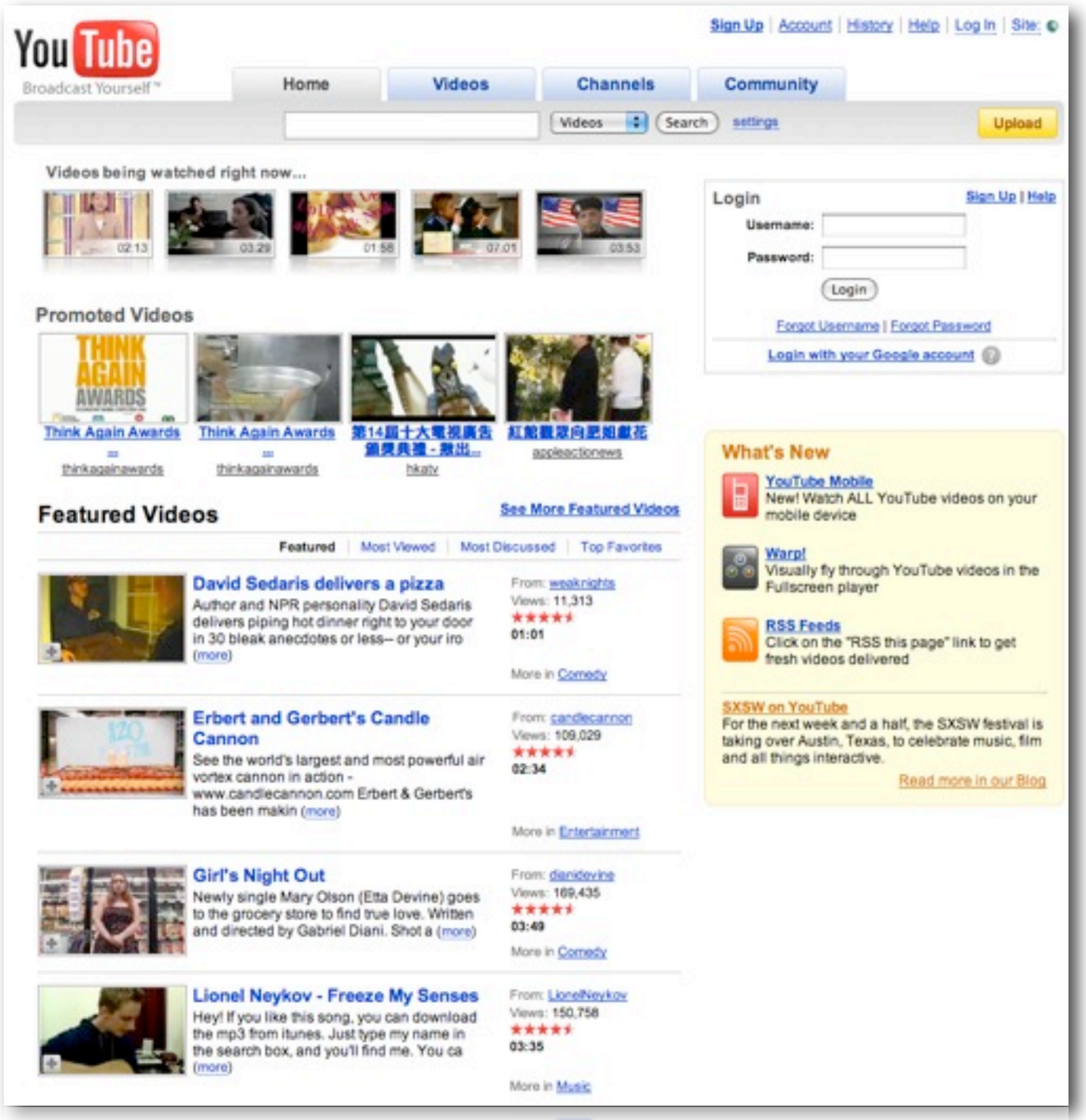
Social News/Mash Up

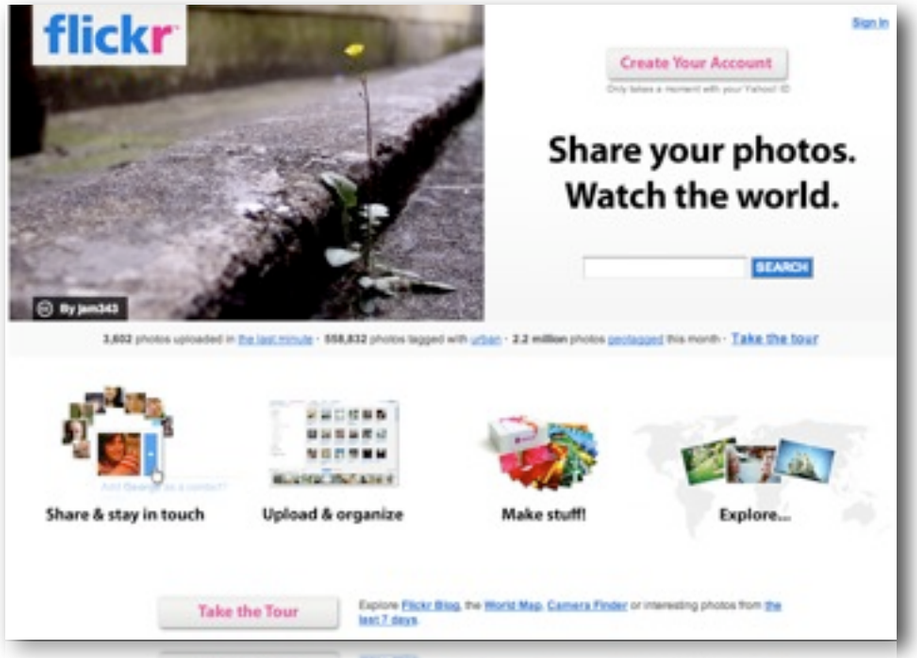


Social Bookmarking

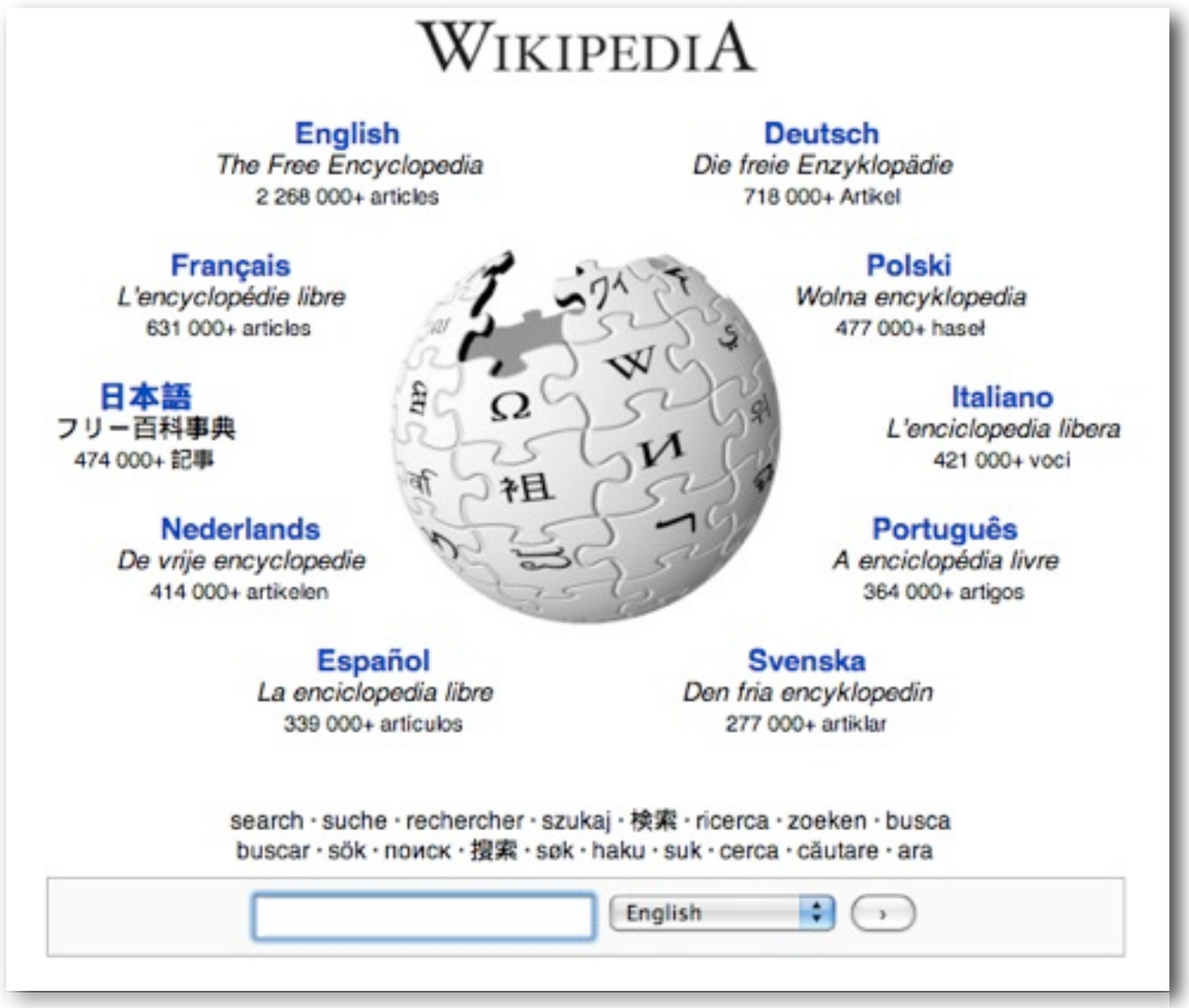


Social Media



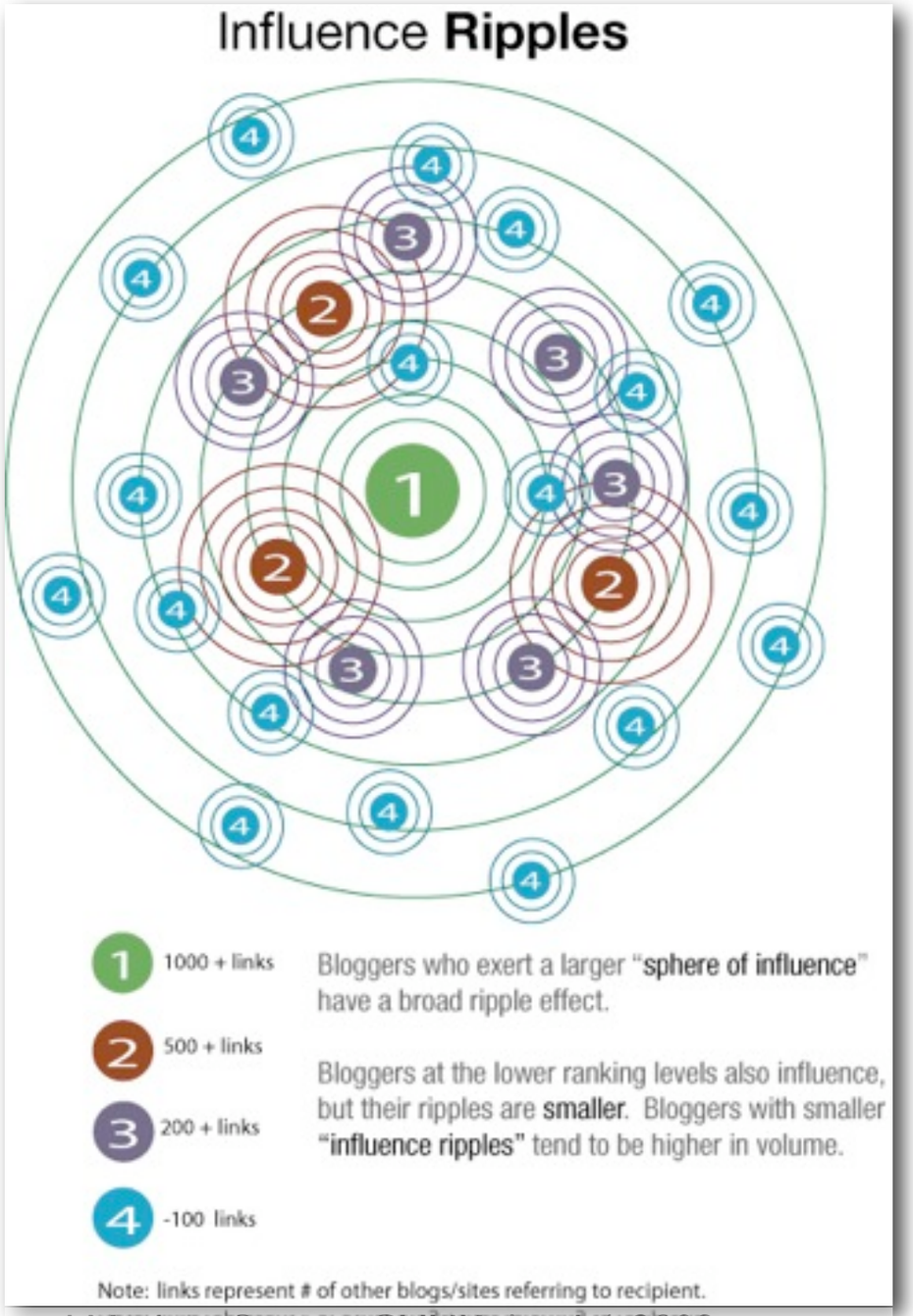


Social Knowledge Sharing



Social Marketing

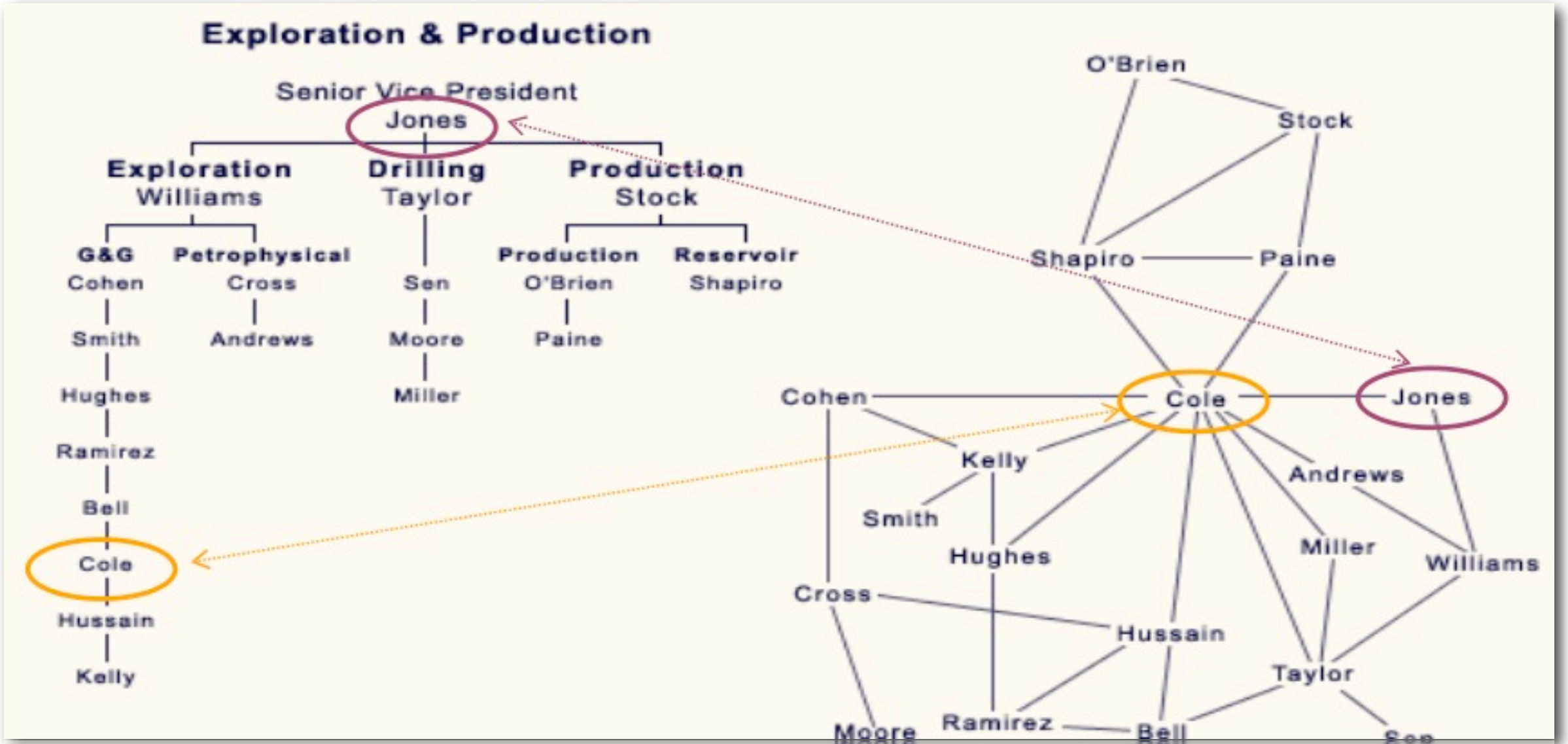
- Viral marketing
- Who are the brokers?
- Who can exert the most influence on buying/ selling?
- How much should one advertise?



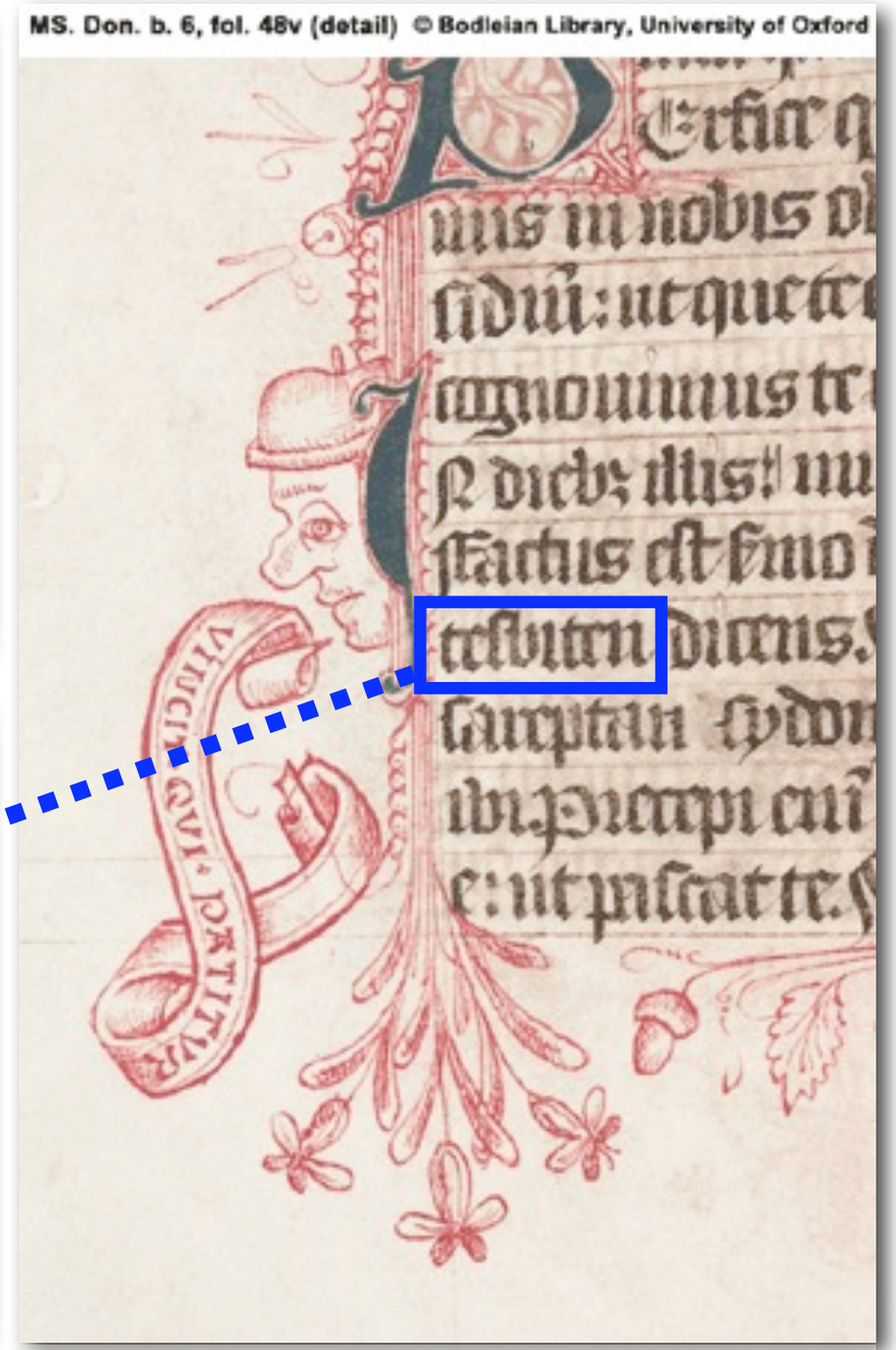
The Golden Rules

- Gives away valuable products or services
- Provides for effortless transfer to others
- Scales easily from small to very large
- Exploits common motivations and behaviors
- Utilizes existing communication networks
- Takes advantage of others' resources

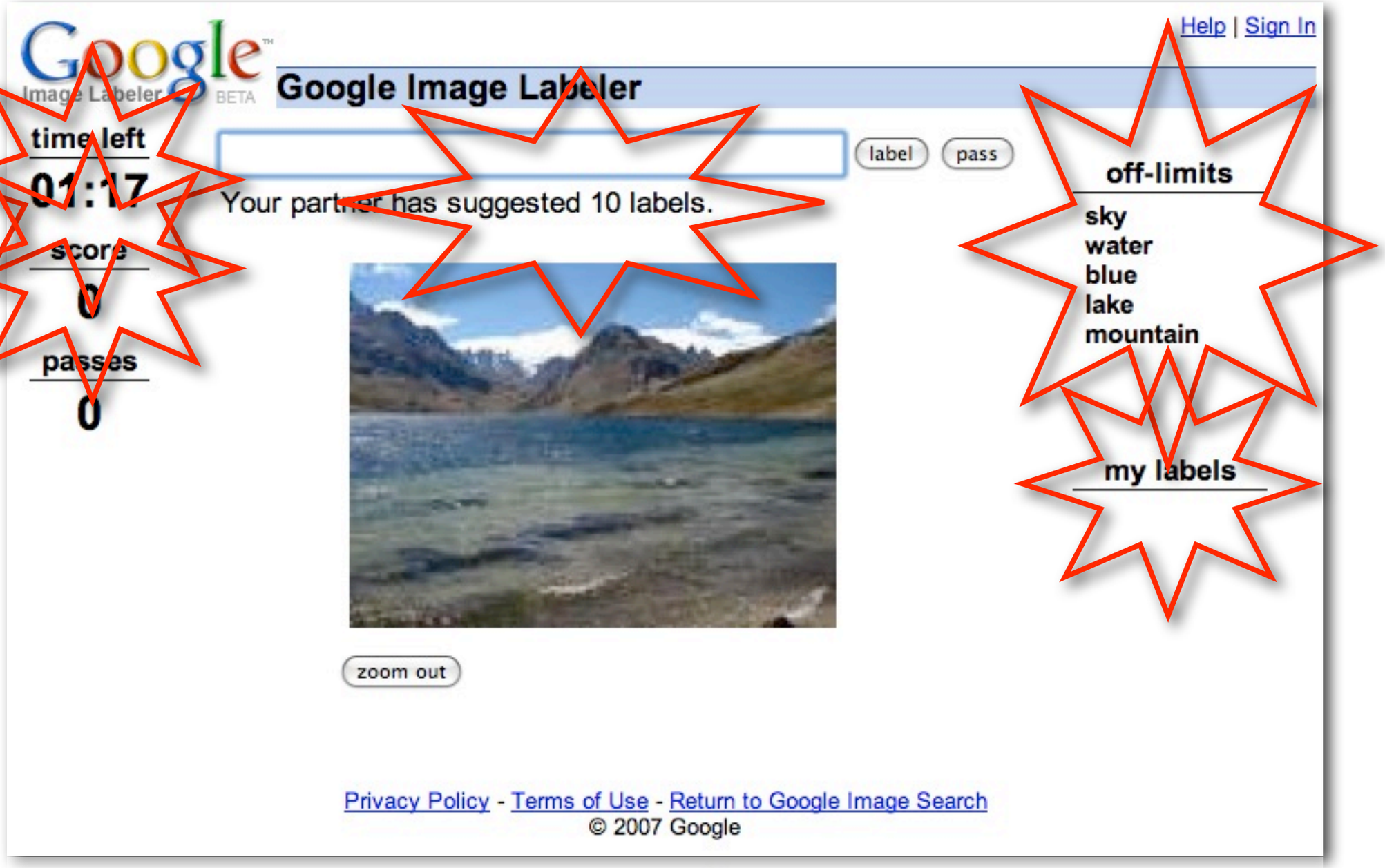
Social Management



Social/Human Computation



Google's Image Labeler



Games With A Purpose

- **Matchin**
  - Image search by aesthetic value
- **Babble**
  - Translate foreign language into English
- **InTune**
  - Tags songs with description text
- **Squigl**
  - Image segmentation
- **Verbosity**
  - Database of common knowledge description

Social Computing

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Social Relations

crew

teams

populations

squad

organizations

cohorts

markets

communities

partners

groups

binary

cardinal

integer

real

presence

identity

social role

reputation

expertise

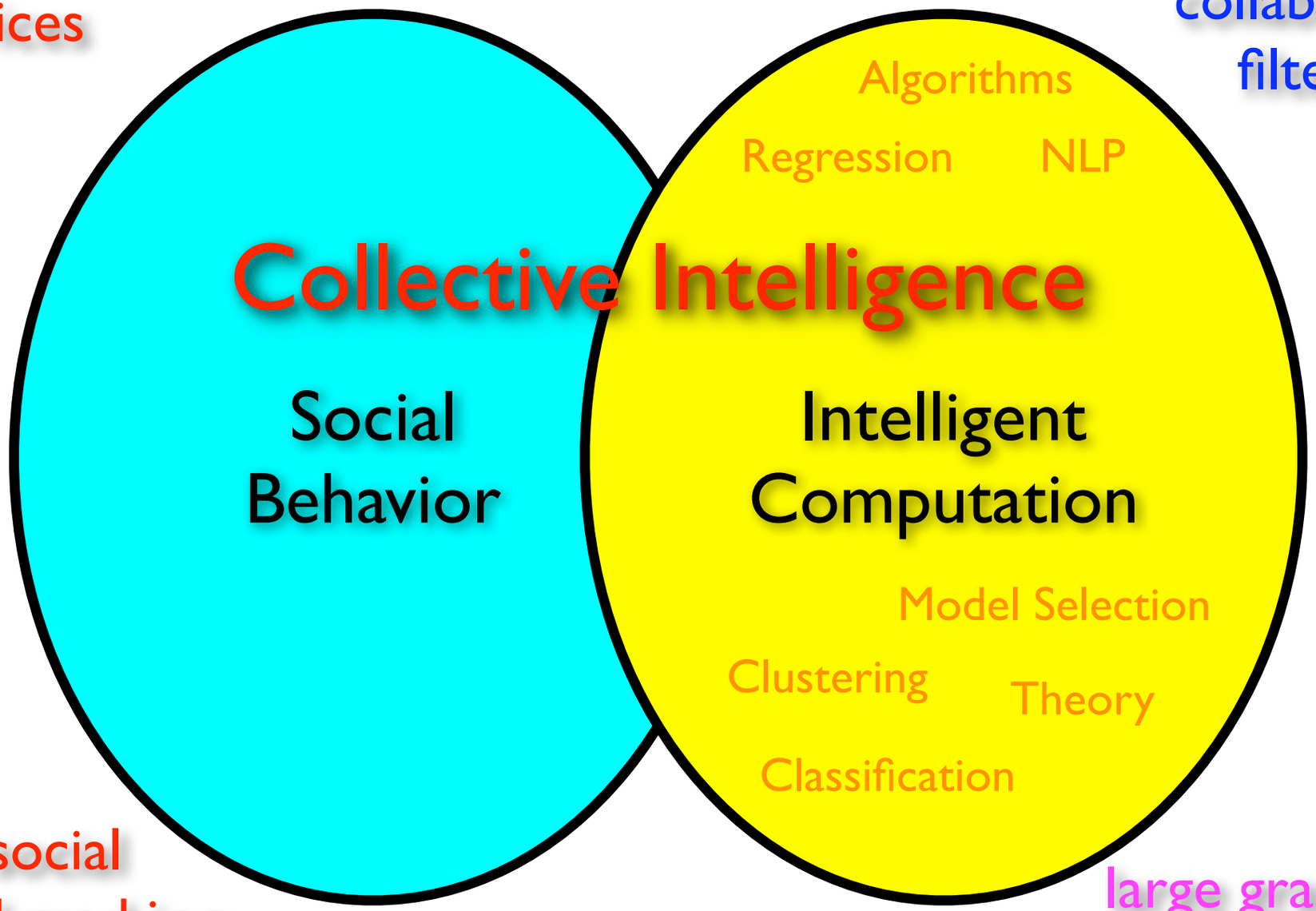
trust

ownership

accountability

knowledge

Social Computing



social network services

wikis

blogs

emails

instant messaging

mobile devices

social bookmarking

ranking

tagging

collaborative filtering

Algorithms

Regression

NLP

social marketing

human computation

opinion mining/ sentiment analysis

query logs analysis

Model Selection

Clustering

Theory

Classification

large graph algorithms

security & privacy

Social Computing (SC)

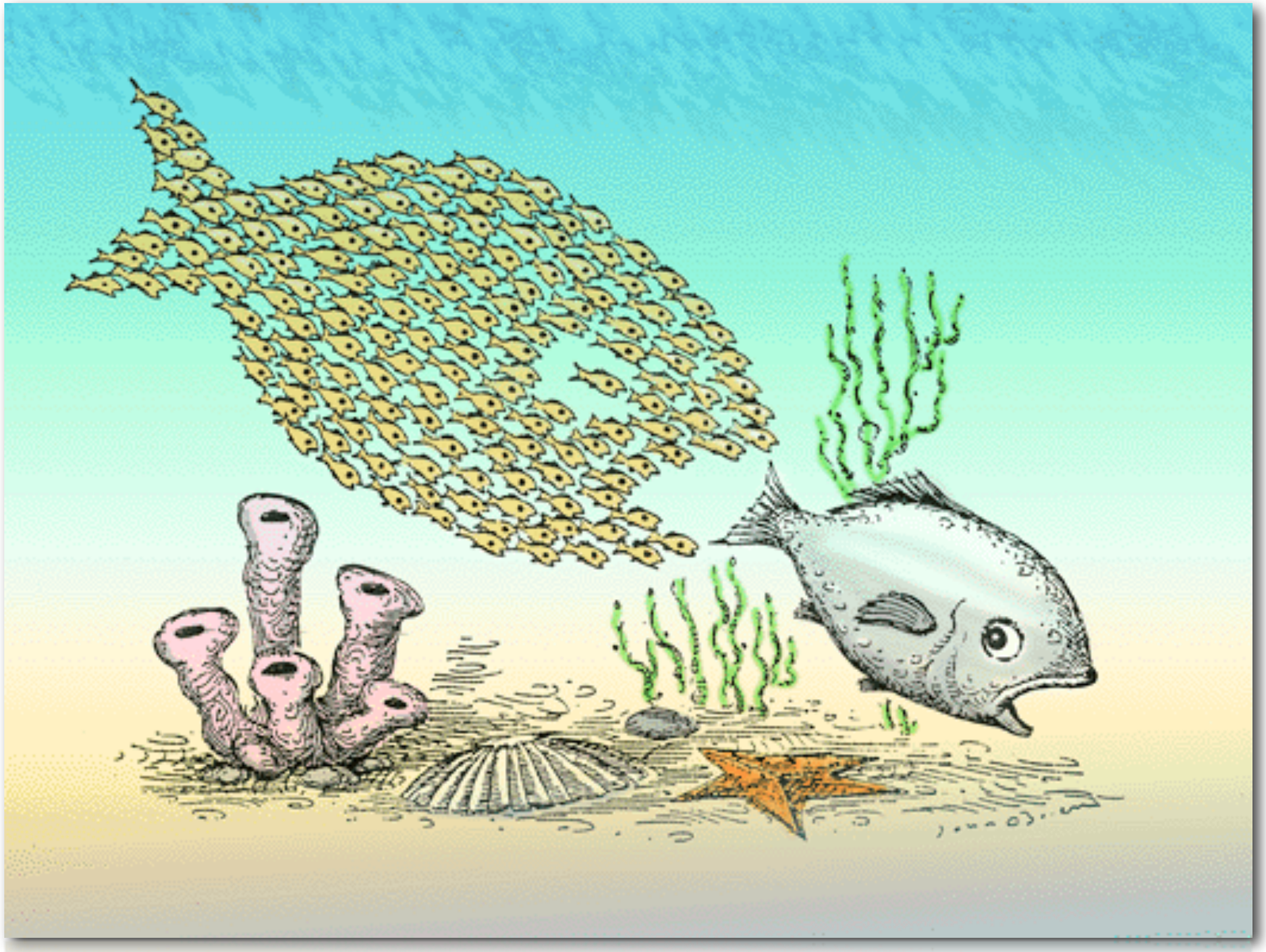
- Social computing is a general term for an area of computer science that is concerned with the intersection of *social behavior* and *computational systems*.

  Wikipedia

- *A social structure in which technology puts power in communities, not institutions.*

  Forrester

- *Forms of web services where the value is created by the collective contributions of a user population.*



Issues

- Theory and models
- Search, mining, and ranking of existing information, e.g., spatial (relations) and temporal (time) domains
  - Dealing with partial and incomplete information, e.g., collaborative filtering, ranking, tagging, etc.
- Scalability and algorithmic issues
- Security and privacy issues
- Monetization of social interactions

Machine Learning in SC

- Classification, clustering, regression, etc.
- New insights on the data
  - Social relations are often hidden (latent)
  - Change data from (x, y) to $(x, c_1(x), c_2(x), \cdots, y)$
- $c(x)$ = context in *tags*, *relations*, *ratings*, etc.
- data type = *binary*, *integer*, *real*, *cardinal*, etc.

Social Computing in Education

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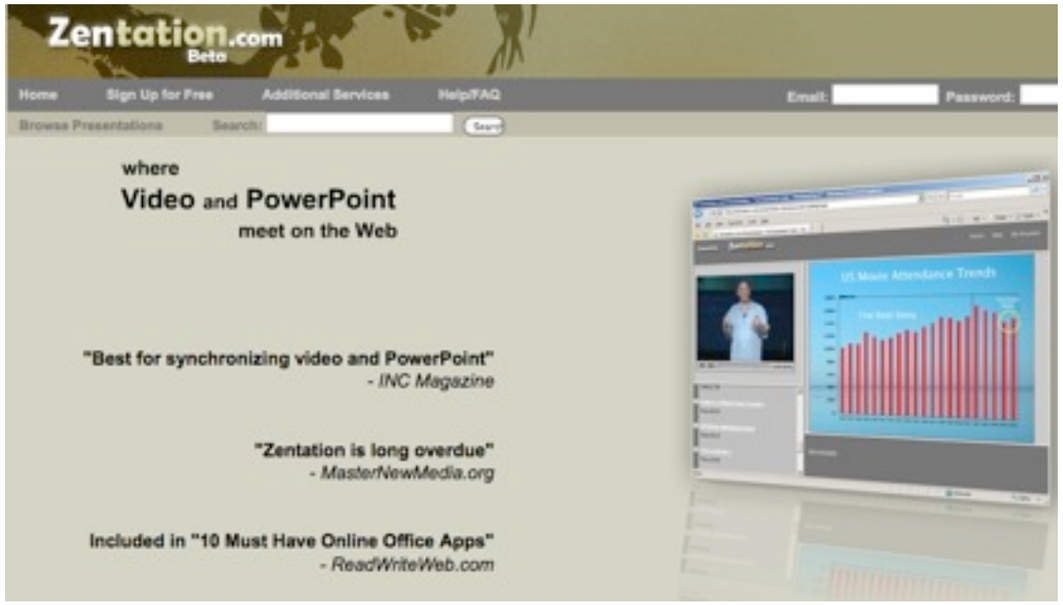
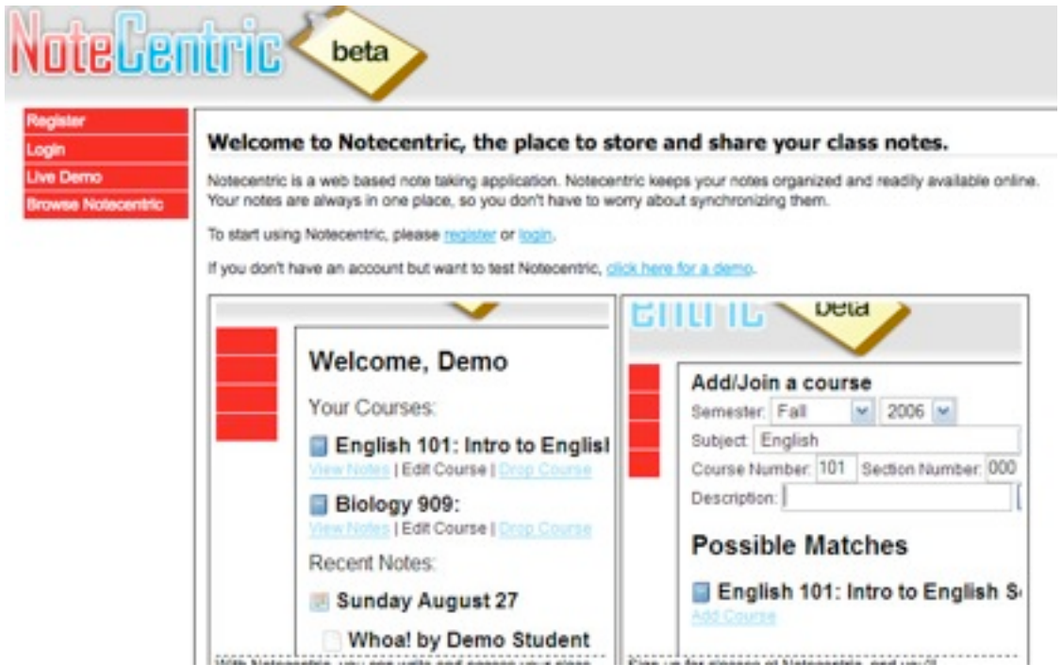
Categories of Educational Activities

- Media sharing
- Media manipulation
- Conversational arenas
- Online games and virtual worlds
- Social networking
- Blogging
- Social bookmarking
- Recommender systems
- Collaborative editing
- Wikis
- Syndication

Media Sharing

General	Educational
Uploading and downloading media files for audience or exchange	Sites have emerged that welcome creative digital material organized by educators





Zentation: Share video and powerpoint

NoteCentric: Share university class notes

Media Manipulation

General	Educational
Use web-accessible tools to design and edit digital media files	Provide graphical representations education materials

Thumbstacks: Allow presentations to be built and played online

Googlelittrips: Link literature to places or maps

Conversational Arenas

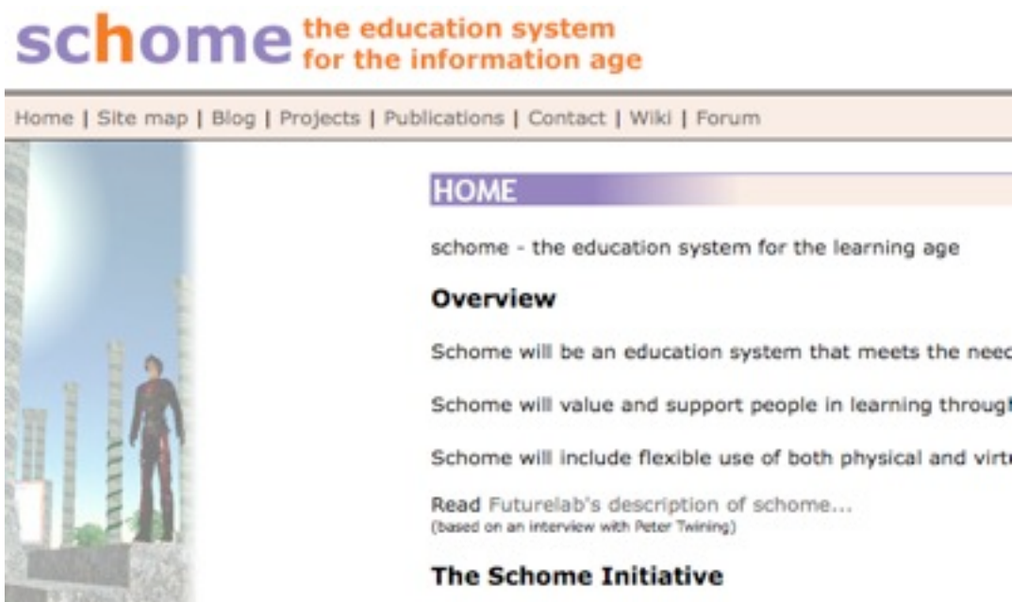
General	Educational
One-to-one or one-to-many conversations between internet users	Support educational conversations by a variety of tools

Think: Teachers and students create learning projects, participate in a website competition...

Chatmaker: Users can create chat rooms for personal websites, blogs, newsgroups...

Online Games and Virtual Worlds

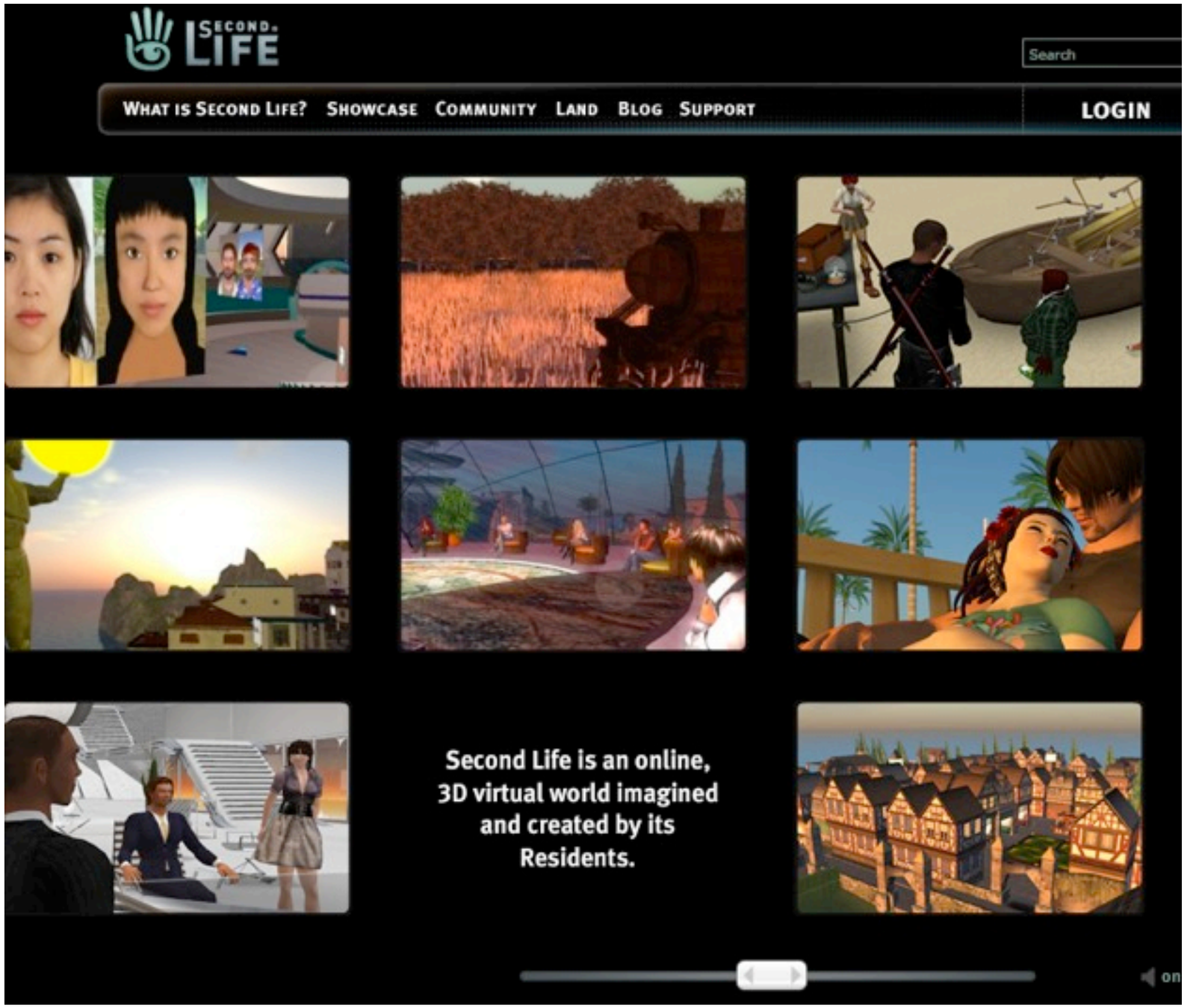
General	Educational
Rule-governed games or themed environments that invite live interaction with other users	Develop multi-player online games for educational purpose



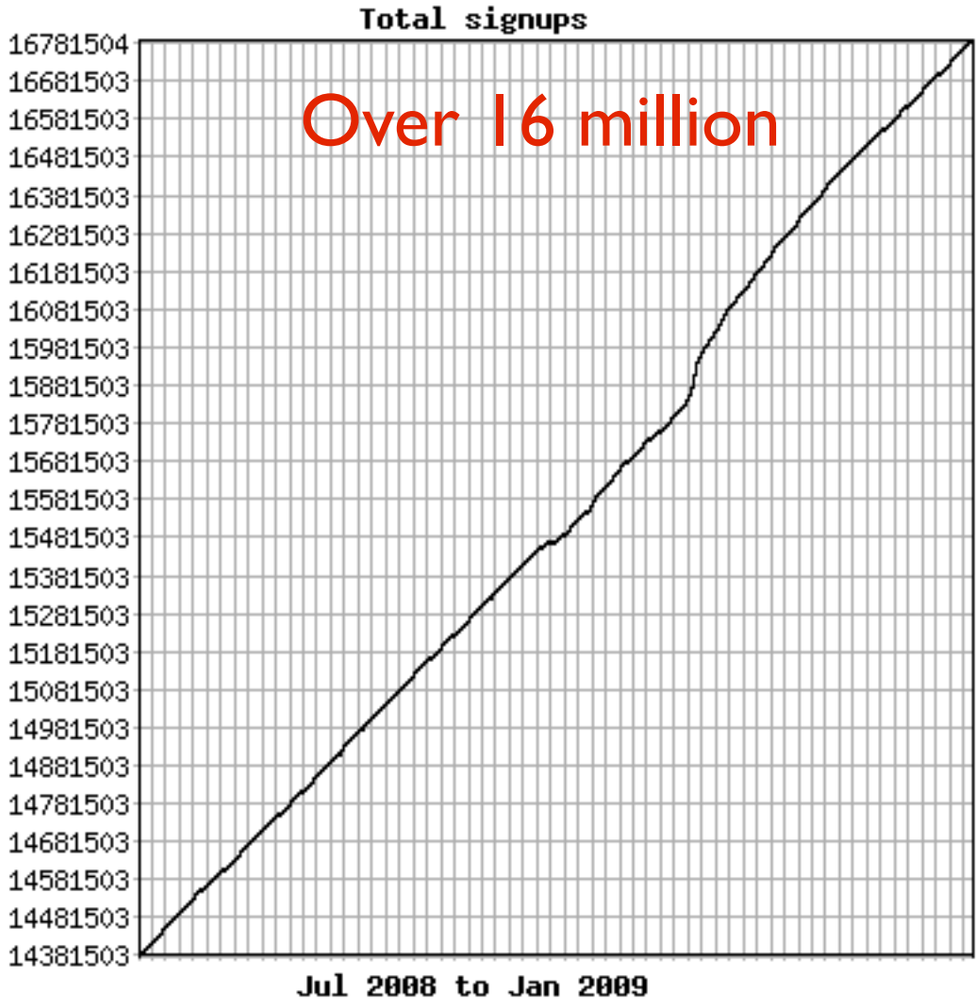
Vue: Provide a virtual educational and research institute

Schome: An education system to support people in learning throughout their lives

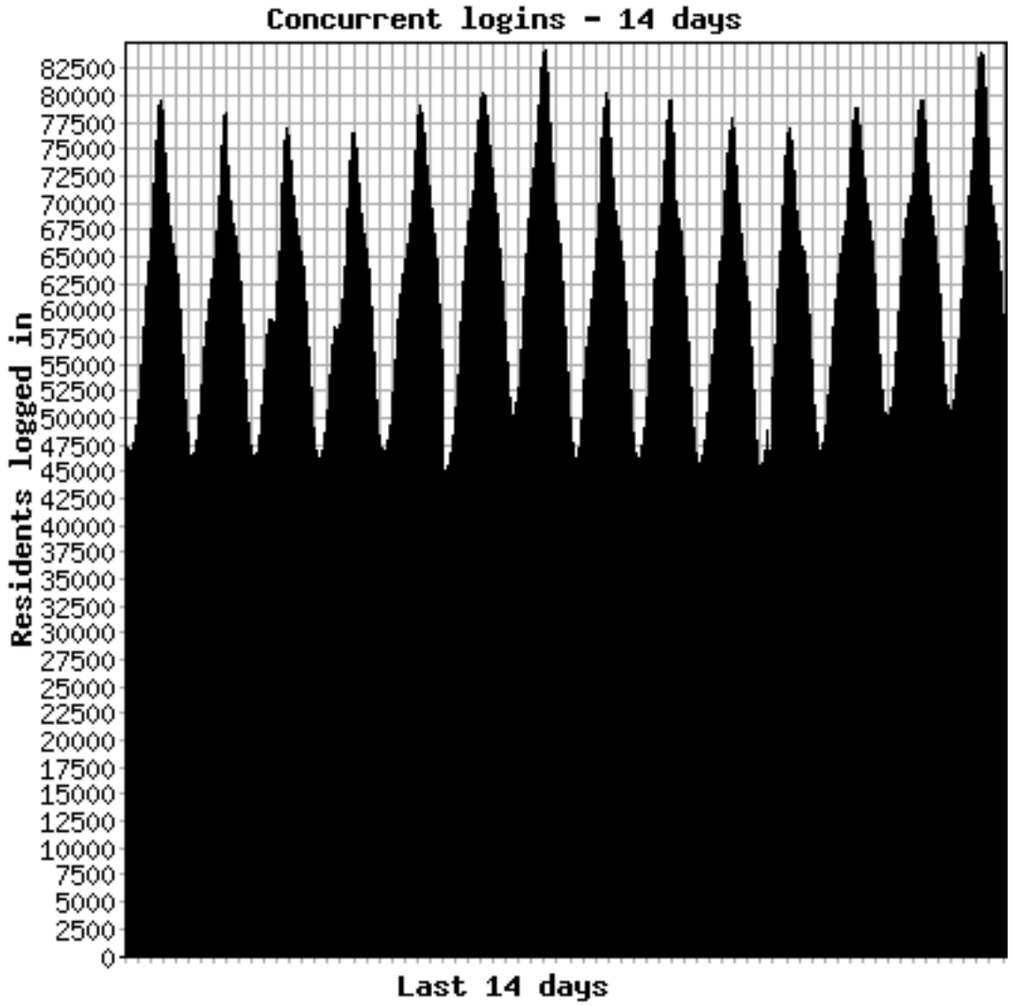
Online Games: Second Life



Online Games: Second Life



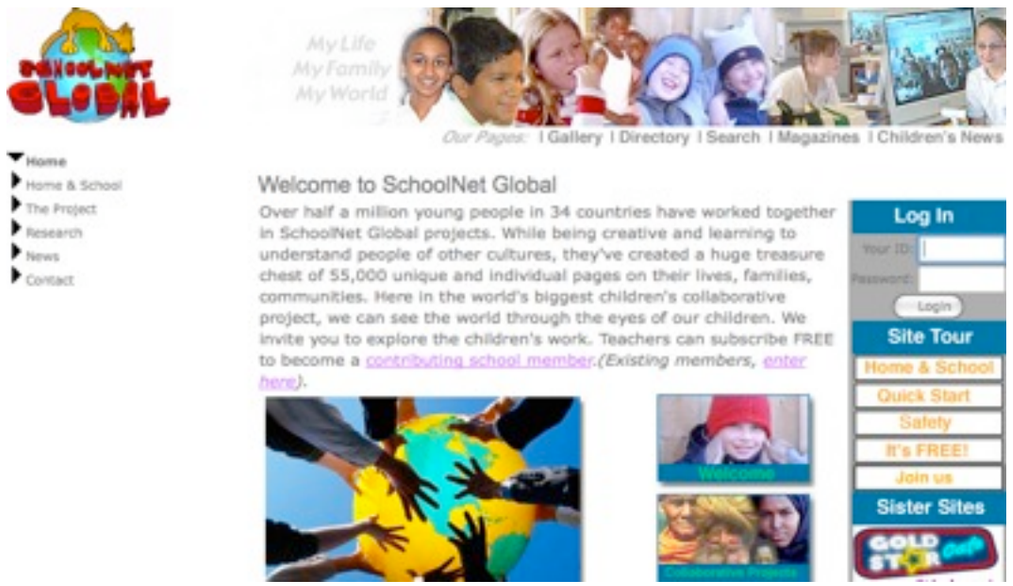
Total signups from July 2008 to Jan 2009

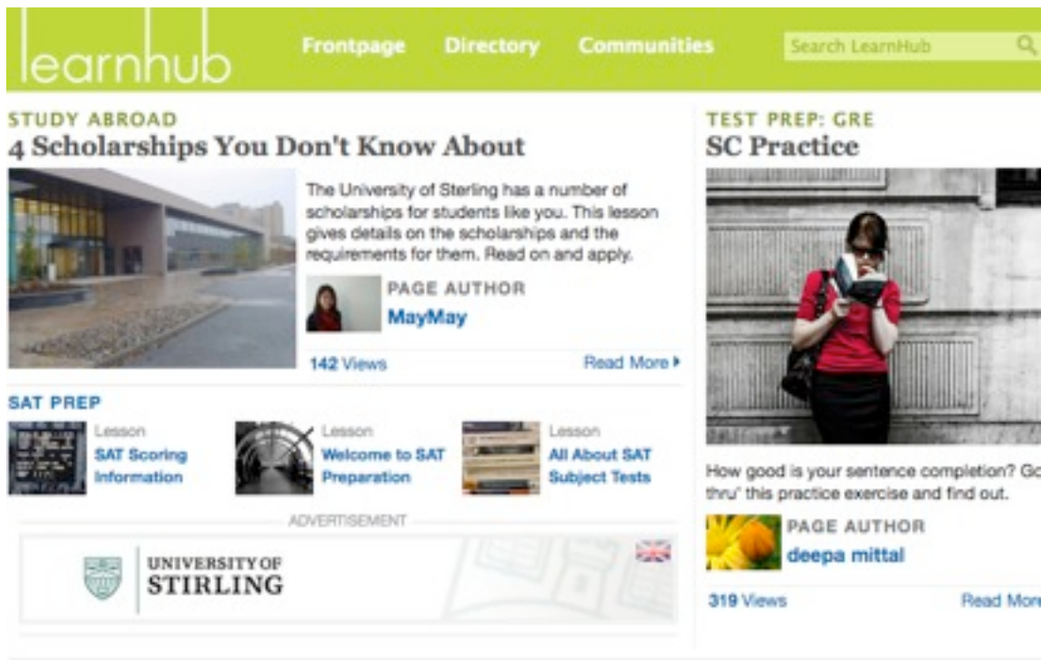


Concurrent online users in the last 14 days

Social Networking

General	Educational
Websites that structure social interaction between members who form subgroups of 'friends'	Typically include education-oriented friendship groups



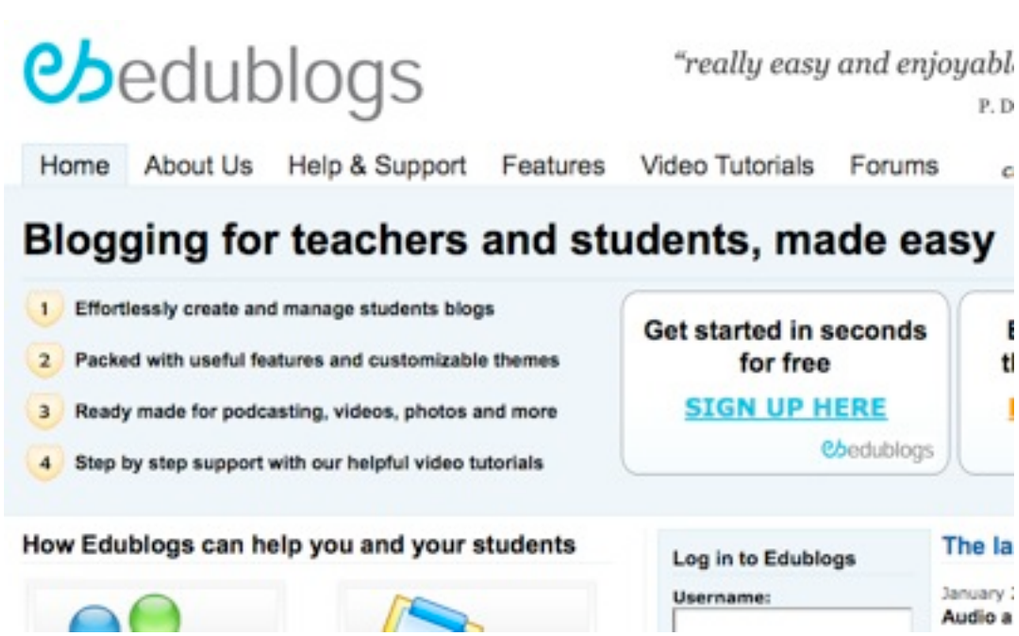


Schoolnetglobal: Provides a child-oriented design and security service for cross-site collaboration

Learnhub: Teachers can create learning communities.

Blogging

General	Educational
An on-line journal or diary in which a user can post text and digital material while others can view and comment	Blog sites exist especially for students and teachers



Edublogs: Blogging for teachers and students

Nature: Encourages scientific authors to blog around their findings

Blogs and Risk

- What's so great about blogs?
  - Tool for personal reflection
  - Citizen journalism
  - Forum for publishing your views or expertise
  - Reader feedback
- Blogging and risk avoidance
  - Services are advertising to high school and younger audiences who are not savvy about personal security: MySpace, AOL, Xanga, Facebook
  - Posting personal info: names, birthdays, towns, dorms, etc.
  - Harassment and bullying via blog postings; libel suits

Wikis

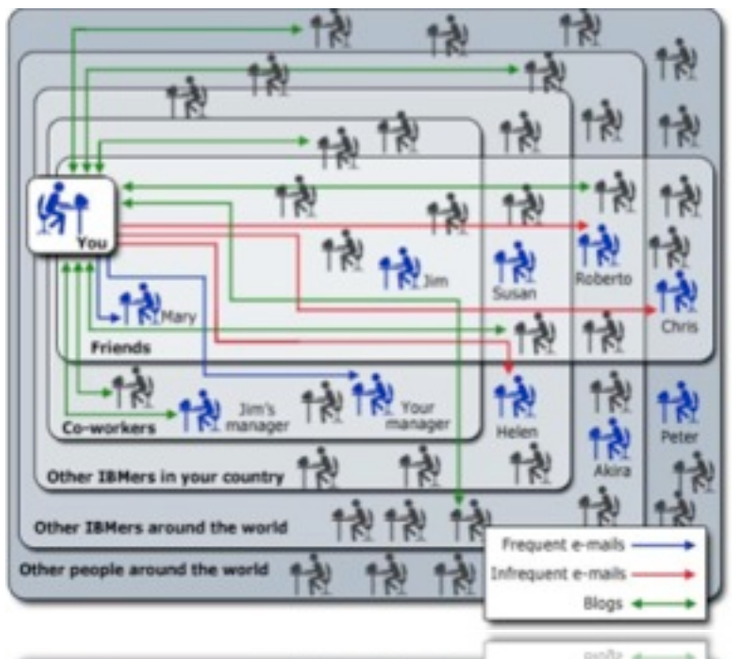
General	Educational
Web-based services allow users unrestricted access to create, edit and link pages	Sites that allow students and teachers to establish their own wiki with an educational slant

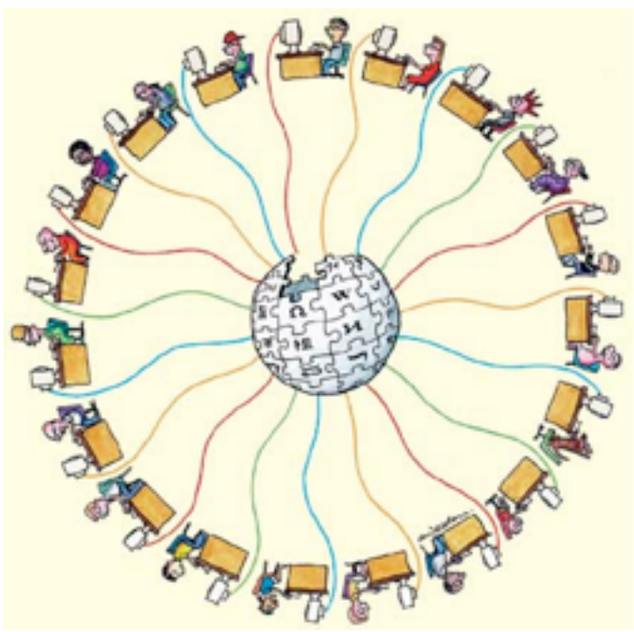
Pbwiki: students and teacher can create their own wiki

Wikiversity: devoted to learning resources, learning projects, and research for use in all levels, types, and styles of education

Blogs vs. Wikis

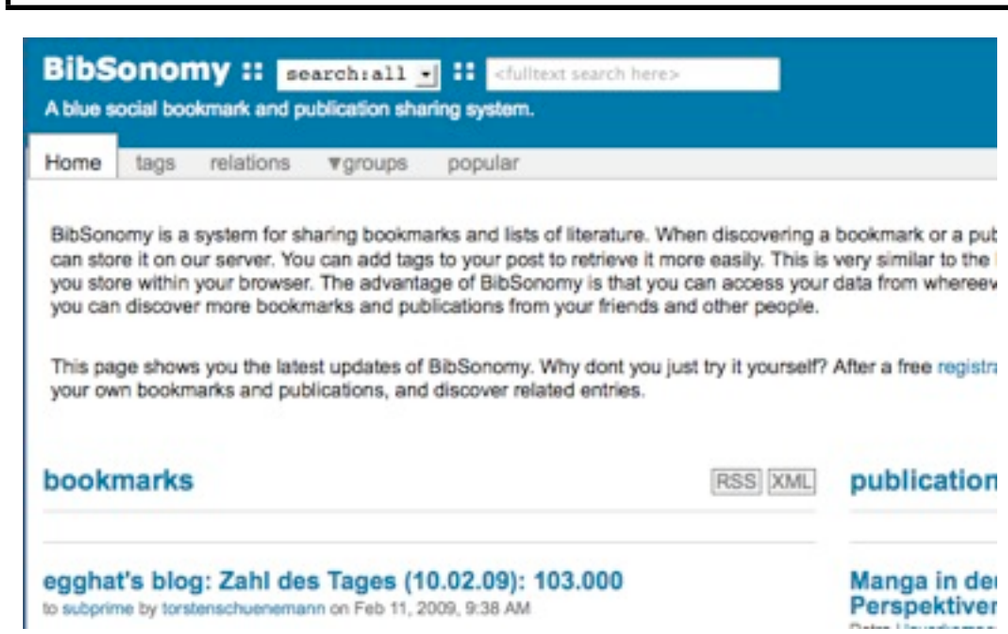
- Blogs generally have a topical element and a single author (but not always)
- Wikis are designed to be easy to use collaboration spaces for storage of shared material
- Blogs are more like journals; Wikis are shared reference sites



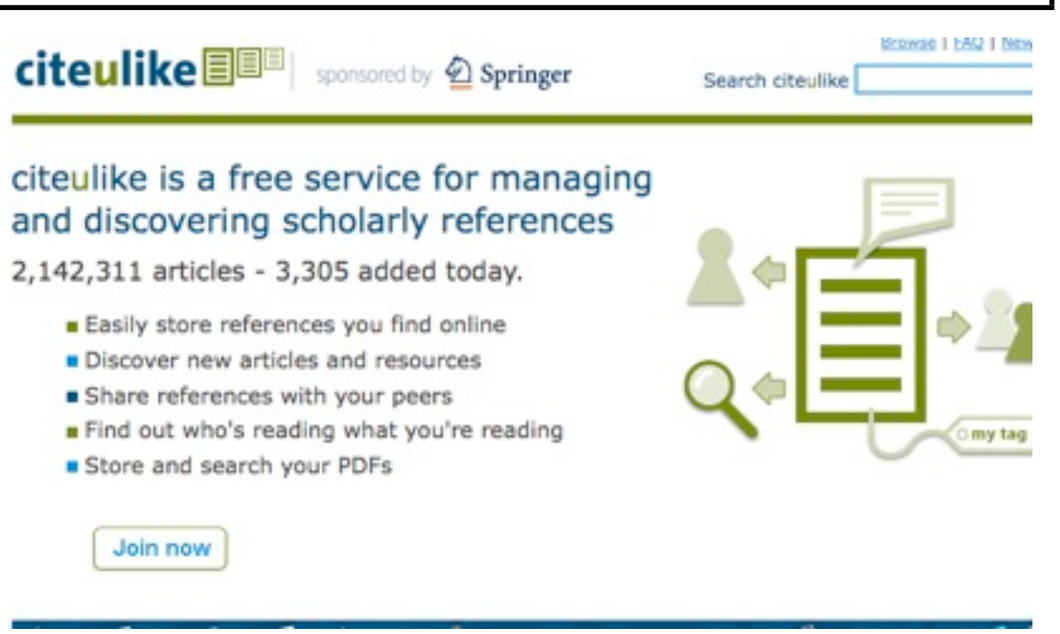


Social Bookmarking

General	Educational
Allow users to submit their bookmarked web pages to a central site where they can be tagged and found by others	Bookmarks sharing systems designed for research and education users

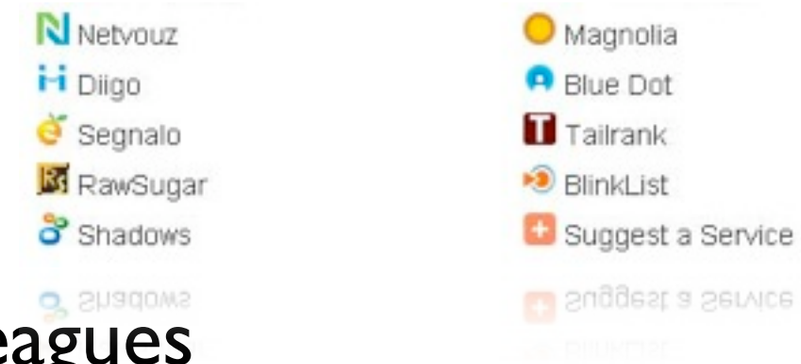


BibSonomy: A system for sharing bookmarks and list of literature



Citeulike: A website for the collecting and sharing research publications

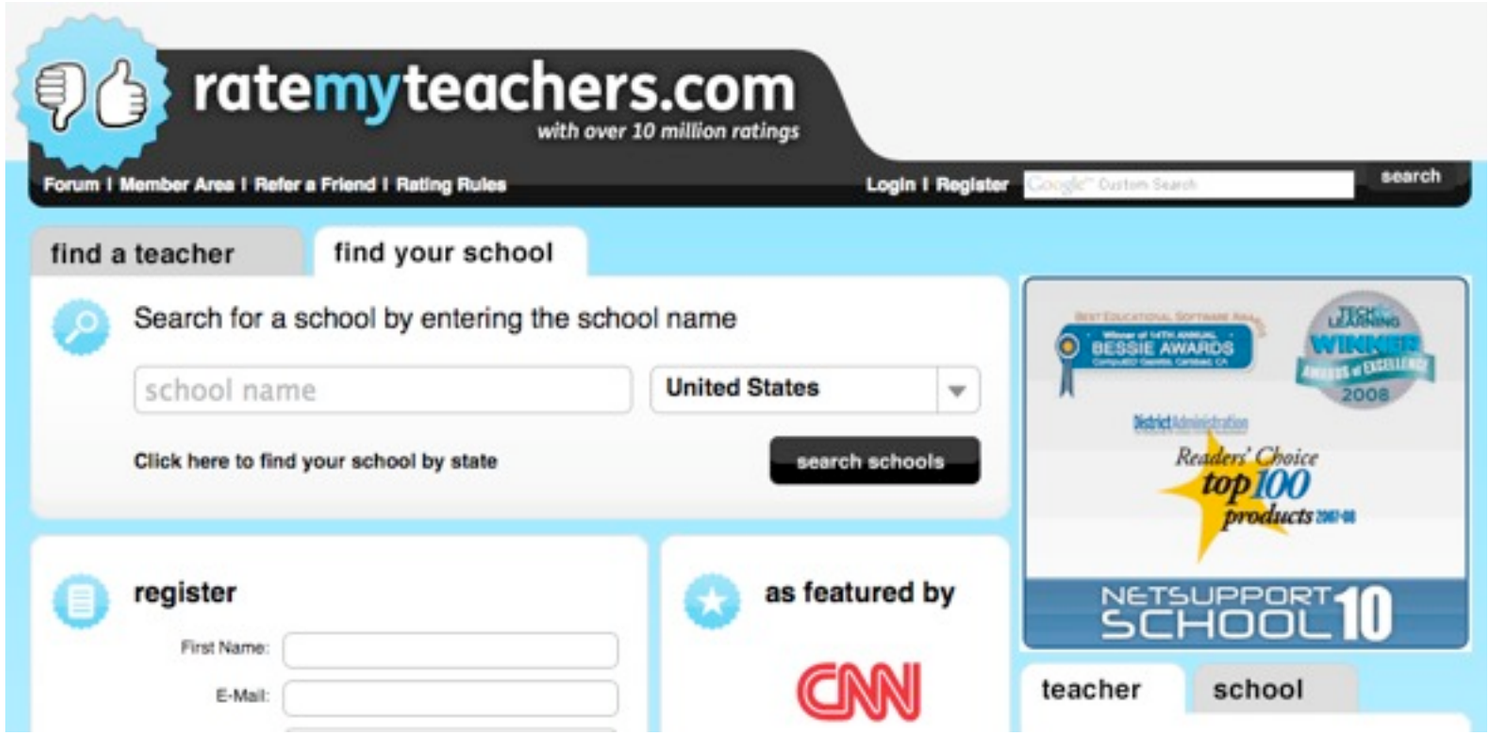
Social Bookmarking Enabling...



- Save and tag bookmarks and searches
- Share resources among peers and colleagues
- Find relevant, reliable resources more easily
- Evaluate the quality of the resources
- Update courses automatically with dynamic content feeds
- Contribute to course collections, both students and instructors

Recommender Systems

General	Educational
Websites aggregate and tag user preferences to make novel recommendations	Recommender systems designed for research and education users



Ratemyteachers: An (infamous) example of recommendation technology in education involves user evaluation of teachers.

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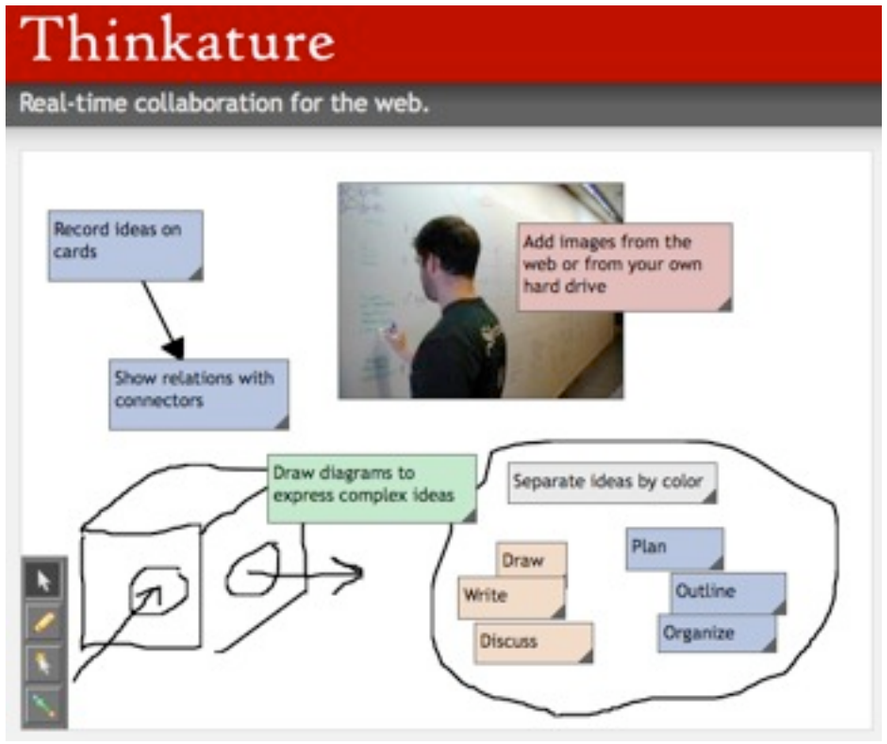
Collaborative Editing

General	Educational
Web tools used collaboratively to design, construct and distribute digital product	Text, spreadsheets and other documents can be stored centrally and permit collaborative editing



Thinknature: Websites incorporate more visual tools for collaborative pages

Bubbl.us: Some emphasizing mind-maps for brainstorming

Syndication

General	Educational
Users can 'subscribe' to RSS feed enable websites so that they are automatically notified of any changes or updates in content via aggregator	Websites from which students can take advantage of syndicated content

Podcastschool: A website contains podcasts for school students

Stanford: A website contains syndicated material sponsored by Stanford

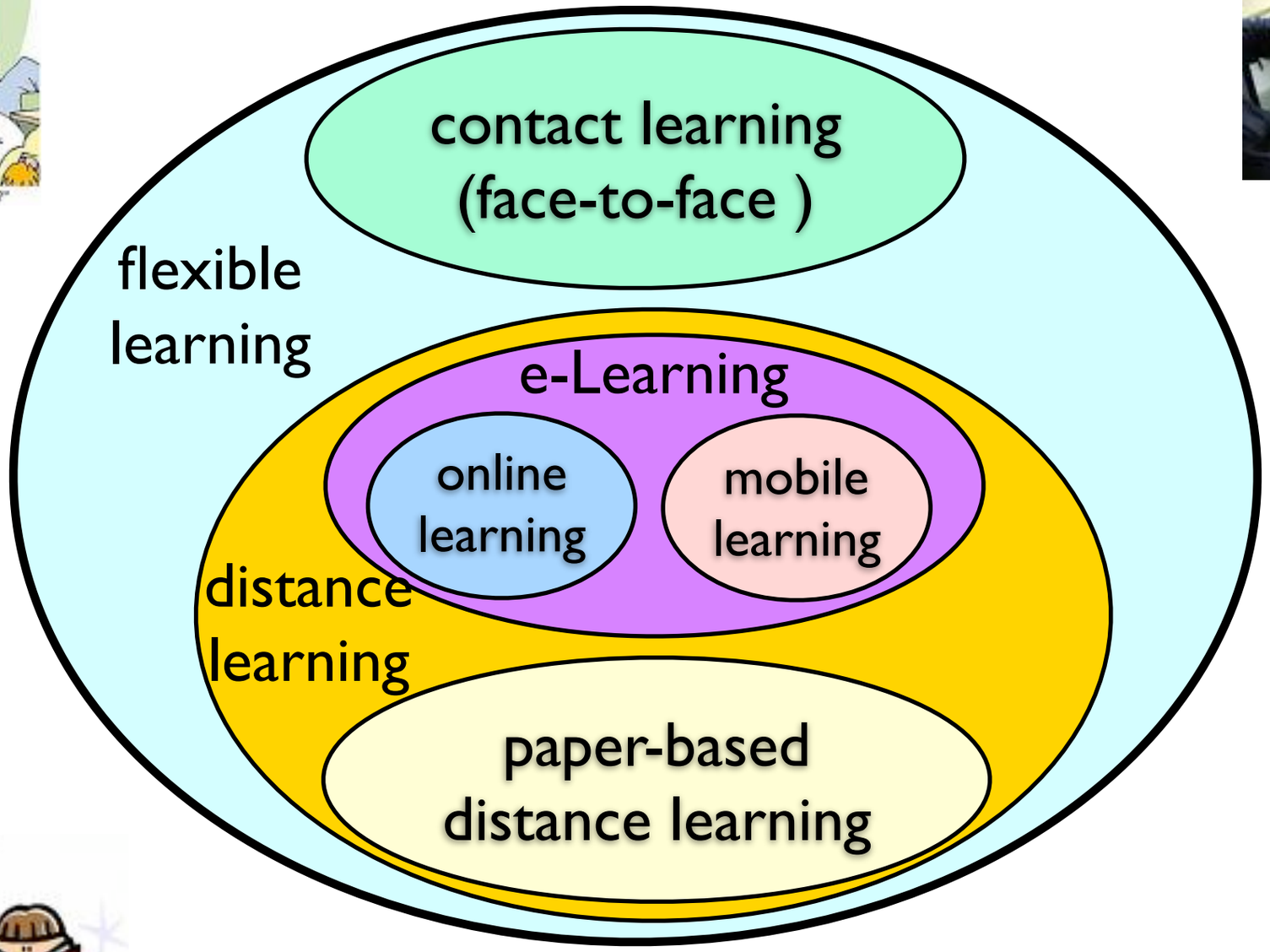
Evolution of Learning and Training

distance learning
d-Learning

electronic learning
e-Learning

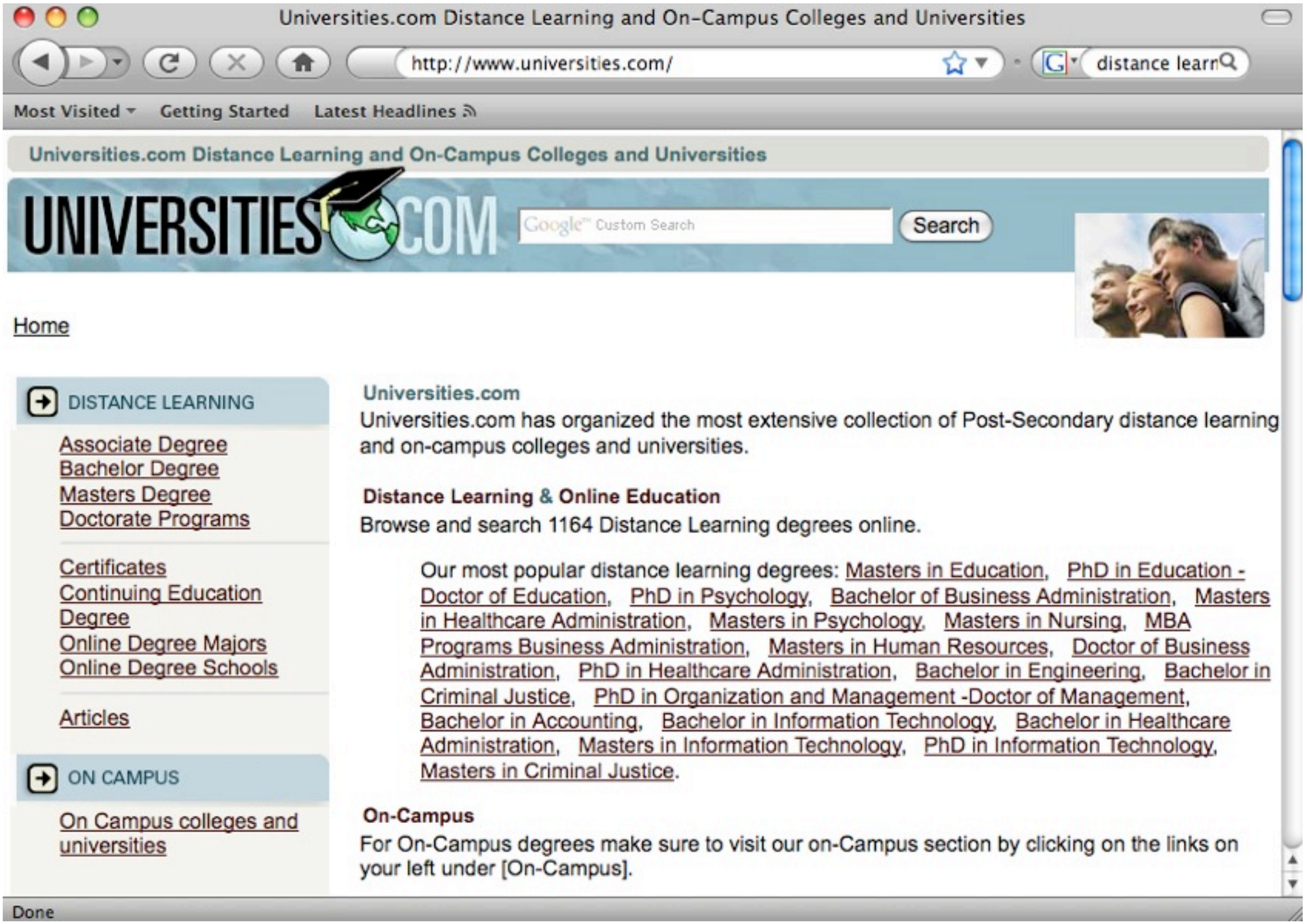
mobile learning
m-Learning

Categories of Learning



e-Learning

- A subset of technology-based training and encompasses all learning activities conducted on the internet
- Can be "live" (also known as "synchronous") learning, meaning students communicate with peers and instructors in real-time, or it can be completely self-paced, which is known as "asynchronous" learning
- Covers a set of applications and processes, including
  - Computer-based training
  - Web-based learning
  - Virtual classroom
  - Digital collaboration



UNIVERSITIES.COM: The most extensive collection of distance learning

What is m-Learning?

New Learning Paradigms		Mobile Technologies
Individual/Learner centered	⟷	Personalized Services
Collaborative learning	⟷	Networked/Wireless
Situated learning	⟷	Mobile awareness
Contextual learning	⟷	Context awareness
Ubiquitous learning	⟷	Ubiquitous
Life long	⟷	Durable

What is m-Learning?

- Refers to the use of mobile and handheld devices in teaching and learning
- Mobile implies movement and mobility--to learn "on the go"

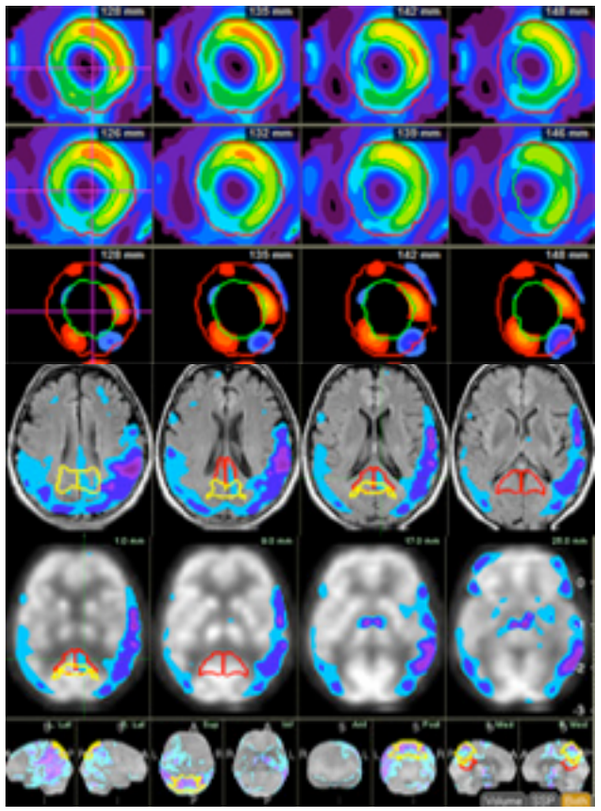
Why m-Learning?

- Enhance learner's success
  - Real world skills
  - Access learning materials from anywhere and anytime
  - Just-in-time learning-- reference tool for quick access to data in the field
  - Interact with others
  - Collaborate learning

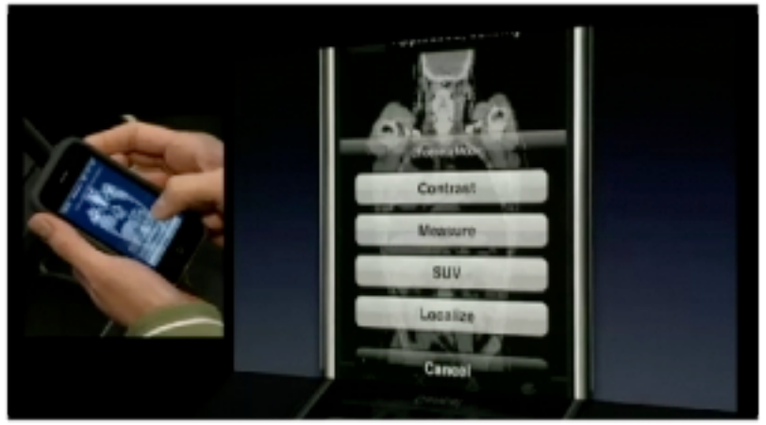
m-Learning Devices

- PDAs
- Tablet PCs
- Mobile phones
- Wearable computers
- Laptop computers
- E-book readers
- Hybrid devices

iPhone in Medicine



Multi-planar
reconstruction data sets



Images

online version

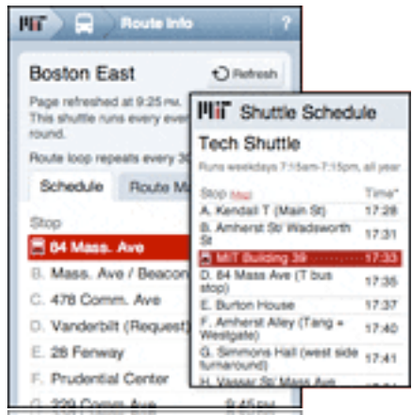
Medical resources developed for the iPhone
can be used by students and practitioners

http://jeffreyleow.wordpress.com/2008/06/10/iphone-in-medical-education/

MIT Mobile Project

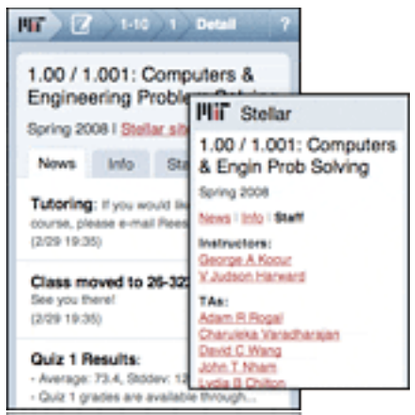
People Directory

Campus Map



Shuttle Schedule

Events Calendar



Stellar

Emergency Information

3DOWN

http://mobi.mit.edu/

Introduction to Social Computing, GEN2182 Science and Modern Society, CUHK, April 4, 2009

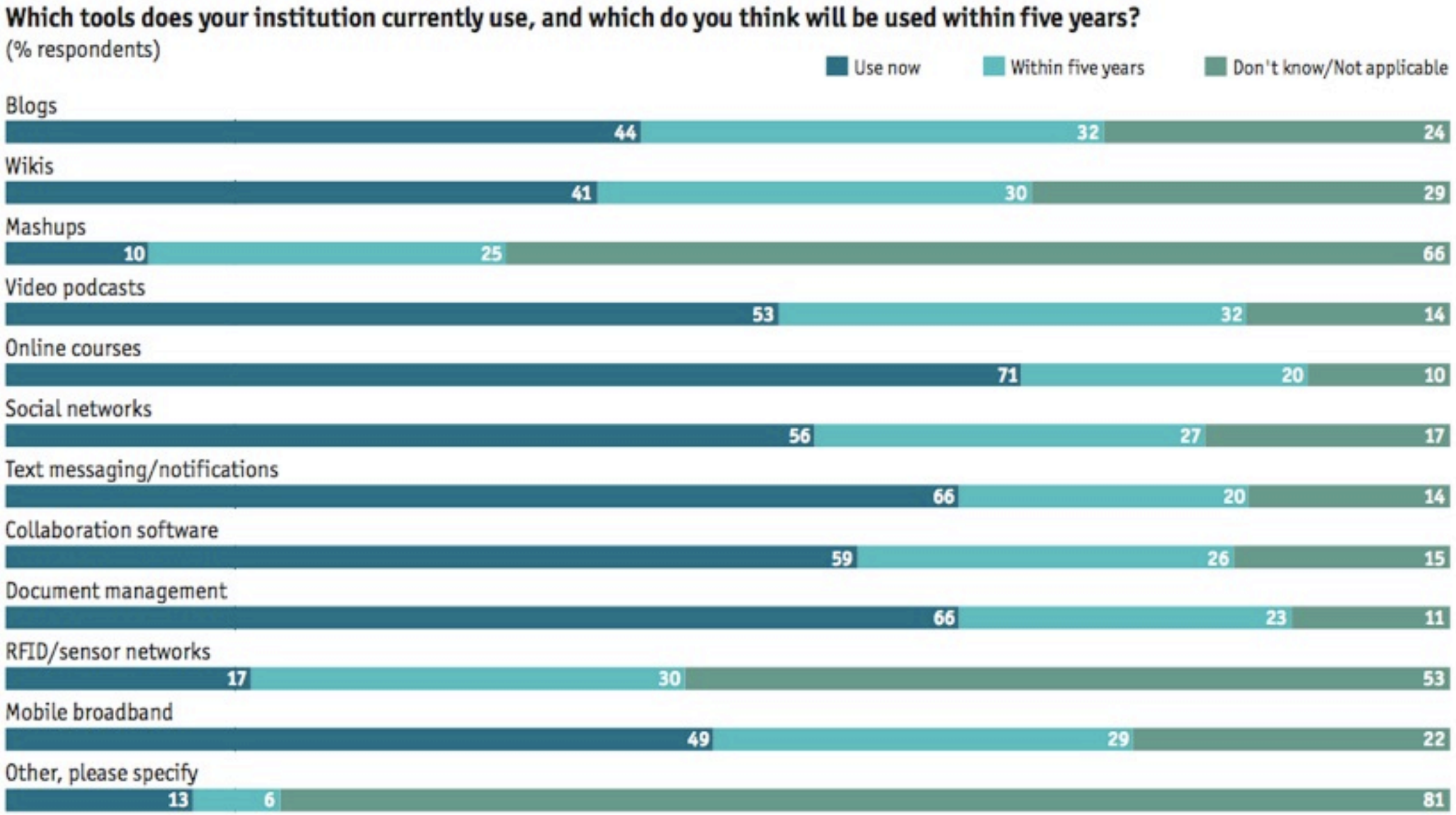
Limitation of m-Learning Devices

- Small screen size and limited storage capabilities
- Batteries require regular charging
- Lack of common platform
- More easily lost or stolen
- Much less robust than desktops
- Get outdated very quickly
- Security and privacy issues
- Limited bandwidth problems
- Difficulties to upgrade

Tensions and Areas for Further Research

- Teaching vs. learning
- Walled garden vs. open arena
- Private learning vs. collaborative learning
- Digital native vs. digital immigrant
- Social networking vs. anti-social networking
- Rip-mix-burn vs. cut-tweak-paste

Economist Intelligent Unit 2008

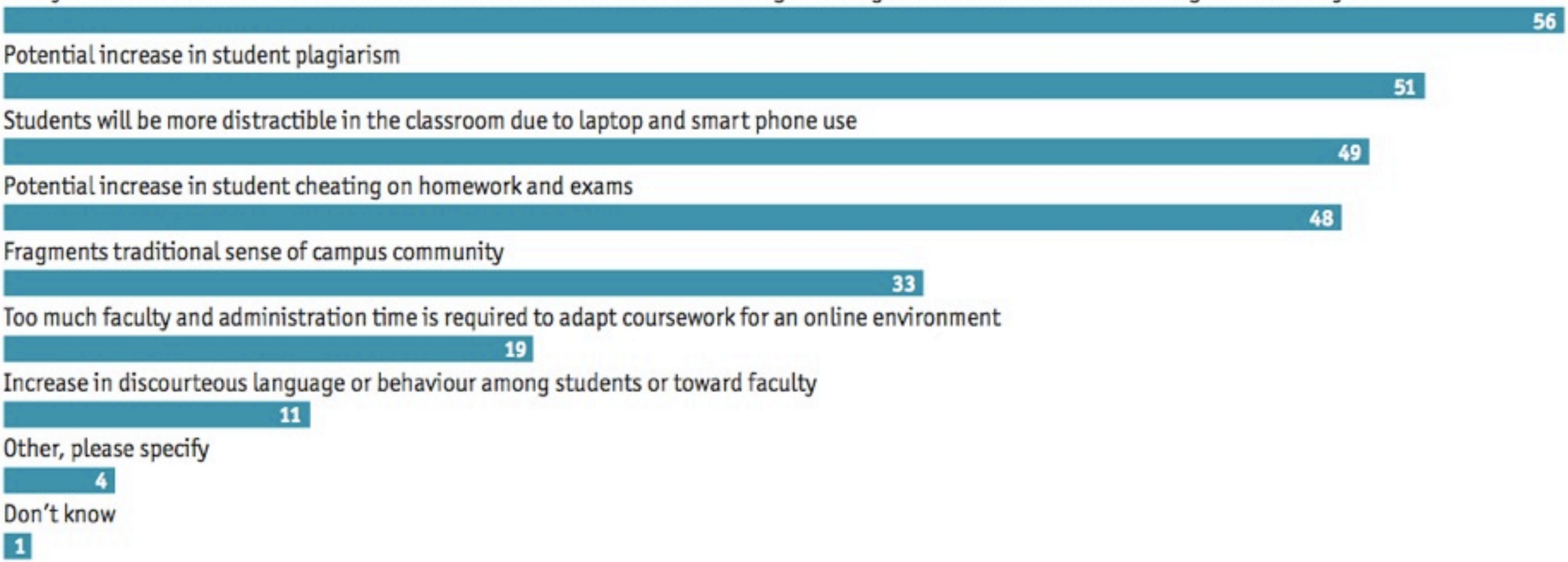


New Challenges

- Quality and reliability of information and resources
- Responsibility and awareness of security and privacy issues
- Ethical questions, e.g. http://www.ratemyprofessors.com/, and cyberbullying
- Need for new skills both for learners and teachers

Economist Intelligent Unit 2008

In what ways do new technologies pose the greatest challenges and risks to colleges and universities? Select up to three.
(% of respondents)



Conclusions

- Social Computing is a paradigm shift!
- Novel views on the spatial and temporal relationship among social entities!
- Great opportunities in a new research direction!

Conclusions

- New availability of resources for learning
- New learner empowerment and networks
- New participation in learning processes

Conclusions

- New availability of resources for learning
  - Easy access to free information resources (dictionaries, encyclopeadia)
  - New variety of sources and resources
  - Education providers pressured to open up their resources to show their quality

Conclusions

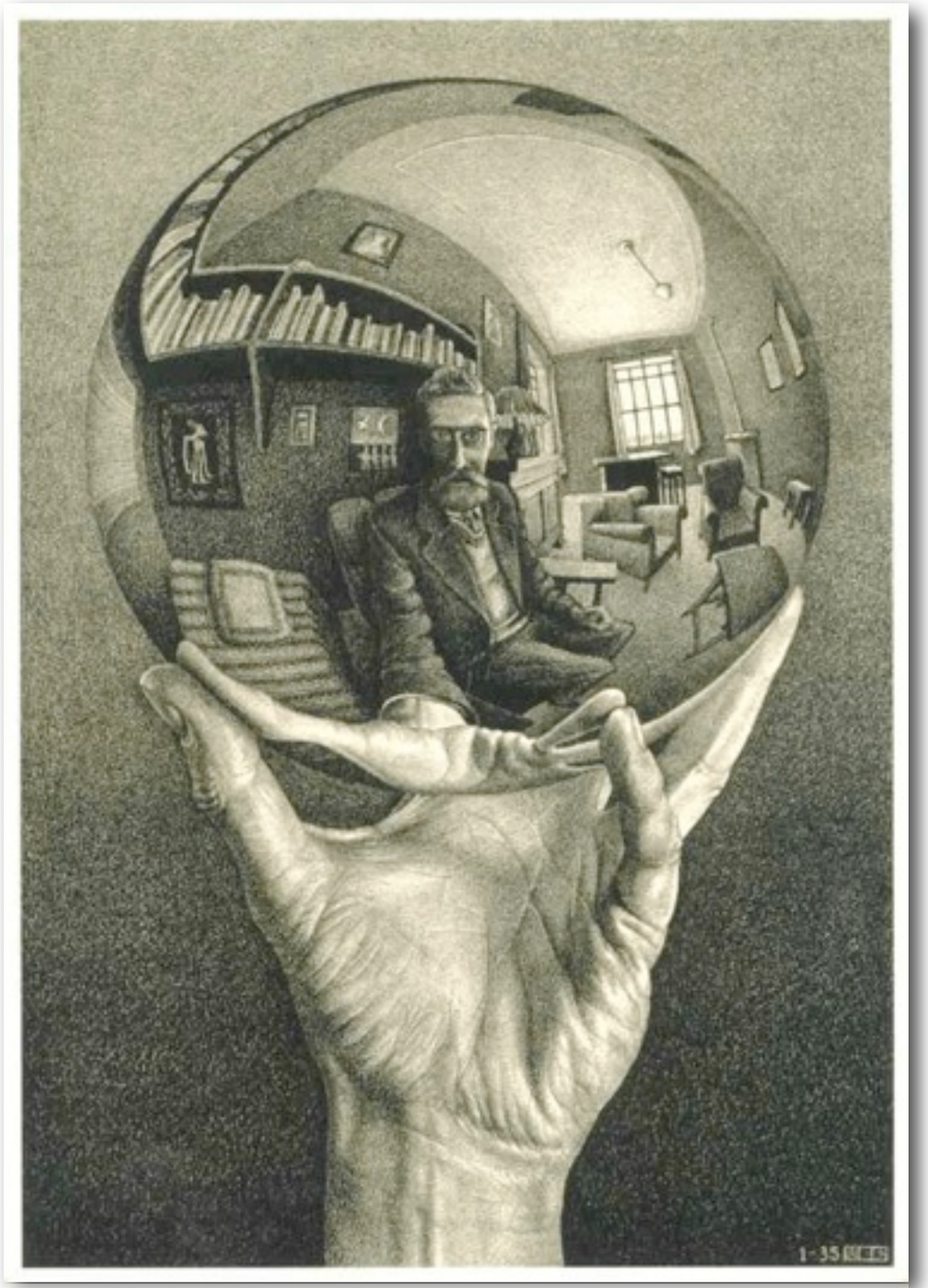
- New learner empowerment and networks
  - New empowerment in choosing the learning provider
  - New means to express and show one's skills
  - Collaborative communities, new support for informal learning

Conclusion

- New participation in learning processes
  - Digital natives expect to use participative approaches
  - Learning tool developers are already integrating and developing participative tools to their products

On the Horizon...

- CLOUD (broadband + wireless)
- Web Services
- Monetization of Social Interactions
- Security & Privacy



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- Xin Xin (Ph.D.)
- Haiqin Yang (Ph.D.)
- Jessie Li (R.A.)

"On the Internet, nobody knows you're a dog."