Agents and Desktops on the Web

Ted Selker: I can't believe it! We are back on schedule! (applause) Thank you. Can I see a program? I want to keep pointing out the logistics -- oh, I've got one right here, it's amazing! Well, this has been a very exciting year for me, for example, the adaptive help agent that I have been working on for the last decade is just about to go into mass production in a wonderful operating system that you all don't use. But I do! OS2. That's WarpGuides. (changing the subject) This is a projector that is not produced by other people, it is only a prototype. We have been producing a portable presentation computer that most of you I hope are aware of. And it is a notebook, or a presentation computer. I think that really changes the way that my meetings run. When I go to a meeting, I have a tendency to sit there and write up a transparency on my machine and put it up in front of people on the overhead projector, it is really kind of nice. Another example of something really nice that happened with it is, where is Barton Smith? Can you raise up your notebook, just up in the air so people can see it? Barton was sitting in a meeting about six weeks ago with that setup there, and it just a Metracom, thirty dollars a month will get you one, too. And he had it on one of these kinds of computers, and somebody was coming to interview. Only the person had kind of forgotten to bring their transparencies. I don't know what happened. Anyway, so he is standing there and we are talking, and Barton, without wires or cables or anything, just brought up the guys website, brought up the transparencies, and handed him the presentation computer. The guy gave the talk! It was amazing! It was great! But that is something I had never believed was possible, even though I had seen video tapes or heard people talk about it. Why isn't Todd here this year? In any case, this is more logistics, this is kind of the interface that you might see out in the lobby that shows you how to use your badge. One of the fun things in this interface was trying to make a GUI where there is no pointing device, because the pointing device is being used as a censure. So we have these drawers that pop out and we have these keys that look like buttons so you end up pressing on the keys rather than thinking there is no cursor to move around. I run a group called User System Ergonomics Research here, and the members of it are proudly displayed in your brochure because they worked very hard to make today possible, so thank them for that. And we work on physical interface, graphical and cognitive. Here is somebody in space using a TrackPoint. So what I am supposed to be talking about is how desktops of the future are going to occur, what is a desktop, and how agents may help that also. Not only, but also. So, a desktop is a place to concentrate and organize (I don't need the two computers here, I'd rather look

at you) concentrate and organize, bring things together, and communicate. Those four things I am going to talk about. So, where is a place to concentrate? Well, as you saw in my abstract, it used to be that you had to sit at a big desk and have a well, and use your pen, and if you wanted to do anything, you really needed to be inside. Things are changing and getting better in that way. Dynabook's a reality. This personal presentation computer I am very excited about. This particular one is designed so that it is designed so that is will work outside in the bright light. You will see a demo of that outside there also, which is that the back comes off and allows light to reflect off inside and present that way. And Room-With-a-View is something we have been talking about around here for quite awhile. This is Room-With-A-View and you'll see that these are a bunch of tablets, let's call them pieces of paper. They lay on your desk, and you can use them to grab things off your wall. So if you want to look out the window, I find myself in NetScape. And if I want to grab a book, and so what happens is that you can use your peripheral vision to keep yourself oriented, and your full field vision to focus. Just like our old offices before we quit keeping them up and they got all dusty and everything lived on our web browser, just like our old office, we can use our peripheral vision to orient people to come into our room about what are the important things in our lives, and put paper in front of ourselves, sit down, use it, hand it to somebody, get another copy off the wall. And when you leave the room, instead of having printed out something, marked it up and having to take it back and type up the new changes into the computer, they are already in the computer, the file system already has exactly all of the changes, and there is no messy desk to clean up, it's just get the next thing. Of course, if you live a very complicated life, you probably have more than one room. So that is just one kind of image of what a desk type might look like. Wearables are really allowing us to concentrate in other places than at a desk in an office. It is just tremendously exciting to me to see that this computer here that I have only modified so much so that I can keep my hands free in social situations and use my Windows 95 interface. It has Windows 95 with enough memory, enough disk, and enough horsepower to do just about anything you do on a desk top. It is only sold in Japan, so it is an expensive air ride, but IBM makes this computer. (audience) This keyboard? Redesign it! When people want to ask questions, raise your hand and we'll throw the ball to you. Thank you. How about a wallet? This is a wallet that actually it, it seems like you have to have money in your wallet, but wouldn't it be nice if you just had a time piece in your pocket, and if it beeps, you open it up and why not be able to change information, or find out about your medical appointments, record something, or talk to somebody, give out cards. We have also been playing around with user

interfaces being used in the car in my group. It is kind of interesting, what do you know, you can spend another couple thousand dollars and have another screen that you've got to concentrate on the little wigglies on in cars today. I don't think that is necessarily the direction we have to be going in. I think that the direction, that what people care about is sparkle in other people's eyes, the handshake, the warmth of the handshake. Tom Zimmerman in my group is working on personal area networks. I believe that it is going to be that a lot of these wearables are going to go away and we are going to have virtual computers to the extent that we really, that they add to our ability to do things without having to be really an actual physical item that we carry with us. So what if those glasses frames that you bought still cost two hundred and fifty dollars like they do now, only they did a little bit more. Enough of that out there thinking for now. I told you about Room-With-A-View, the virtual reality that you use with other people. I guess a lot of you have heard me talk about agents. Agents use various techniques -- anthropomorphism, macro's explicit user models, or adaptive user models to do things for you that you thought you had to do or somebody else had to do for you and they can work as an assistant doing things for you or they can work as an advisor helping you by bringing you along, teaching you things so that even if your computer is brittle and breaks down, you are able to do things on the next computer that you were unable to do on the last. Oh, which brings me to another point. There is something else in your giveaway, and that is Communications of the ACM this month did me the honor of allowing me to put together some of the people's articles from talks given here before into a group of papers. A new paradigm for using computers is the kind of headline of the CACM. The editor is Tom Landberg from CACM. So, I hope you all enjoy that. There is a whole lot of other interesting articles that I had nothing to do with as there always are. So I was talking about how do you concentrate? Where do you work? And how do you bring things together that you need on your desktop? Well, we've been working on a bunch of stuff that is about searching and browsing relative to user interface issues. So a lot of people work on relevance feedback but Rob Barrett back here has been working on using the relevance interface -- what time am I supposed to be done? Oh, lots of time -- relevance feedback for making user interfaces that allow people to find things easier that they might not be able to. The other thing is that you want to, and well I will just give you a tiny demo of a couple year old version of that as long as we seem to be having time which is a shocking thing to have. So, let's say you had a, you wanted to find out about information or data sources or locations relative to a user or users. So this is kind of looking for database that's relevant to a user. That seems to be what we

are interested in. So we went off on Inspect and we got back one hundred and twelve articles and we say, "well let's take a look at these articles." So this one here, among other things, this article seems to be about making a CD-ROM and I trash it on the basis that if somebody were writing about CD-ROMs, that's not about being relevant to the user. And these guys are making a CD-ROM, too, and I just trash that. Statistical abstract of the United States is real proud of making a CD-ROM. Must be the year of making a CD-ROM here. But, if we take a look at this one, they have this meta-information and they're using that to aggregate, browse clean stuff. That seems kind of relevant to my goals. And, oh, WAIS, I've heard of WAIS, and it talks about using a content routing architecture to help find things. Boy, that sounds interesting, so I say that's interesting. But, at this point, uh oh, I don't see it. (response from the audience) What? Oh, PowerPoint! Who made PowerPoint? Okay, well I will just have to let PowerPoint diminish itself a bit. Aha! It is starting to suggest things. That's kind of fun! Paper architecture and computing. Those are all kind of abstract and fancy. Words. I wonder if I look at this next one that I'd passed up -- what happens is this U.S. Genome project has made this great big database so I think that is not so interesting and it comes down to saying that you should add the word architecture for some reason. If I accept it, and instead of changing anything here, I just let it do that, I come back with five articles instead of one hundred and twelve. We find that in three or four minutes, we are diminishing the things we have to look at by 30-40%, in this case 95%, but that is unusual. But I think that this kind of way of doing things where we use these various AI in the small techniques is going to be more and more part of the way we get things and keep things and I just am seeing more and more little companies starting up thinking about that, and it is kind of an exciting time for figuring out how to filter out all of the stuff that is out there. Meanwhile, there is a thousand databases going on-line a day. So instead of searching, browsing becomes important. Some of our early work was looking for meta-information that we could kind of generically notice and use to call out what data bases we're interesting and useful. In one experiment, we kind of compared what the timeline looked like, the dates you would find in various data bases. In a database about LCD's, it looked like -- LCD's are basically, you know, booming. Fusion, about October 1989, the articles dropped, or the dates just dropped to zero. And Java looks like this, of course it's in this mighty gigantic exponential growth of interest. So we have thought about cataloging, highlighting relative to some thing. Like we tried classifying it relative to the Almaden Library titles from the Library of Congress. And newsgroups, and also we are thinking about "what if I use my archives?" So that when something new

comes in, it says, "you know, this data base is a lot like that article you wrote in 1987." And that is where things get exciting for me. We've had tremendous success actually, with very simple linear-algorithm programs discriminating kinds of information. So how are you going to put those things together? We can look at this as an old-fashioned library and we could bring things together in the library. The library is kind of an interesting place, it is a place you go, not necessarily make things, but to gather things and on the other hand you can have a desktop in there, too. This find a thing that I was talking about, the last thing I was talking about, I think that was the magazine rack because it's the kind of place you can explore. And the catalog, that is kind of that relevance feedback your running through this catalog finding things. Of course, there are new things available all of the time, and if you want to share your view with people, you go and you copy it. I don't know if that 3-D thing that started happening a few years ago is really going to be the future of all interface. But it is true that by having specific landmarks that allow people to concretely remember where particular things are. We can make people able to find things better as opposed to having no landmarks and no spatially significant relationships. That's kind of a relatively old result, and I think that's if anything ... yes?

Speaker: Do you think that's only good for a ... you know you have a half a dozen things, and if you have a half of a dozen icons on the screen or even ten, you don't get lost, and people soon learn to read. Do you think this is going to be useful for when things get crowded? I know my office starts not being useful when it gets crowded and I have to sort of shove all of the papers away.

Ted Selker: Sorry about your office! Absolutely. GUIs are really good for, you know, under two hundred things. Right? And our lives are much more complex than that, and how do we organize them? Well, I think that is really where we start to have a relationship between the person and the computer, where the computer understands something about us, and is helping us guide ourselves through these thousands and tens of thousands of things that we are concentrating on over a long period of time -- and helping us group them and helping us retrieve them so they're -- I think he needs the microphone again.

Speaker: I'm looking at your interface, and your interface has these landmarks. And you have half a dozen landmarks, and that is all you have on the screen. And so these tens of thousands of things, if you are going to get down to them at a factor of six, you

are going to have to have at least four levels, and you are going to have to have interesting landmarks all the way down. Is this the way to provide landmarks? Why do you believe this is appropriate?

Ted Selker: This is not appropriate for tens of thousands of things. If you take a look at Romano Rouse(?) talk last year here, he had this lovely visualization called "_____", for looking at thousands of -- comparing thousands of pieces of data visually and viscerally. Visualization is continues -- visual/spacial things -- we've got 70% of our inputs to our brain comes from our eyes. Very important, very great, visualization helps, we all love it, it's good and so on. However, at some point, the world is too cluttered. And at that point, we have to have some cognitive, some representation, some sort of a shared relationship -- something we both believe is true -- us and the computer, us and the other person. What do you think of that?

Speaker: Fine, but I don't see the relevance to this interface (laughter)

Mark Davis: Don? The football, is that better? I'm talking into the football! (laughter) The other issue is when you talked about being able to search your own personal archives, that seems like the right start. The question I have for you is _____ and your collegues and your near associates archives and being able to have a social space that allows you to solve the query and retrieval problem, rather than just you and a delegated agent. And so, that austere librarian of course is a virtual librarian, and I am wondering how you bring -- the way you really look for things is that you go and ask people, normally.

Ted Selker: Yeah, except there we are in our dormitory, and there are all of these people flowing through our room, and we are having a great time. We are really happy we came to the University. There are all of these interesting kids. But, how do we concentrate and focus? We go to the library. So, there is always trade-offs between the social and the focus.

Mark Davis: No, we walk down the hall and ask an expert what the reference is.

Ted Selker: No, but then we get involved with her, you know, the drink possibility and the movie possibility.

Fred Lakin: To answer Danny's problem, why can't you have a landscape agent who creates the great landmarks just before you get there to each level?

Speaker: Hard to recognize.. _____

Ted Selker: only if they are not really good ones

Mark Davis: I just want to point out 3-Ds are really bad use of screen real-estate.

Tony Fernandez: Hi there, Tony Fernandez from NetScape. I just wanted to ask you - the landmark and the 3-D argument seems fine to me but why do you think it is so important to bring and manifest the real world using that. I mean, you instantly bring up issues of, you know, there is the stereotype of an old marm librarian, you know. There are people in different countries, I mean we are talking about a world-wide community now that won't perceive that as a normal looking library at all. I mean, why bring the real world and feasibly the American real world into it at all?

Ted Selker: Well, the American real world, unfortunately, is big part of - could you throw that over to Charlie Rose? Is a big part of a lot of people's experience on the media currently. I'm not particularly tied to that metaphor. I think that there are big limitations to this spatial organization except for the fact it's what we're good at. People are very good at keeping track of where they are in a spatial environment. And people enjoy recognizing things rather than recall them to do things in a computer interface. I don't know if that's...

Michael F__: I'd like to get back to the dorm example just for a second.

Ted Selker: And your name is?

Michael F: Michael F__ at Universal Access. I want to make the comment that in the dorm example, with a couple of little add-ons, this thing works perfectly in the sense that I allow certain dorm members do to certain things in my room when I'm not there. There is a bigger group that has different things. There are pre-answered questions that are very generic, and I've already answered them. So this thing expanded slightly. Obviously there is a lot of pressure for these things to expand in some manner driven by the market, satisfies a lot of those big future __.

Charlie Rosen: Ted.

Ted Selker: Charlie Rosen.

Charlie Rosen: You made sure that I would speak this time cause the last time I watched and heard this august group talk about things much of which I didn't understand, but much of which I did. I want to say a little piece about agents and interfaces, and I really prepared a little bit of this for you if you give me about three minutes. The best agent is the individual himself who is trying to get things done for him or get information from the system or what not. Because he knows or she knows what the heck they want to get. And so I say the interface may be the most important thing if it is easy for you to elicit the information or get what you want out of the computer. I had experience in the early 70's with industrial robots.

Ted Selker: what you said is we should do market driven design, right?

Charlie Rosen: No, I want to go on ... until they were able to program them by doing. That is a guy who didn't know how to read or write even. But had eyes and a brain, could move a robot around and see what it was doing as he went step by step and the important thing is that he had visual feedback to make corrections. At that time, in the early 70's, was the first time somebody brought out a speech understanding machine on the East Coast in Jersey, an old colleague. And I bought his number two machine for twenty grand, which was a lot of money then. And it could recognize about one hundred phrases and I programmed an industrial robot to respond to spoken commands. The important issue, and that is the one I want to bring to the attention of this group, was that the feedback was visual at that time, via diplay, and the actual machine so that you could make corrections and a man would use himself as the means for getting the information that was misrepresented because the speech part was not good. Now today, we have some awfully good speech systems which are not 100% perfect or what-not, and I say our major work for interface has to be to get interaction between the user and the program so that errors can be corrected very quickly via speech, via eyes, via any means, by pen, this is the most crucial thing you can do for all of those people who can't read or write and for all of those CEOs who won't go near a computer because they won't put a pinky onto a keyboard. These are the two huge groups and I say this is the major place to do work.

Ted Selker: Yes, I totally agree. It is not just how fast, but how unconsciously you can fix these errors. You know, when we are communicating with each other and there is a mistake, a raised eyebrow, a little wrinkle on the face makes a big impact on how the conversation continues and so I don't know how, in all cases, to make de-bugging communication with a computer that unconscious.

Neil Scott: Hi, I'm Neil Scott at Stanford University.

Ted Selker: Just one moment, I want to help introduce these people. Charles Rosen ran the AI lab and started at SRI and has started several different companies. Neil Scott is running a program called Archimedes at Stanford University, and he has a bunch of computer interfaces that he will be showing out in the lobby that help people who are, I want to say special needs people interact with computers

Neil Scott: Okay, what I was noticing as you were passing the ball around is that you were all talking, you're looking at the visual display of what you are wanting to select from. But you are always saying that you talk to the librarian, you talk to someone down the hall, then basically when we've been working on interfaces for people with disabilities, we've found that a single interface doesn't work. There are always huge inefficiencies if you try to use just speech alone, if you try to use just eye tracking alone, if you try to use just head pointing alone and so what we're working on are ways to merge these all seamlessly together and use whichever path is appropriate for what your doing. So I invite you to come out and see J.B. who is sitting in the back with a wheelchair with the system that he uses for his daily work which combines speech and head tracking, but it means that you can make your corrections very very quickly just by looking at something and telling him what happened. So I believe very strongly that the real future is all of these things are alive and working and whatever path is appropriate gets used without really thinking about it.

Ted Selker: One more question and then I'm just going to go on a bit. Your name?

Michael Shrage: Oh, Michael Shrage with MIT and L.A. Times. I'm sort of intrigued in that there's - one of the comments that Fred made about user design, clearly people have a wide variety of cognitive styles. We're talking about multiplicity of interfaces. I would just like to know on an operating hypothesis, what's the variance and

distribution going to be as we look ten years as we give all of these tools out. Do we see a clus- what kind of a bell curve do we see? Do we see it with a very narrow variance? Or do you really see something that might have several hills and valleys in regards to, because of the variety of people's cognitive styles and the nature of domain searches, do you see a scatter pattern of how these tools are used?

Ted Selker: Absolutely. Every trick in the book, right? I mean, when you go out and see this Archimedes system, you are going to see a system in which a person carries a way of communicating to any computer that is personalized to them every where they go. When they come up to a different computer, that interface...

Michael Shrage: ... however, now can this, just briefly, you're agreeing with this hypothesis, that creates very interesting both marketing and business questions because all of the sudden economies of scale, traditional economies of the scale that companies like Intel and Microsoft and thus far NetScape have exploited, and IBM, have exploited so well, begin to decay because what you're telling me is that we are an explosion in the variety of the way interfaces are clustered together to serve both domain knowledge and different cognitive styles.

Ted Selker: Yeah, in fact, the coach adaptive help system is designed to give people the amount of information, the type of information, the style of information to them when they need it as they are doing some work. I invite you to play with it out there and that is the beginning of that. A lot of people right now are actually saying they have results about how to make video games good for girls, and hope to make a lot of money off of that. I think that there is a lot of user modeling that is about to start happening that's going to address individual differences. And that the hope of people making an application that serves many people. But I believe also at the extreme, we have people that only can use their tongue, and they are absolutely going to have a different interface. And if I look through our audience, it was a millenia ago that we decided to be adaptive and use our brains rather than be optimized. And at this point, I'd say that about 30% of you are wearing glasses. That is not a product that is useful to everyone. I'm really lucky at the moment, I haven't yet had to put some on. But, you know, it's really going to, I don't know if you see how that relates, but I think it's exactly.. Hey, let me see what else this thing has to say. Okay, so another demo out there, and by the way, anybody who has demos on their machine, like I see people with their open notebooks, and I just have this feeling, Don, that you have dripping,

drooling images that you can show people. See, there they are! Anyway, so, as we go to break, I really encourage people to share their stuff and there are tables out there to .. here's John McCarthy.

John McCarthy: Okay, well, there is too much greed here. People are trying to figure out how the large quantities of money can be made, and I wish you all well in that, but what I'd like to do is make the peaks higher. Which is to say that the people who get the most out of computers, and have the most ability should be able to get yet more. And one of the problems is that even the experts are always beginners at the more things they want to use. So, I would like to see five percent of the attention going into making the peaks higher, and not all of it going into making the executives and other handicapped people (laughter).

Ted Selker: I like that idea, we've had talks past in this workshop. Lakin for example talked about having interfaces for high performance users, people who are willing to take a year or two to become really really good at something, the way we get good at skateboarding, the way we get good at skiing. These are things that are worth, if it's worth doing, it's worth doing sometimes people say. You look like you have something to say, never mind. So, we, the other thing that we are proud of, couple things we are proud of that have happened this year are, that I've been saying something about. Come back, please. Oh, thank you! Web browser intelligence (WBI) is a system that we've just put over the fire wall, and you can all download and use with any web browser to aggregate the lists of where you've been and statistically what places you went from different places. Also, it annotates your web browser with green lights next to things you're going to get, that are fast to get to, and orange lights next to those that are a little slower, and red lights next to ones that are slower still. I see the people that did it back there -- Rob Barrett, Paul Nagleo, Dan Kellem -- and I think it's a really exciting idea that we are now in a position where we can start accumulating and watching a tremendous amount of things that people are doing and building a model of what they do when they are doing this, that, and the other, and make it a little bit automated, and where they might want to go from here. We've even played around with and have had quite exciting success with building a model good enough to browse as though it were you. The who? (audience member speaking) No, WBI is just if you spun upside down, it's kind of IBM upside down. So, what would you really want for this communication that we do with other people? About a year ago, we made a mail-system here that allowed you to get your mail from a web

browser, and I still think it's a wonderful thing - it filters and rules and mail topics, and other things were read and unread all available to you. And if you wanted to send out mail, if somebody wanted to send out.. could you hand this to... (speaking from audience). The question was, 'do I use this specific mail system?' And the answer is that we are not working on this specific mail system at the moment. (speaking from audience) WBI and this are two different things. But it is nice to be able to send people links rather than sending them big files and so on. But what would our mail system really like to be? Well, I really think of mail as being something that is a lot like other social situations. When you go into a party and it is ten o'clock at night, and you look down in the sunken living room, and you see a bunch of people there - how long does it take you to make your decisions about whether you are going to pay attention to the guy who is having problems, he's drank too much and his girlfriend is talking to somebody else, or somebody else is trying to catch your eye, or somebody in that outrageous getup, a friend, somebody who is part of my everyday work - maybe a whole gaggle of colleagues hanging around down here and then there is the food that is going by, and gosh, I hope I don't have to talk to him. And you make these decisions in just a few seconds, really. And then you have your evening planned out. And when I look at my e-mail, there are all of those relationships. There are relationships that are groups of people, people that I don't want to talk to, people that I do, some that are window addressing, and so on. How much of my time do I spend doing each of those? And in the 25 minutes or 45 minutes that I want to spend everyday in that party, am I able to even see in that amount of time - I, personally am embarrassed to say that I have a hard time even finding out which of these people are where in my e-mail. At the end of the evening, do I know that I've talked to everyone I wanted to talk to? Well, anyway, I believe that that is kind of - by using some of these search techniques, some of these browse techniques. Yes, please hand him the microphone.

John McCarthy: Your problem is that your screen isn't big enough! In other words, I get maybe 20 e-mail's a day. If they were all in front of me in some giant screen, then I could quickly decide which ones were really of interest.

Ted Selker: Visualization is valuable for lots of things. I agree that visualization is valuable.

John McCarthy: They just want it bigger! The same old thing, but you're just making it ten times as big.

Ron Barber: I'm Ron Barber from U.S.E.R. I know there are people that get 200 hundred pieces of e-mail a day, and I don't think that simply larger screens would solve all of the problems of that. I really think that some kind of classification and agent classification scheme is going to solve it. I also wanted to state that we will have the URL WBI, and any other URLs that are of interest that if people want to fly with me or other people on the user team out on our new puck web page.

Ted Selker: Let's just define that. Where do people go to on right down URLs if they want to have on the new paradigms workshop? We'll have a sign up sheet on a table out there.

John McCarthy: Well, I agree that 200 hundred e-mail's a day is a lot. And hardly anybody who doesn't make that a substantial fraction of his business will be able to do much with it with any possible computer aid. But nevertheless, we want all possible computer aids, including both classification and mere size.

Speaker: It would also help if people could have a whole bunch of e-mail addresses like hierarchical e-mail addresses so that the addresser of the mail can ...

Ted Selker: Oh, so they can become completely lost. Which female am I going to look at? Which room am I going to be in today? Have I forgotten to look at my e-mail on iii or npuc or selker?

Speaker: it's sorting it based on who it's sent to, instead of trying to look at the header.

John McCarthy: Well I actually have 2. I have an e-mail that comes to JMC-lists, and when anybody wants to put me on a list, I say, 'put JMC-lists on it.' And I call it my junk mail file, and I don't get immediately notified of the arrival of junk mail, and I look at it at my leisure. I can't say I also spend too much time on it, but it relieves things a bit.

Ted Selker: This is Phil Agre of UCSD.

Phil Agre: Yes, automatic sorting of e-mail is useless unless the e-mail system knows something about the social system the e-mail is circulating in. What if every piece of e-mail came in with the pointer to the CV of the person who sent it, what if you had representation of your relationship with various people so that there was some structure there for that kind of system to sort off of. At least there would be some hope of drawing maps, prioritizing, bringing to your attention, grouping relevant groups, calling up relevant background information and files along with the message and so forth. Right now that's hopeless because the e-mail message in itself doesn't tell you much at all about how it is embedded in the larger social system.

Rob Barrett: One thing that we had in the web mail system is to automatically derive your larger social community just by looking at the address lists because people tended to be copied on pieces of mail. And we can actually derive who you worked with in different areas, and then derive what sort of information that group had to do with to start understanding your larger social community. And you could do even more if you had other information besides the simple mail address lists, but it is a really good start.

Larry Missinter: I think automatic sorting of the mail is completely useless in general, is completely useless as a way of saving time because all you are doing is pushing around the time. You either have to read it or you don't. If you don't, you should figure out how not to get it in the first place. And sorting it into buckets, it's just one way of automatically deleting things you shouldn't have gotten anyway.

Mark Davis: Synthesis of Don in Phil's point. I think it's important in modeling the social situation to not have a uniform identity. You don't give everyone your home phone number or cell phone, you'll give more people your business phone. So the idea of multiple e-mail addresses is not that whacked, it's really saying that if you look at a person on the web, they are going to have very different spheres of influence and forms of proximity they want with other people, and current systems don't support that at all.

Phil Agre: Multiple e-mail addresses is a really primitive model, and a very technology driven model of social identity. One of the things that the world wide web is about is it's an amazing tool for people to construct a public persona - like

consultants having their brochures, or college professors sticking cartoons on their doors and things like that. What we really need is much more elaborate tools for people to project and construct identities and to project and construct relationships and larger social systems, especially ones that cross boundaries of organizations in the various ways that people already spontaneously do in a quite complex fashion.

David Henkel-Wallace: David Henkel-Wallace of Cygnus support. I think Phil, Larry, and John form an interesting triangle right here because John's algorithm, which I also adopt, is to have a junk or third class mailbox and a regular mailbox. And Phil's point of the social group thing is that, the real issue is that I get mail that I have to get because people have to CC me because it's important for the social structure of my company that I be on the distribution list even though I don't want to get it. But they want to signal the importance of the message to some third party by "CC-ing" me. So, the sort of standard technological value of this, and I say, by the way, the CEO of my company reads no messages that are CC'd to him, except the ones from me. So, that's our secret signaling mechanism.

Ted Selker: So you're saying that a lot of people in your company tell mommy?

David Henkel-Wallace: Essentially, yes. And since I know they're going to do that, I just don't bother to read the messages from them.

Ted Selker: So having said that I'm going to tell mommy on you already solves the problem.

David Henkel-Wallace: No, and that's why that's very funny about this, we've got one corner of the triangle where we are trying to solve, and take the most general complex, technological solution and say that we've got to have a general single solution for the general problem of getting mail which is not a solely technological thing. And we have another angle which says 99.5% of the problem can be solved with a tiny, little, simple solution and that last bit can't be. A sort of third angle is, am I only going to think about technology and I'm not going to think about anything else and am I going to try and build the most complex solution at all? And as Larry says, that will never work. I think it's a great lesson in just the interaction of these three people.

Ted Selker: This is a great conversation, and I just want to mention that we are almost on time. And what really I think is important that people are bringing up is the social dynamic. We use telephones, personal visits, e-mail, the web, faxes, telegrams, all for different purposes. Cakes with flowers on them. And every communication medium can't do and shouldn't really be asked to do - everything that all other communication mediums are trying to do or doing well. With that, I really hope this conversation continues over the break, and we will try to start promptly at 11:10 to listen to Larry Masinter from Xerox Parc talking about standards in the net.