

MessyBoard: Lowering the Cost of Communication and Making it More Enjoyable

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ABSTRACT

Coworkers often do not communicate as much as they should both because communication costs time and effort and because work-related communication can be unpleasant. MessyBoard is a communication medium that aims to improve collaboration by reducing the costs of communication and making it more enjoyable.

MessyBoard is a persistent networked 2D bulletin board. Freeform layout reduces the cost of communication by allowing people to quickly express ideas. The medium makes communication more enjoyable by facilitating playful behavior alongside work-related communication. I reduce the cost of receiving communications by projecting MessyBoard on the wall and displaying it as a screen saver.

Several groups have found MessyBoard useful in performing real-world tasks. Usage patterns differ widely between groups and over time within groups, and I plan to conduct a systematic study in order to discover how group characteristics relate to MessyBoard use.

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Additional Keywords and Phrases: digital bulletin board, MessyBoard.

INTRODUCTION

Projects often demand the resources and attention of multiple people. People who are working together on a project must communicate with each other, and the act of communication incurs a cost in time and effort.

Some costs are incurred when a person initiates communication, and I refer to these as **sending costs**. For example, it takes time and effort to compose an e-mail message that precisely expresses a complex thought.

Other costs are incurred when a person receives a communication, and I refer to these as **receiving costs**. One component of the receiving cost is the time and effort required to read or listen to a message. Two other components are

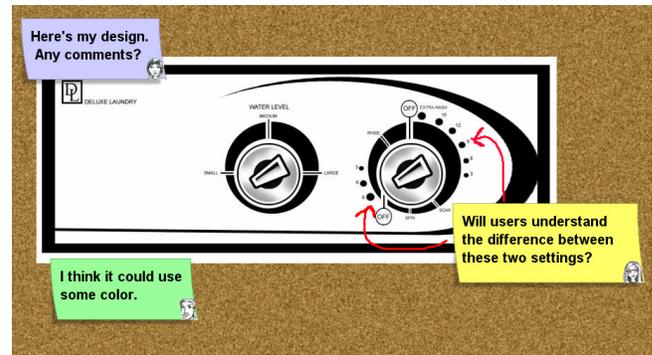


Figure 1: Designers use MessyBoard to comment on a design sketch.

interruption (as in an unexpected telephone call) and polling (as in checking e-mail or voice mail). An interruption takes time away from ongoing work and causes workers to forget things, requiring them to expend more total time to complete a given task [4]. Polling requires workers to set aside time to check messages regularly.

People enjoy communicating in a variety of situations, but work-related communication is often boring, inefficient and distracting. Many workers complain about having to read e-mail and attend meetings [16].

All else being equal, if the cost of communication is high and it is not enjoyable then people will communicate less often. Though some workers complain about “information overload”, many researchers argue that a lack of communication amongst collaborators leads to less effective collaboration [6, 13]. The purpose of this research is to improve collaboration by lowering the cost of communication and making it more enjoyable.

I have identified a set of characteristics for a communication medium and I argue that these characteristics will reduce the sending and receiving costs of communication and make it more enjoyable. I also argue that the receiving cost can be reduced by displaying the medium in convenient places: on the wall of a shared work space and on idle workstations. I have combined these characteristics in a robust implementation and this will allow me to observe how the medium is used in a real-world setting. My findings will be relevant to the design of any communication medium that provides a shared 2D space.

MESSYBOARD: A PERSISTENT 2D SPACE

MessyBoard provides a networked persistent 2D space with freeform layout. Users view and interact with the space in a web browser on their own computers and a server keeps everyone's view synchronized. Users add content using a menu or by simply dragging and dropping or cutting and pasting from other applications, and they move and resize objects by clicking and dragging. Users can share notes, images, freehand drawings, hyperlinks and files represented by icons.

Each group of users has its own distinct MessyBoard space and each space has a URL that is easy to remember. For example, the MessyBoard for the "xyz" research group is located at www.messyboard.org/xyz. The MessyBoard client is a Java applet that runs in most Java virtual machines (version 1.1 and higher) so that users can access MessyBoard instantly without installing software.

Medium Lowers Sending Cost

A persistent 2D space lowers the sending cost by facilitating two important communication activities: referring to an object and grounding a conversation [3]. As shown in Figure 1, users can place their notes and draw arrows in order to refer to specific parts of an image. The entire conversation is grounded because the objects are persistent. In other words, it is always clear what the conversation is about because the relevant objects are near the discussion.

Medium Increases Enjoyment

Effective communication requires people to pay attention, but work-related communication is often considered boring as compared to jokes, stories or office gossip. A medium with freeform layout of mixed media facilitates the kind of playful behavior that people naturally pay attention to and displays it side-by-side with work-related communication. For example, people can share personal photos or comics and comment on them. Playful communication can draw attention to the medium by making it enjoyable, causing people to pay more attention to the work-related communication as well. Research has also shown that casual communication can lead to increased productivity [13] and that humor can make a collaborative task more enjoyable without a loss in efficiency [14].

Special-Purpose Widgets Decrease Cost

Certain communications problems are both common and extremely costly to solve. For example, scheduling meetings via e-mail can be extremely inefficient. Shared calendar systems like Microsoft Outlook require groups to change their culture and practices, and some people are unwilling to share their schedules or keep them up to date [8]. Users may also revert to e-mail because a calendar only allows limited forms of expression and communication.

I plan to reduce the cost of communication for common tasks by integrating task-specific solutions into MessyBoard. For example, a calendar widget on MessyBoard could allow people to quickly mark the times that they are not available during the coming week. This solution is far more efficient than exchanging multiple e-mail messages in

terms of sending cost and receiving cost: marking times by clicking is easier for the sender than typing a list of unavailable times and looking at a single representation is easier for the receiver than constructing a representation from multiple e-mail messages. Users are not required to share and maintain their entire schedules and they can express arbitrary preferences using notes and pen strokes.

Limited Space Reduces Cost

MessyBoard reduces the receiving cost of communication by providing a finite space that fits on a single monitor with no scrolling or zooming. A user can quickly glance at the medium and be sure that they have seen everything that the last user intended them to see. A limited space forces the authors of the information to use the space wisely by consolidating, summarizing and removing unimportant information. Since the space is limited, information that occupies the space has implicit value.

One problem with a limited space is clutter. Users may be reluctant to delete old material even if they believe that it is obsolete because someone might still need it. I address this problem by providing a history mechanism that automatically captures all activity. A simple slider interface allows users to scroll back in time and recover deleted notes and pictures. Users can casually delete material knowing that it can always be retrieved by anyone who needs it.

Displaying at the Right Place and Time to Reduce the Receiving Cost

Interruption and setting aside time to check messages are two components of the receiving cost of communication. Many people will not use a new communication medium because they are already overwhelmed by the receiving costs of e-mail, IM, voice mail and cell phones. However, there are usually times in a persons' schedule when they are able to process a little bit of information without losing productivity or being annoyed. For example, people often do not mind if someone asks a question on the way to lunch or during a stretch break. My goal is to get people to pay attention to MessyBoard during these convenient times.

One approach is to display MessyBoard as a screen saver when the computer is idle. Users see it when they arrive or return from a break, but it will not interrupt them while they work. The MessyBoard screen saver is interactive, so that users can use idle computers to post comments. In a work environment, this makes all the unused displays act as a distributed shared bulletin board with low-overhead access. Instead of disappearing when the mouse is moved, the MessyBoard screen saver is dismissed when the user presses the Escape key.

Another way to get people to pay attention to MessyBoard at convenient times is to show it on a large public display using a projector. People see it at a glance when they arrive at work or when they take a break, and they may pay attention to it without perceiving it as a burden.

	Large Space	Multiple Spaces	WYSIWIS	Freeform	History	Screen Saver	Public Display
MessyBoard			✓	✓	✓	✓	✓
TeamRooms [17]	✓	✓	✓	✓			✓
Groove Pinboard [2]	✓		✓	✓			
Kansas [18]	✓		✓	✓			
MuSwikis [19]		✓	✓	✓			
ScanBoard [9]		✓	✓	✓			✓
Semi-Public Displays [10]		✓	✓	✓			✓
Dynamo [11]			✓	✓			✓
Notification Collage [7]			✓	✓	✓		✓
iCom [1]			✓				✓
Designers' Outpost [12]			✓	✓	✓		✓
netomat [15]	✓	✓	✓	✓	✓		✓

Table 1: MessyBoard embodies a unique set of characteristics as compared to other systems.

Though any medium could be shown on a public display or displayed as a screen saver, MessyBoard is particularly well suited to this kind of display because it is a 2D, finite What-You-See-Is-What-I-See (WYSIWIS) medium. Users can easily arrange content on MessyBoard exactly as they wish other people to see it.

RELATED WORK

I developed a prototype version of MessyBoard as a tool to enhance human memory [5]. The new version of MessyBoard employs a unique combination of characteristics in order to lower the cost of communication and make it enjoyable. Table 1 compares MessyBoard to other systems.

Designers' Outpost is very similar to MessyBoard in terms of these characteristics, but the two systems are designed for different audiences. Designers' Outpost is a tangible interface that supports synchronous collaboration for the early stages of web site design [12]. MessyBoard is a purely digital interface that is designed to support asynchronous collaboration of many kinds.

Dynamo is similar to MessyBoard in some respects, but it has been designed to achieve a different set of goals. Dynamo allows users in a single room to quickly share content, and users can leave notes to communicate asynchronously [11]. Users must go to the room where Dynamo is displayed in order to interact with it. MessyBoard can be modified from any computer on the Internet.

Large Spaces

A large or infinite shared space allows a large amount of information without users ever having to delete anything. TeamRooms [17], Groove Pinboard [2] and Kansas [18] provide large shared spaces where users view a portion of the space at a time.

Multiple Spaces

Some systems provide multiple spaces, also referred to as "rooms" or "pages", in order to accommodate large amounts of information without deleting anything [9, 10, 15, 17, 19]. Multiple spaces can be used to separate content by topic or project.

Non-WYSIWIS Space

I have argued that MessyBoard's persistent 2D space with freeform layout and strict WYSIWIS allows users to quickly refer to objects and ground conversations. Eliminating strict WYSIWIS or freeform layout can result in a system with different benefits. Notification Collage [7] allows each user to arrange objects in a way that makes the most sense to them without disturbing the layout for others. iCom [1] allows users to quickly post information using an e-mail client without worrying about where it should appear in the space.

OBSERVATIONS

I recruited several pilot groups and gave them their own MessyBoard spaces to use as they see fit. My initial observations and their comments during interviews indicate that some groups find MessyBoard useful in real-life situations, but usage patterns differ a great deal.

A research group has been using MessyBoard for 6 months and a projector displays their board on the wall of their lab. Their leader has asked that they use MessyBoard to sign up for their weekly meetings so that the secretary knows how much food to order. Group members do not mind this, and the secretary prefers getting the list of attendees from MessyBoard over the old method of reading individual e-mail responses. They post work-related and playful content and both are often present at the same time. Some people like having the projected display and nobody finds it distracting.

Three groups of graduate students used MessyBoard during the summer to collaborate on class projects. Each group had a shared office with a projector to display MessyBoard on the wall. One of the groups used MessyBoard constantly as an annotated file repository as shown in Figure 2, another group used it occasionally to share ideas asynchronously, and the third group used it primarily to manage to-do lists in real time when deadlines were approaching. All of these groups used their boards almost entirely for work-related content.

All of the Ph.D. students in a department (approximately 25 people) have been using a single MessyBoard for over two months. This board was not shown on a large public display until recently, but several members of the group installed the screen saver. When new space became available in their building they used MessyBoard to choose their new offices. MessyBoard played an important role in this process and they continue to use it to discuss the setup of the new office space.

FUTURE WORK

My initial observations indicate that MessyBoard use varies a great deal between groups and over time for individual groups. If a large organization were to deploy a collaboration tool like MessyBoard, it would be important to identify which groups would benefit from it and under what circumstances. For developers looking to improve such a tool, it would be useful to understand how different kinds of groups use the existing features.

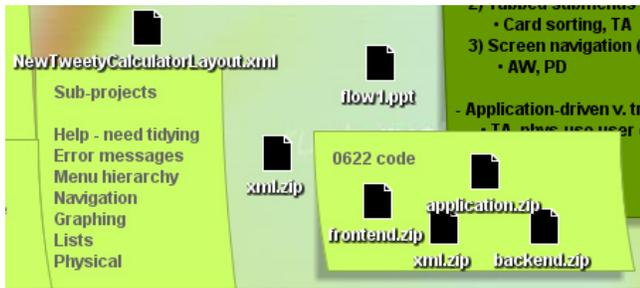


Figure 2: Users create an annotated file repository on MessyBoard.

Variance between groups may be due to group characteristics such as cohesion or the nature of the group's work (knowledge work, administration, etc.) Variance over time may be the result of events such as deadlines or the introduction of new projects. I plan to recruit a wide range of groups including class project groups, research groups and student organizations, give them their own MessyBoard spaces, and look for correlations between the variables mentioned above, the ways that the groups use MessyBoard and their perceptions of how useful it is.

SUMMARY

I have argued that a communication medium that provides a persistent, finite, WYSIWIS, 2D space with freeform layout will reduce the cost of communication and make it more enjoyable. I have also argued that the cost of communication can be reduced by displaying the medium on a public display in a shared work space and as a screen saver on idle workstations. I have built a system, MessyBoard, that embodies these characteristics and I am observing how teams of workers use MessyBoard for real-world tasks.

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