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

AI and the World-Wide Web

Gerhard Fischer

AI Course, Fall 1996, Lecture, Nov 27th, 1996

E-Mail to the White House

October 1993

Dear President Clinton,

We are a research group at the University of Colorado, Boulder, working in Human-Computer Interaction. One of our specific research goals is to investigate the "information overload problem" attributed to e-mail and computer network news.

We would be very interested, how your office deals with this problem: How many messages a day are sent to you? How are they processed? How are they filtered? Do you use computational artifacts to deal with the messages? Do you print them on paper in order to process them? Etc! I am looking forward to your answer.

Sincerely
        Gerhard Fischer

Answer From the White House

October 1993

From autoresponder@WhiteHouse.Gov

Dear Friend:

Thank you for writing to the President via the Internet. This Administration is committed to the goal of integrating electronic communications into the White House. We hope to begin responding electronically to your messages soon.

Since June 1, 1993, the White House has received more than 60,000 electronic messages. Though this volume of mail prevents the President from attending personally to every message, your message is carefully read by our staff.

If you have written to request a White House document or information on Administration policy, we have good news for you. We will be announcing the new Internet address for obtaining selected White House documents, publications, and new releases very soon.

Sincerely,
    Marsha Scott, Director of Correspondence and Presidential Messages

Technology and Cultural Change — "Orality" and "Literacy"

- Plato's theory about the "consequences of literacy" — his complaints about the **negative effects** to Socrates:
    - weakens memory (external support)

    - text is "deaf"

    - no focus on a specific group of listeners

    - weakens the responsibility of the author (no physical presence)

- **a positive view of literacy**
    - reduces demands on memory

    - broader distribution

    - accessible (enhances democracy)

    - writer can work out concepts and ideas over long periods of time

Technology and Cultural Change — Example: Roads and Railroads in France

- **before 1880:**
  - highways led to and from Paris

  - they did not connect with the farms and villages and did not serve the ordinary people

  - a peasant's world was restricted to narrow corridors

  - exchange of goods was limited to neighboring regions ----> farmers and regions tended to be self-sufficient

- **1880-1914:**
  - rural roads and railways were constructed @rightarrow larger markets

  - productivity expanded enormously

  - France became a unified marketplace

Cultural Change

- the horizons of the peasant were expanded

- new opportunities were perceived

- traditional orientations were abandoned

- the peasant's apparent disinterest in trading evaporated

- the necessary skills for shipping and receiving goods — reading, writing and counting — were learned

- **question:** what are the necessary skills to be empowered and successful in the age on the information super-highway?

National Information Infrastructure (NII)

- **national funding effort:** passed July 26, 1993 — allocation: 1 Billion $ for the years 1994-1998

- **global objective:** to bring libraries, local governments, schools and health care onto national computer networks

- **application research:** security, privacy, copyright problems, user interfaces, social science

- **education:** demonstrate educational uses of the Internet ----> the NIE (=NII for Education) program

- **health:** exchange medical images and records, basic research on virtual reality, development of interactive technology to help patients, statistical information revealing patterns of disease among specific populations

- **libraries**: digitize libraries, organize and store large quantities of information, finding friendly user interfaces

- **government**: dissemination of information, depository libraries to offer information

Transportation (TH) versus Information Highway (IH)

- **engineering procedures and standards**
  TH: roads, bridges, ...
  IH: network protocols, interoperability, ...

- **services:**
  TH: gas stations, restaurants, hotels
  IH: e-mail, news, info services, remote access, db search and retrieval

- **regulations:**
  TH: traffic laws, speed limits, ...
  IH: privacy, copyrights, ...

- **enablers:**
  TH: interstate trucking
  IH: electronic commerce, electronic town hall

- **rate of change:**
  TH: over many human generations
  IH: fundamental changes within one generation

Classification of Collaborative Systems

- **Distributed Computing / Distributed AI (DAI)**
    - computers and computers
    - all information must be interpretable by computer

- **Collaborative (Design) Environments**
    - computers and humans
    - mixture between interpretable and computer-mediated information
        structures

- **Computer-Supported Cooperative Work (CSCW)**
    - humans and humans
    - computer-mediated
    - most information is not interpretable by computers

Collaboration - With Whom

- *ourselves* - e.g., capturing our thoughts of the past (reflexive CSCW)

- *all stakeholders* - e.g., clients, designers, customers, users (symmetry of ignorance)

- *colleagues* - e.g., supporting long-term, indirect collaboration

- *tools* - e.g., knowing which tools exist, how they can be used, how they can be tailored to our specific needs

- *domains* - e.g., domain abstractions, standard examples (cases)

- *critics and agents* - e.g., shared knowledge of the task at hand, information volunteering

Information Access and Information Delivery

- **the big misunderstanding:** "human attention is the scarce resource, not information
    - every school child has access to a Nobel prize winner
    - every citizen has access to the president

- **information overload**
    - 100 million volumes in the library of congress
    - 108,600 scholarly journals
    - 2,000 news groups

- new information *access* technologies

- information *delivery*: saying the "right" thing at the "right" time in the "right" way

- **claim:** WWW is potentially harmful, because it contributes to an expontential growth of irrelevant information

    relevant info / total info ---> 0

The Productivity Paradox: Information Technology (IT) has NOT Fulfilled Its Promise

- IT (with its traditional focus on the written/typed medium) shifts communication to slower channels

- IT entices people to spend more time adding unnecessary quality to their products

- IT includes ever changing computer environments
  - repeated skill obsolescence
  - making workers' experience using the system obsolete
  - work process and procedures that are affected by the system

- IT leads to extended paperwork for information output

- question: is this all a *transitional effect*?

Tele-Everything

- **work + private life + new relationship + new persons**
    - people can live where they want

    - no socializing through work

    - work without supervision

    - time zones (Boulder and Germany)

    - new (maybe more flexible) role distribution between females and males

- **decentralization of work and power** (e.g., Fax machines destroy communication monopolies)

- **claim**: technology does not change the equation ---> people do!

Isolation: The "Social Toll" of Information Highways

- one of the things that binds a culture together ----> everyone reads the same newspapers, sees the same show

- individualized newspapers, interactive video is likely to speed the process of social isolation, even alienation, that has been gnawing at American society

- it will weaken further our sense of a common culture, purpose and responsibility -----> freed from the necessity of watching "what's on", we will summon up only that which is of special interest to us

- the trade-offs between "massification" and "de-massification"(source: HCI Journal, special issue, Vol 9, No 1,1994, "Context in Design")

Toward an Every-Citizen Interface to the National Information Infrastructure

A Report of the National Research Council / National Academy of Sciences

Recommendation 1: Aggressively seek ways to break away from 1960s human-machine technologies and paradigms. Major attempts should be made to find new paradigms for human-machine interaction which employ new modes and media for input and output and which account for the new roles technology will play in society.

Recommendation 2: Invest in the research required to provide the component subsystems needed for the every-citizen interface. Research is needed that is aimed at both technological advances and the understanding of human factors related to their use.

Recommendation 3: Encourage research on systems level problems involving one or many humans collaborating with each other with one or many connected machines.

Our Research in "AI and the WWW"

- transform a "information dissemination/broadcast medium" into a medium for "evolutionary and collaborative design" (the M1, M2 and M3 model)

- **BASAR** (Christoph Thomas) — "Building Agents Supporting Adaptive Retrieval"; — for details see: "http://zeus.gmd.de/i3/mmk/basar/text.html"

- **GIMME** (Stefanie Lindstaedt)— a group / corporate memory system using Latent Semantic Analysis, — for details see: "http://www-l3d.cs.colorado.edu/~stefanie/GM_Info.html"
  - what will make people want to share?
  - people need to make explicit what they know and take the trouble to enter it into the system
  - quality control (a big WWW issue)

- **Webquest** (Corrina Perrone)— is a construction environment that allows students to play, and to build interactive simulation games using the World Wide Web as a research tool, — for details see: "http://www.cs.colorado.edu/~corrina/mud/"

- **Gerry Stahl:** "Structuring the Web: Issues and Examples"