Vying for your attention: Interruption management

July 2004

Executive summary – How do you stay focused on work when your attention can be drawn away by e-mail, instant messages, phone calls, pop-up notices and pages? **Interruption management** *combines tools, social practices and policies to help organize and control the many media demanding our attention. Classifying, prioritizing and understanding workflow, as well as helping people make better decisions, can all reduce stress and improve productivity.*

In this Executive Technology Report, Peter Andrews interviews Dan Gruen, a researcher and manager with the IBM Research Collaborative User Experience group.

Peter Andrews Could you begin by saying a bit about who you are and what you do?

Dan Gruen I'm a researcher and manager in IBM Research's Collaborative User Experience group, based here in Cambridge, Massachusetts. I've been with the group since 1996. My background is in Cognitive Science, and the work I do involves human computer interaction and design.

My most recent major project was a "reinventing e-mail" project, which did deal with helping people manage their attention around all the many items they received each day. I'm currently working on a unified activity management project with researchers in a number of IBM labs, including Hawthorne, New York, Almaden, California and CRL (China).

Peter Andrews Tell me about interruption management (or if you prefer, *attention management*). What does it entail? Why should people care about it?

Dan Gruen Helping people deal with interruptions is one aspect of helping them manage their attention. Currently, many people are inundated with e-mail and other communications, facing the dual problems of *infoglut* (sheer volume of information) and "*infoscatter"* (information related to a single task or activity being scattered among different items in their in boxes and in the other resources they use, including teamrooms, chats and files).
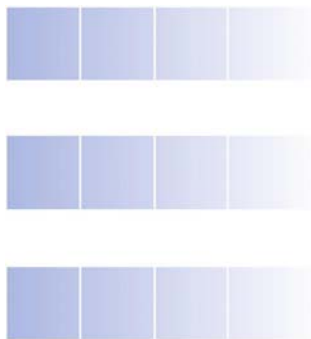
We've observed how people try to use their in boxes as a tool to help their attention, for example, leaving messages marked as "unread" so they would continue to grab their attention. And our work on e-mail has also reflected the multiple ways e-mail is used today: as a tool for collaboration, as a way to exchange files, for calendaring, for participation in workflow, for newsletters and other "background" information, for scheduling, for receipts and payroll stubs and so on.

Peter Andrews With so many uses and approaches, it sounds like it could get confusing.

Dan Gruen The problem is that these all tend to come in a single, undifferentiated stream. So one goal is to connect related items and group them in a way that helps people pay attention to the ones they need to for the activity they are currently doing. It's also important to let them know what else is going on – providing a sense of peripheral awareness – and grabbing their attention when you need to, if something important comes up.

**Peter Andrews** What do you mean by "reinventing e-mail"?

Dan Gruen Our reinventing e-mail project included tools like *thread maps* to connect related items, and *collections*, which combined simple rules and manual actions to help people deal with similar items together.

One of the things we've seen is the ability within an enterprise to preestablish meaningful collections and groupings, such as for HR (Human Resources) related items, so people don't have to create them from scratch. We're also inspired by observing what people do in the "real" world.

Peter Andrews What have you seen in the real world that was surprising?

Dan Gruen I'm not sure if it surprising, but it is interesting to note the way a realtime chat application can serve as both a source of interruptions and a tool for mediating them. A quick example is the instant message someone sends asking, "Is now a good time to talk?"

Peter Andrews Right.
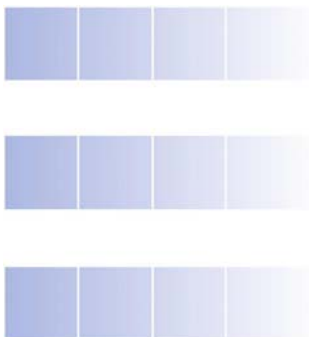
Dan Gruen In the non-computer world, we and others have observed how people deal with interruptions.

Peter Andrews Such as?

Dan Gruen In the real world, people tend to gauge how interruptible someone is before interrupting them. Is their door open? Are they on the phone or meeting with someone else? Deeply concentrating on something and rapidly typing? And then there can be a subtle negotiation of the interruption. Based on what I'm doing and what the other person needs, I might decide to handle the interruption right away or defer it to later.

So one approach is to enrich the cues our computer tools – like online chat – can provide to give people a better sense of how interruptible someone might be.

Peter Andrews So I'm less apt to barge right in when it isn't appropriate.

Dan Gruen Yes. A related approach is to give people better tools to control the extent to which interruptions should alert them, depending on what else they are doing. For example, how could software developers establish rules for how interruptions should reach them, depending on such things as what they are doing (are they debugging? coding? reading specifications?) or who the interruption is from (someone in their team? someone from outside the organization?) and so on.

Then there are tools to make it easier to defer interruptions quickly. But one surprising research finding is that not all people see interruptions as "bad." Some people consider being responsive and dealing with things as they arise a critical part of their jobs. One study showed that if managers aren't interrupted within about nine minutes, they'll find ways to interrupt themselves. Etiquette and social and group norms definitely play a role.

Peter Andrews Tell me more.

Dan Gruen Here's a simple example. One concern people expressed when instant messaging started being used more in the workplace was if they should provide access to everyone in the corporate directory, and if people would start sending chats to executives at will. But in many ways, this is no different from our current abilities to send an e-mail or make a phone call to just about anyone in the company. People tend to use their discretion in such matters, and the fact that they are authenticated plays a role.
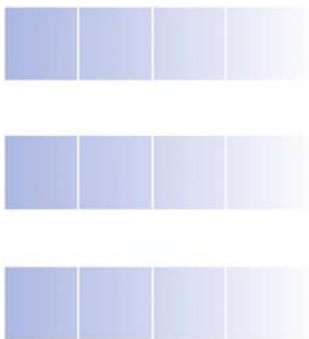
Also, different groups and teams develop different norms for how they use the different collaborative tools they have.

Peter Andrews I guess having differing norms is fine, as long as there is orientation.

Dan Gruen It tends to be something people pick up on when they join a group, though [it] can lead to problems until the norms are recognized, when people work across teams. A simple example is the extent to which people keep their online calendars up to date. In some groups or organizations, everyone does, and people feel free to rely on them when scheduling meetings. In other groups, they are more spotty and unreliable.

I would like to get into another aspect of dealing with interruptions, and that involves reducing the cost of an interruption by helping people restore their context.

Peter Andrews To more effectively handle interruptions, what are the key decisions people need to make or actions they need to take? What are the trade-offs?

Dan Gruen Well, implicit in handling an interruption is the cost to the work the person is currently doing, balanced against the importance of the interruption. The cost is both in terms of the amount of time required to deal with the interruption, but also the time it will take to restore context when you return to the interrupted activity.

And, on the other hand, there's the question of how important the interruption is and how much of the person's attention it will require. In some cases, these things are easy to see: for example, interrupting reading a journal article to give a quick answer needed for a critical deadline. But obviously, other subtle and social issues play a role – who the person is, your relationship to them, and the impression given by deferring an interruption versus being immediately responsive.

Peter Andrews Any rules of thumb? Or does effective response vary too widely?

Dan Gruen Well, one consideration is the extent to which some general rules will be useful and fit people's intentions.
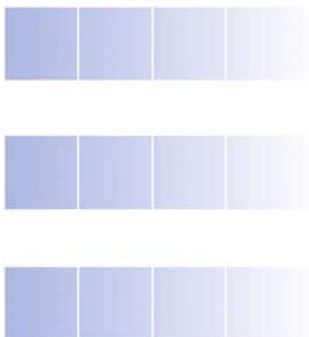
The key approach is to increase the amount of information available to people in helping them decide how to interrupt and be interrupted. Another is to provide tools to lessen the impact of interruptions: both by letting people handle items "on the side" without entirely leaving their current context, and by helping them restore their context quickly when they come back to an activity after an interruption.

Peter Andrews Sounds good. What have the reactions of people been to some of the tools you have been creating? Do they feel the burden being lifted?

Dan Gruen Reactions have been very positive, and people relate to the problems and proposed solutions.

Peter Andrews It definitely hits me where I live. What can you tell me about unified activity management?

Dan Gruen Unified activity management aims to recast collaboration technologies in terms of the meaningful business activities in which people are engaged, both to support the work of each individual person, team and enterprise.

One goal is to substantially increase support for the large number of important business activities that combine some general structure with lots of unstructured, ad hoc, emergent work.

Peter Andrews Sounds like a big challenge.

Dan Gruen An example of that is the way a medium-sized company responds to an RFP (Request for Proposal). There's a general idea of the steps, some specific structure and some sense of deadlines. But the specifics change from instance to instance, with lots of ad hoc communication and different people being involved in different ways. So you can't just build a traditional workflow system for this, but at the same time you'd like to support reuse, both of the general structure and of specific content. So, as one example, if you're working on an RFP for an airport, and are at the point of pricing it, you'd like to be able to pull up the materials and contacts you drew from when doing the same activity for a different airport several years before.
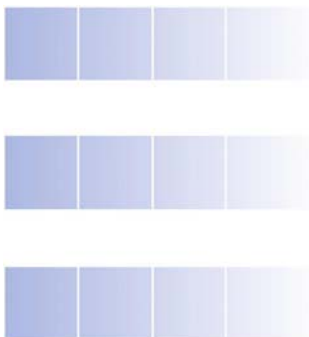
We've also recently created a collaboration micropractice as part of On Demand Innovation Services, giving us another avenue to use our research on collaboration and business activities to support clients.[1]

Peter Andrews What things should people know about interruption management?

Dan Gruen In the broadest sense, attention management can be seen as a key challenge for an individual and an organization: how do you help people devote their attention, efforts and creativity to the "right" things at the right time?

And how do you reduce costs in shifting attention, and in pulling together all the resources they need to deal with challenges that arise?

Technology to watch
Attention management
Attention model
Cognitive engineering
End user experience
Human factors
Interruption management
Query interface design
Task model

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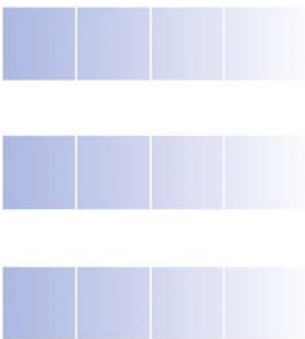
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Knowledge Management: Capturing a company's collective expertise wherever it resides – databases, on paper, in people's minds – and distributing it to where it can yield big payoffs

Pervasive Computing: Combining communications technologies and an array of computing devices (including PDAs, laptops, pagers and servers) to allow users continual access to the data, communications and information services

Realtime: "A sense of ultracompressed time and foreshortened horizons, [a result of technology] compressing to zero the time it takes to get and use information, to learn, to make decisions, to initiate action, to deploy resources, to innovate" (Regis McKenna, *Real Time*, Harvard Business School Publishing, 1997.)

Ease-of-Use: Using user-centric design to make the experience with IT intuitive, less painful and possibly fun

Deep Computing: Using unprecedented processing power, advanced software and sophisticated algorithms to solve problems and derive knowledge from vast amounts of data
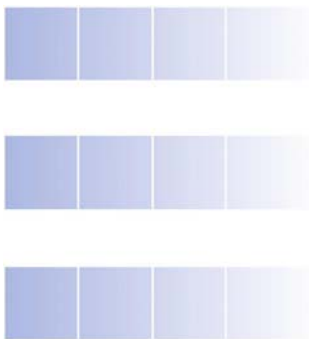
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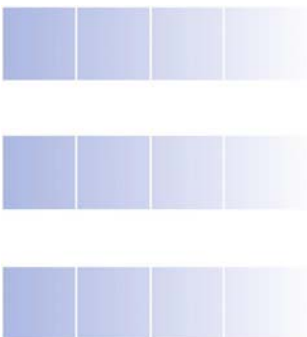
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