Thesis Proposal

Toward an understanding of user innovation in communication software.
Effective management of on-line communication
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Wendy Elizabeth Mackay
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abstract

Electronic communication systems are here to stay. Their benefits are increasingly recognized throughout industry, government and academia. Effective management of on-line information has become critical to success.

If the short term costs of categorizing and managing on-line information outweigh the long-term benefits, users will resist taking advantage of tools that would otherwise be highly beneficial. (Cite behavioral literature on short-vs-long-term reinforcement, cite evidence that people do not manage information well).

Preliminary Results: Electronic communication systems evolve and are adapted by users to meet individual and group needs. These adaptations affect the kinds of messages sent and reflect the evolving needs of the organization. Many users become overwhelmed and find it difficult to manage the increasing volume of information (Mackay, 1988). Tools such as the Information Lens are designed to help users manage large quantities information. However, they are utilized far less than the benefits would suggest (Mackay et.al, 1989).

Because the benefits are so great, some users (lead users) will create customized tools to address individual problems. However, the majority of users do not have the technical skills, even if they have the need, to successfully manage their on-line interactions. To increase the usefulness of such systems, we need to understand how to lower the short-term costs of managing the information.

Barriers that increase the cost of managing electronic information:

1. Users who manage their own messages often do not have clearly articulated rules for how they do it. Most people, except those with extreme needs, will resist articulating these rules.
2. Users have misconceptions about what they actually do with electronic mail (Mackay, 1988, others), which makes articulating effective rules even more difficult. Observing user behavior and either operating directly as a result (Wexler, neural net work) or providing feedback to users (Mackay, others, tutoring work) will be more effective.
3. Pre-categorization of messages by senders will be most helpful in situations in which communication patterns are highly regular or the content of the message is the major indicator of how the message should be processed. The information lens should prove useful here.
4. Recipients of messages react to the same message differently, depending upon previous interactions with the message, changes in the external environment, and changes in the user's interests. Providing flexible annotation (categorization) mechanisms to recipients,

> that can be used differently when the user’s state changes, will prove more effective than fixed annotation schemes.

I hope to demonstrate that taking these psychological barriers into account when designing annotation and filtering tools will significantly increase the overall usefulness of electronic communication.

Introduction

Problem statement.

Introduction: background of work already done. Provide pilot data and basic phenomenon: diverse use of email. Case study approach.

Explore how users use electronic communication -- how they innovate to solve communication problems not anticipated by the designers of the software and how those innovations change what they do. (User’s don’t always know what they want to do -- the system may redefine what they do. Example: railroads vs transportation -- changing the definition of what you do changes the way you think about solving problems.)

Claim -- requires triangulation, not just one thing. Introduce a new system, observe, examine examples where change sparks innovation.

Completed Work

Summarize three papers.

Remaining Work

Questions raised by past work, questions answered. Can we go beyond finding that email use is diverse -- what’s predictable?

Proposed Method

Early stage -- not yet able to test hypotheses. Need to carefully observe behavior and find out what people’s strategies for use are.

Proposal: explore the dimensions of user innovation in software -- communication systems.

Subjects: 13 case studies -- follow on to work at Xerox PARC and Athena Lens.

Method: In-depth interviews.

Output: 13 in-depth case studies. Will find one of two things -- either "these are the predictable dimensions along which users 0would modify the software" or "it is not possible to predict". What constitutes evidence that it is not possible to predict???

Case study of myself>> give an idea of what such a case would look like.

Wendy, Lucy, Ramana, Debbie, Stu

Peggy, Danny, Bernardo, Bob, Stan

(Randy, Mark, Tom F. Dana)

Rich, Brian, Dan, Don, Maya

Gary, Catherine, Ron, Earll, Jackie,

Ack, Kevin, Kum Yew, Dave, Jin Tae

(Danny -- JM's comment on evidence from old Multics days...can predict that he'll keep pressing the return key. Look at Lotte's stuff.)

Case Studies -- try to get an indepth look at what users are really doing with the new technology. they the innovate, how they change, how they can't predict their own behavior. (Again -- ask users of card readers what they want and they'll say "faster card reader", not multi-tasking workstation. Start as a glass teletype.)

Case study quotes: Toby Used email since high school, now a college graduate. Friends around the world. Can't imagine being cut off.

Danielli -- set up network for World College (7 sites around the world, Britain, Italy, US, etc.) Students maintain ties with each other. But administration doesn't like it -- they want to have all communication go through them.

Similar to the Rand study in 1986 -- forest rangers and email.

Make points about the design of adaptive systems.

Sample Case Study

How do I use Email to communicate electronically?

What kinds of modifications do I do?

What causes me to do it?

Built email net of colleagues use for sw development, paper collaboration, help people

Find list of email categories. constrast with kinds of phone calls.

Papers

3 referreed papers. Data summary from CHI panel.

Mackay, W.E. (October 1988). Diversity in the Use of Electronic Mail: A Preliminary Inquiry. *ACM Transactions on Office Information Systems*, Vol. *6*(4).

Mackay, W.E.,Malone, T.W., Crowston, K. Rao, R., Rosenblitt, D. and Card, S. . (May 1989). How do experienced information lens users use rules? *CHI '89 Conference on Human-Computer Interaction*. Austin, Texas: ACM/SIGCHI.

Mackay, W.E. and Davenport, G. (July 1989). Virtual Video Editing in Interactive Multi-Media Applications. *Communications of the ACM*, Vol. *32*(7).

Expect that tools that users can adapt easily will be more useful than those that are rigid, because the environment is dynamic....

Tools that are adaptive and adaptible by individual users are more likely to be effective than those that are externally prescribed.

1. Flexible annotation of messages by the recipient, rather than just by the sender, will increase the usefulness of the system.
2. Providing the ability to change the recipients interaction with a message based on the user's previous interactions with the message and changes in the user's state will be more useful.

These beliefs are based on observations of users, who have difficulty managing their electonic communication.

Better understanding the barriers they present to users, the ways that lead users overcome those barriers and to determine the

The purpose of this investigation is to identify the requirements of users, and the ways in which systems must be designed to lower the costs of information management, which will in turn improve the effectiveness of such systems.

Kinds of

=== Can we increase the overall effectiveness of electronic communication?

the content of the message is the most important feature for successful handling of the information.

This problem can be addressed by creating a flexible range of annotation features... A flexible range of annotation features, from formally structured messages to informal annotations added to messages

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