

# Beyond “From” and “Received”: Exploring the Dynamics of Email Triage

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## ABSTRACT

*Email triage* is the process of going through unhandled email and deciding what to do with it. Email triage can quickly become a serious problem for users as the amount of unhandled email grows. We investigate the problem of email triage by presenting interview and survey results that articulate user needs. The results suggest the need for email user interfaces to provide additional socially salient information in order to bring important emails to the forefront.

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H.5.2. Information interfaces and presentation (e.g., HCI): graphical user interfaces, prototyping, user-centred design;

## Author Keywords

Email triage, email user interfaces, social computing

## INTRODUCTION

The volume and use of email has changed dramatically over the past decade while user interfaces to support email have changed relatively little. The particular email task that we are interested in is *email triage*: the process by which one goes through unhandled email and decides what to do with it. Triage is primarily performed when people arrive at work first thing in the morning, return from a meeting, or receive an important email. Email triage can become very time-consuming when users receive a large volume of email and especially problematic for those who receive large volumes of email on a recurring basis.

This problem arises because existing email user interfaces do not provide users with an effective means for performing email triage. Existing interfaces usually provide only the most basic information about new email, such as who it is from, when it was received, and the subject line. When receiving large volumes of email, this information does little to help users decide which emails are the most important or which should be handled first.

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Several research prototypes have presented design ideas for supporting email triage where two main approaches exist. The first approach is to reduce the number of items to triage by grouping emails into conversational threads, categories of interests, or collections of tasks (e.g., 1,2,5,7). While this is helpful, people who receive large volumes of emails typically still have a large number of entities to triage within these groups. The second approach focuses on providing users with additional meta-level attributes that can provide users with an understanding about which emails should be handled first (e.g., 4,6). Here, meta-information is created automatically to describe a variety of social attributes for each email.

We build on this existing body of knowledge by providing a detailed understanding of email triage and the specific problems users experience when triaging their email. First, we present findings from contextual interviews and a survey. Next, we discuss the implications of these results for the design of email user interfaces.

## STUDY METHODOLOGY

Our study of email triage took part in two stages. First, we conducted a series of contextual interviews with ten information workers in our company. Second, we distributed a survey to 2000 randomly selected employees within our company and received 233 responses. Participants in both stages ranged in their job role, e.g., software developers, managers, researchers, administration, but all used Microsoft Outlook to handle email.

For portions of our analysis, we classified our survey respondents into three categories:

1. low volume triagers (LV): respondents who receive fewer than 50 new emails daily—we had 69 (29%);
2. medium volume triagers (MV): respondents who receive between 50 and 100 new emails daily—we had 84 (36%);
3. high volume triagers (HV): respondents who receive more than 100 new emails each day—we had 81 (34%).

<sup>1</sup> Work done while at Microsoft Research.

**RESULTS**

We now describe the results from the interviews and survey, comparing methodologies and respondent types.

**Pre-Processing to Reduce Triage Volumes**

*How many rules are used to pre-process email before triaging?* Ten (4%) of our survey respondents didn't know what rules were. Of those who knew about rules, we asked how many rules they used on a scale from 1 to 5 (1: 0 rules, 2: 1-4, 3: 5-9, 4: 10-14, 5: 15+). The median response for LV was 3 or 5-9 rules (mean,  $3.1 \pm 1.0$ ), MV was 3 (mean,  $3.7 \pm 1.3$ ), and HV was 4 (mean,  $4.2 \pm 1.4$ ). Significant differences were found between LV/MV and HV users ( $p < 0.05$ ).<sup>2</sup> Thus, rules were more heavily employed as email volumes increased.

*What types of emails are pre-processed using rules?* Table 1 shows our results in order of popularity and indicates that rules are primarily used to folder emails sent to mailing lists. Interview respondents said that rules were generally used to move emails that were less important into folders so that important emails would stand out more in the inbox. Folder usage ranged greatly with interview participants from the use of no folders to the use of almost a thousand folders. Folders were organized according to time, project, person, or interests; similar results were found by [2].

**Setting Up the Email Environment**

*Do people group emails by conversation?* One technique that has been presented as a means to help users triage their email is the ability to group by conversation or thread [3,5,7]. Microsoft Outlook provides users with this ability by grouping items with the same subject line. About 27% of respondents didn't know about this feature though and another 26% knew about it, but didn't use it on their inbox or folders. We took a deeper look at those who said they actually grouped by conversation. For all user groups, we found people only grouped by conversation occasionally, be it in their inbox or folders. We found similar evidence of

Type of Email	Respondents
Sent to mailing lists with topic of interest	117 (50%)
Sent to group mailing lists	94 (40%)
Sent to project mailing lists	70 (30%)
Sent from a particular person	63 (27%)
Sent directly to you	50 (21%)
Project-related	44 (19%)
From family or friends	35 (15%)
CC'd to you	28 (12%)

**Table 1:** The number of survey respondents (n=233) who use rules to move each type of email to a folder.

Type of Email	All Groups
Unread emails in my inbox	$4.4 \pm 0.7$
Emails received today	$4.4 \pm 0.7$
Emails received in the last hour	$4.0 \pm 1.0$
Emails received in the last 15 minutes	$3.8 \pm 1.1$
Emails received yesterday	$3.7 \pm 0.8$
Read emails in my inbox	$3.6 \pm 1.0$
Unread emails in my folders	$3.5 \pm 1.1$
Read emails in my folders	$3.0 \pm 1.0$
Emails received last week	$3.0 \pm 1.0$

**Table 2:** Mean responses to survey questions of the form "It is important to include the following when triaging email..."

users not typically grouping by conversation in our interviews; only one participant used this feature.

**Choosing What to Triage**

*What emails do people include when triaging?* As discussed, email triage involves deciding what to do with "unhandled email," yet prior to the study it was not clear what this entailed. We found in our interviews with HV triagers that they do not often look at the contents of folders when triaging; rather, triaging is primarily performed on unread emails in the inbox, with some people also looking at read items. We asked survey respondents to rate how important it is to triage each of the types of emails listed in Table 2 using a 5-point Likert scale (1-Strongly Disagree to 5-Strongly Agree)<sup>3</sup>. Table 2 shows the mean user responses for all groups. Clearly the most important emails to handle are unread emails in the inbox and those which arrived today. People do, however, find it important to include other items when triaging and none rated any as unimportant. Our interviews showed that this often depends on the amount of time the user has to triage, e.g., spare moments may be used to triage folders not normally included during the main triage process.

**Email Triage Approaches**

*How are emails handled during triage?* During our interviews we saw that emails are usually handled on a per email basis where the user looks at the email, acts on it, and then either leaves it in its current location or moves it to a folder. Acting on an email meant either simply reading it (or a portion of it), choosing not to read it, sending a reply, forwarding the email, or performing some other task associated with the email (e.g., writing another email, working on a document). When triaging, emails that users felt would be needed at a future date were moved to folders. Other emails were left in the inbox or moved to folders as tasks to do throughout the day. Occasionally users would

<sup>2</sup> Kruskal-Wallis and Mann-Whitney post-hoc analyses were used.

<sup>3</sup> This same scale is used throughout the rest of our results.

handle multiple emails at the same time, e.g., moving a batch of emails to a folder. This most often occurred when the emails were part of the same conversation or thread, determined by the subject line.

*Do people triage email sequentially or by priority?* We found one of two methods is used for handling a given pass of one's email: sequential or by priority. We asked survey respondents if they used each method with two questions using the same 5-point scale as before. The mean response for using the sequential approach was  $3.4 \pm 1.1$ , while the priority approach was  $3.0 \pm 1.0$ . We did not find significant differences between user groups for both of these questions. We also analyzed these questions together: about 19% of all participants triaged by priority only (agreeing with priority and disagreeing with sequential), 30% only sequentially (agreeing with sequential and disagreeing with priority), and 15% used both (agreeing with both). The remaining participants rated their use of one of the two approaches as neutral.

*Do people triage email with a single pass or with multiple passes?* In our interviews we found people use either a single pass or multiple passes to triage their email. In the single pass case, the user starts at the top or bottom of the unhandled list of emails and handles each email as the user comes across it. Half of our interview participants used the single pass approach for handling email triage and all of them handled email sequentially during this pass. The alternative, using a priority approach with a single pass, means emails will simply get missed. The important aspect of the single pass approach is that each email is only visually scanned once during triage.

In the multiple pass case, the user performs multiple single passes handling a certain type of email during each pass. The important aspect about using the multi-pass process is that users will often scan the same email multiple times before actually handling it.

Half of our interview participants used the multi-pass approach for handling email triage. Three of these five performed both sequential and priority passes. One multi-passer strictly used a sequential approach and one only used a priority approach. Survey respondents rated their use of each strategy on the same 5-point scale. The mean response for using a single-pass strategy was  $2.8 \pm 1.1$ , while the mean response for using a multi-pass strategy was  $3.6 \pm 1.0$ . We did not find significant differences between user groups for either of the two strategies.

We also analyzed these questions together to see if one strategy was more dominant than the other. About 17% of all participants used a single-pass strategy (agreeing with single-pass and disagreeing with multi-pass), 47% used a multi-pass strategy (agreeing with multi-pass and disagreeing with single-pass), and only 9% used a combination of both (agreeing with both single and multi-pass). The remaining participants rated one of the strategies as being neutral or felt they used neither strategy. Clearly

the multi-pass strategy is dominant, despite the need to scans emails more than once.

*What emails do people try to handle first?* What we found most interesting was that interview participants using the multi-pass strategy would routinely use a first pass to handle emails they considered to be *not* important or junk. This pass would involve finding emails they could quickly delete or get rid of. This seemed counterintuitive to us initially because we thought people would try to handle email that was most important to them first when confronted with only a short amount of time to triage email. Contrarily, we found it was easiest for people to handle emails of little importance (they could quickly delete them or file them) and often once the unimportant emails were gone, it was easier to find the important emails. Subsequent passes would then include handling the more important emails from specific people or about specific projects. During the interviews, we found that the importance of an email largely depends on the current social context of the person, e.g., their schedule for the day, the people they work closely with, the projects they were working on, and their project role.

We asked survey respondents what type of emails they tried to handle first, important or unimportant, using two questions rated on the same 5-point scale. The mean response for trying to handle non-important emails first was  $3.5 \pm 1.3$ , while the mean response for trying to handle important emails first was  $3.7 \pm 1.2$ . We did not find significant differences between user types for both questions. We also analyzed these questions together: 27% of all participants try to handle non-important emails first (agreeing with non-important and disagreeing with important), 21% try to handle important emails first (agreeing with important and disagreeing with non-important), and 29% (agreeing with both) try to handle both first (likely these people use a sequential approach). The remaining participants rated one of the two questions as neutral. These results show that users are mostly split when handling important vs. non-important email first.

Time of Day	LV	MV	HV
First thing at work	$4.0 \pm 0.9$	$4.1 \pm 0.8$	$4.4 \pm 0.6$
Throughout the day	$4.0 \pm 0.7$	$3.9 \pm 0.7$	$4.1 \pm 0.7$
After lunch	$3.4 \pm 0.8$	$3.4 \pm 0.9$	$3.7 \pm 0.9$
After meetings	$3.3 \pm 1.0$	$3.5 \pm 0.9$	$3.5 \pm 1.0$
At end of workday	$3.2 \pm 1.1$	$3.2 \pm 1.0$	$3.8 \pm 1.0$
In the evening at home	$2.6 \pm 1.1$	$2.9 \pm 1.2$	$3.5 \pm 1.3$
Before I come to work	$2.5 \pm 1.0$	$2.8 \pm 1.1$	$3.0 \pm 1.2$
During meetings	$2.2 \pm 1.0$	$2.5 \pm 1.0$	$2.8 \pm 1.1$

**Table 3:** Mean responses to survey questions of the form "I spend time triaging my email..."

### Triage Times

*When do people triage their email?* We asked survey respondents when they triage their email using a series of questions based on the same 5-point scale. Table 3 shows the mean responses for each time grouped by user type. Clearly users triage their email at the beginning of the day with subsequent triage times occurring throughout the day as time permits. We found significant differences ( $p < 0.05$ ) between LV and HV for triaging first thing in the morning, before work, during meetings, before leaving work, and in the evening at home.<sup>4</sup> We also found a significant difference ( $p < 0.05$ ) between MV and HV for triaging email in the evening.<sup>3</sup> That is, HV users triage their email more times throughout the day than LV users, and are more likely to triage their email in the evening than both LV and MV users. Of the HV triagers that we surveyed, 8.6% spent less than 20 minutes triaging their email over the course of the day, 40.7% spent between 20 and 59 minutes, 37% spent 1-2 hours, and 9.9% spent more than 2 hours.

### User Satisfaction

*How satisfied are people with email triage?* Regardless of the user type, we found that most people felt their strategy was pretty good, but realized there were likely other, more efficient, strategies. People who were in front of their computer for most of the day generally had an easier time triaging their email; most email could simply be handled during the incoming flow. Participants found emails built-up when they were away from their desk in meetings or away from the office making subsequent triage much more difficult. Particular grievances were found when people returned from vacation. When asked what they would like to see in email clients to help them perform email triage, answers from interview respondents included mechanisms to keep important things visible, tools to easily find things, and additional task management features.

### DISCUSSION

The results of our interviews and survey point out that the real issue facing people for email triage is not whether their current strategy works or does not work; the real issue is time. People need a means to more efficiently handle email triage, especially those receiving larger volumes of email.

We found that the dominant triage strategy required people to scan emails more than once, thus reducing efficiency. Our results also point out that the importance of email is largely determined by social properties such as one's current social context or time attributes like recency. For example, one may want to focus first on emails from those with whom they have a close working relationship, or they may focus on recent unread email from today. However, we found that emails of lesser importance either clutter the

inbox making it difficult to find important emails, or were dealt with first to simply get rid of them.

Thus, to improve email triage, we feel that email user interfaces should present additional socially salient information about the sender, receiver, and time attributes. Sorting or searching by these types of meta-data will allow people to either: easily find important emails, or move unimportant emails away from the foreground (be it by simply moving them, filing them, or deleting them).

### CONCLUSION

We have presented the results of contextual interviews and a survey to uncover user needs for interfaces to support email triage. This work takes a significant step beyond previous work on email triage by showing that the main problem people face when triaging their email is a lack of time. We also suggest that email clients should provide additional socially salient information about emails for sorting or searching mechanisms to aid email triage.

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<sup>4</sup> We used ANOVAs with follow-up T-tests using Bonferroni correction.