

Working 9-5? Professional Differences in Email and Boundary Management Practices

Marta E. Cecchinato
UCL Interaction Centre
University College London
London, WC1E 6BT
m.cecchinato@cs.ucl.ac.uk

Anna L. Cox
UCL Interaction Centre
University College London
London, WC1E 6BT
anna.cox@ucl.ac.uk

Jon Bird
HCID Research Centre
City University London
London, EC1V 0HB
jon.bird@city.ac.uk

ABSTRACT

Technology not only brings benefits such as flexible working practices but can also have negative stressful consequences such as increasing email overload and the blurring of work-home boundaries. We report on an exploratory study that extends the current understanding of email usage by investigating how different professions at a university manage work and personal emails using different devices and how this impacts their work-home boundary management. Our findings lead us to identify two user groups: those with permeable boundaries (primarily academics) and those who have more rigid ones (primarily professional services employees) and that there are differences in when, where and how they manage their work and personal emails. In particular we find that some participants use *micro-boundary* strategies to manage transitions between work and personal life. Based on these novel findings we propose improvements of email software design to facilitate effective email, work-home boundary management, and micro-boundary practices.

Author Keywords

Email; work and personal email; email overload; cross-device interaction; boundary management; work-home interference.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g. HCI): Miscellaneous.

INTRODUCTION

As technology becomes increasingly embedded in our everyday life through a suite of devices, the way we work is changing. Over the past couple of decades email has brought numerous improvements to the way we communicate and work. However, there are also negative

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consequences: the increasing number of emails exchanged requires more time to read, respond to, file or delete, resulting in email-related stress, or 'email overload' [7], i.e. the lack of control felt when trying to deal with a growing number of emails. Furthermore, constant connectivity means people often feel they are expected to respond to emails at any time or anywhere [21] and this can lead to work interfering with home life. Such interference has been proven to have a negative impact on health, with a significant positive correlation between work interrupting non-work and psychological distress [18].

However, the differences in the way personal and work emails are managed are currently understudied. Most prior research has investigated the professional use of email, focusing on management strategies, e.g. [7,33], since the number of business emails sent daily is growing and is expected to increase from 100 billion in 2014 to 132 billion by 2017 [27]. Email management studies generally recruit participants from different professional groups to overcome the limitation of collecting data only from one type of work setting. Samples have ranged from university employees (faculty staff, students or admins), e.g. [3,6], to technology companies, e.g. [31,32], to a mixture of professions, e.g. [13,30]. However, this prior research has not focused on differences in email management in different working environments or how different strategies impact on work-home boundaries. A further limitation of email research to date is that it has concentrated on defining email practices for specific devices such as desktop computers, e.g. [10,33], or briefly outlining new uses of mobile phones with regard to emails, e.g. [20,23], but little research has compared email processing strategies on different devices or how they might result in work interfering with home life.

In this paper we report on an exploratory study that extends our current understanding of email usage by investigating how different professions manage work and personal emails using different devices and how this impacts their work-home boundary management. We make three contributions. First, we show that not just individual differences, but also professional context has a large impact on email practices: when, where and how people manage emails and the impact these have on work-home boundaries. Second, we describe the novel finding that some users rely on *micro-boundary*

email practices to support their transitions between work and personal life. These findings inform the third contribution, which are a set of recommendations to improve email software design to help users manage their email and work-home boundaries.

RELATED WORK

In this section we present relevant research in the three strands of literature our study draws from, in order to highlight the following three gaps that inform our research questions:

- Differences in the ways professional groups use email is understudied, with only two studies [8,32] directly investigating such differences.
- There is still little understanding of how people specifically manage email across devices, and across work and personal accounts.
- There is a need for an increased understanding of how boundary management practices – a field that is less considered in human-computer interaction (HCI) – are applied to devices and email accounts.

Differences in Email Management Styles

Findings in email management research are usually based on studies that have participants drawn from a variety of professional groups (academics, mixed professions and/or employees in the tech industry) to avoid bias. However, the studies do not typically contrast the email management practices of these diverse professional groups, implying there are no differences. One exception is found in Dearman et al. [8]: their interview study compared computer science researchers from industry with those from academia. Differences in email practices between the two professional groups were not reported, but it was found that industry users had clearer boundaries between personal and work devices, suggesting that it is the working environment that influences people's boundary management practices.

Work Email

Work email usage reflects both individual preferences and professional demands [6], and the level of seniority may have an impact [16]. Individual preferences include how often the user clears the inbox and files away emails, whether this is done automatically or manually and the frequency of occurrence [19]. Professional demands have been noticed when comparing managers with non-managers across 29 countries (n =13,877) [32]. Managers were found to have almost double the number of stored messages, and more than double the number of folders than non-managers, suggesting that job role partially accounts for the variance in filing style.

Personal Email

Research has shown that work emails are managed differently to personal emails, i.e. communicating with friends and relatives, and with organisations such as schools and businesses [3,13]. Differences include the software used to check email (desktop vs. web client), the types of

emails received, and the email management strategies employed.

To the best of our knowledge, only two studies have explicitly compared work and personal email practices across the same sample. In 2013, Grevet et al. [13] used a mixed methods approach, combining interviews with screenshots to measure the size of each participant's email inbox. They recruited 19 participants with diverse job titles who used Gmail for both their work and personal accounts. They demonstrated that even though work email has doubled in size over the years, personal email accounts were found to be 5 times bigger than work ones, especially for the number of unread messages. Despite this huge growth of exchanged emails, Rector and Hailpern [28] found that only 12.37% of emails are actually critical (i.e. too important to miss).

Capra et al. [3] conducted a survey-based study (n=596) with university employees (both academics and professional services employees) to look at usage patterns across personal and work email accounts. Their findings suggest that there are strong individual preferences in both contexts and that email is an important boundary management artefact. They argue that email can increase boundary permeation between work and personal life. Despite recognising their importance, Capra et al. do not investigate the role of mobile devices in managing the boundary between work and personal emails.

Cross-Device Interaction (XDI)

Today, 58% of Americans own a smartphone and 89% use them to check emails [25]. However, the majority of email research focuses on how email is used on single devices such as desktop and laptop computers. As mobile technologies are becoming increasingly affordable and ubiquitous, workers have access to multiple devices (computers, smartphones, tablets). More research needs to investigate how email is managed across the suite of devices we now own and/or have access to. Research in email cross-device interaction (XDI) [29] is rather fragmented as it either looks at how users access and manage data across personal and work desktop computer/laptop devices, but not smartphones [8]; or how tasks are completed across computer and smartphone devices, without distinguishing between work and personal purposes [17].

Only two studies have reported the use of different devices to access emails: in [13] they were treated as anecdotes and hence not included in the analysis. However, a noteworthy study conducted in 2009 by Matthews et al. [20] directly explored how new generation phones like the iPhone 3G were used. They interviewed 21 members of a corporate research lab to uncover usage patterns. Even though they did not focus on cross-device interaction or specifically on email use, their results describe how smartphones were used in combination with computers. For example, their users preferred using their phone to triage messages in the

inbox, while fully featured computers were used for reading and replying to emails. They also observed that smartphones were used to maintain awareness of information while away from a computer, e.g. checking for emails from remote collaborators. The ways in which people use mobile devices is evolving [9] and the usage scenario today looks very different from five years ago. Therefore we reconsider these findings in the context of today's use of mobile devices.

Boundary Management

Academic interest in mobile email use is not just limited to the HCI field, but is also a focus in the work-home conflict and boundary management literature where mobile technologies are seen as a facilitator of increased spill-overs between personal and work domains. Such spill-overs occur when *"the strain produced by stressors in one domain provokes stressful situations in another domain"* ([12] p. 15). Boundaries between work and home can be conceptualised along an integration/segmentation continuum [22]. At one end of the continuum are individuals who tend to have work and home domains fully integrated, where 'home' and 'work' are *"one giant category of social existence, for no conceptual boundary separates its contents or meaning"* ([22] p.567). At the other end are those for whom work and home are perceived as two completely separate worlds. These two positions constitute extremes and people are typically somewhere in between. As a result, daily repeated shifts occur between the various roles one has in different domains (e.g. employee and parent). These shifts are known as "micro-role transitions" [1] and an example of this is when a parent receives a phone call or email from their child's school whilst at work. People's email strategies partly define where they are positioned along the integration-segmentation continuum [3].

We are interested in understanding how people use their email practices to create and maintain boundaries between work and non-work and how they handle cross-domain interruptions. This is especially important because interference between work and personal life is positively correlated with stress, particularly when work permeates non-work [18].

RESEARCH QUESTIONS

Even though devices have been classified as being personal or work-related, or a mixture [8], there is still a lack of understanding about how users access and manage both personal and work emails across multiple devices, in particular mobile devices. We argue that there is a need for an updated view of mobile usage patterns, especially in the context of boundary management. There is also little evidence about how different professional groups manage emails within the same organisation, even though there are indications of its existence [32]. We argue that understanding current boundary practices in different groups is a crucial first step to finding effective ways of

dealing with email overload. To address these gaps, we used semi-structured interviews and questionnaires to investigate the following research questions:

- 1) How do people manage personal and work email accounts across devices?
- 2) What are the boundary management strategies adopted for personal and work email accounts across devices?
- 3) Are there email and boundary management differences between two professional groups from the same organization?

METHOD

Following [3,8,13,20] we took a qualitative approach to gain an in-depth understanding of participants' email practices. In particular, this study was designed as an extension of Capra et al. [3], who also recruited university participants, but builds on it in three novel ways: first, we take a more qualitative approach; second, we consider cross-device interaction; and third, we compare different professional groups. As a result, in May 2014 sixteen interviews with university employees were conducted in participants' offices and labs, lasting between 30 and 60 minutes. Questions explored participants' device usage patterns for managing email, their feelings towards emails in relation to work-home interference, and their email management practices, especially in relation to devices used to access emails while working and when not working. Participants were asked to bring along any device they used to access email as a prompt to facilitate contextual explanations. They were also asked if they were willing to share screenshots of their inboxes on their various devices, however only five participants agreed. Following the interviews, participants were asked to fill out two surveys: the first one included email overload measurement scales [7,14], whilst the second one included the Work-Life Indicator scale [18] to measure boundary management strategies. All but one participant completed both post-interview surveys. We report findings from the second survey to triangulate our interview data but results from the first survey are not reported in this paper.

Materials

The Work-Life Indicator scale is comprised of five factors: Work Interrupting Non-Work (WINW), which measures one direction of boundary crossing; Non-Work Interrupting Work (NWIW), that measures the opposite direction of boundary crossing; Boundary Control (BC), which measures the perceived control over boundary crossing; Family Identity (FI), which measures the degree of identification with a family role; and Work Identity (WI) which measures the salience of an occupational career. The five factors capture different styles of managing the boundaries between work and non-work by identifying the relationship between cross-role interruption behaviour (WINW, NWIW), identity centrality (FI, WI), and perceived control of boundaries (BC). A total of 17 items

are used to measure the factors, using a 5-point Likert scale, with 1=Strongly Disagree and 5=Strongly Agree.

Participants

We recruited 16 participants from two professional groups at a single large university in London, UK. Our convenience sample included nine academic and seven professional services employees. Academics included research associates and assistants, a lecturer, and a teaching fellow. Professional services employees included a department manager, a human resources (HR) manager, library assistants, an assistant study coordinator, a personal assistant, and a public relations administrator. Fourteen participants were employed full-time, one had two part-time jobs within the same university and one was employed part-time. Two participants had an additional part-time job or were involved in volunteering. Ages ranged between 20 and 54, and 11 participants were female. All participants owned a smartphone with a data package (except for one who relied on Wi-Fi only) and had access to computers at home and at work. The sample was recruited using a recruitment website, posters, opt-in mailing lists and word-of-mouth. They received a total of £17 for taking part in the study.

Analysis

Interview transcriptions were integrated with paper notes and the email inbox screenshots and analysed thematically [2]. The first level of analysis focused on email differences across devices and domains (work vs. personal). The second level looked at differences between professional groups and boundary management strategies across devices and email accounts. The Work-Life Indicator questionnaire data were analysed for differences between the professional groups.

FINDINGS

Work-Life Indicator Questionnaire

Results from the Work-Life Indicator questionnaire show a distinction in how the two professional groups manage boundaries between work and non-work. Figure 1 shows the mean scores for each professional group for each of the

five factors of the scale. There is a notable difference between the two groups regarding the extent to which they allow work to interrupt non-work: the academics score much higher on this value than the professional services staff, suggesting that their boundaries are more permeable. Mann-Whitney tests showed a significant difference ($z=-2.04, p=0.04$) between professional services participants and academics for WINW. On average academics experienced greater WINW ($M=3.62, SE=0.31$) than professional services staff ($M=2.33, SE=0.43$) and this represents a large-sized effect ($r=0.53$). The difference between the two professional groups was not significant for NWIW ($z=-0.41, p>0.05$); FI ($z=-0.89, p>0.05$); WI ($z=-1.37, p>0.05$); nor for BC ($z=-1.36, p>0.05$).

This analysis provides evidence to suggest that there is a significant difference between the two professional groups in terms of how they manage their cross-role interruptions. Boundary theory suggests it is unlikely that profession is the only factor of influence and that personal preferences play a large role in the extent to which people are willing to allow their work to interrupt their non-work time [1] and this might affect their use of technology [24]. The interview data supports this and provides evidence that, in addition to professional differences, individual preferences also play a role in boundary management styles. We also find evidence that people use their devices and digital systems to create boundaries between work and non-work.

Boundary Management Styles Between Professions

We identified differences between the two professional groups in the way they perceive their job and therefore handle their work email outside office hours. Professional services participants were not required to take emails outside office hours, and some were not even allowed to.

“I’m quite fortunate in that my work doesn’t require me to take it home and I’ve never been in the situation where I would need to check it outside of working hours until now.”
– P12, Female, Professional Services worker (PS).

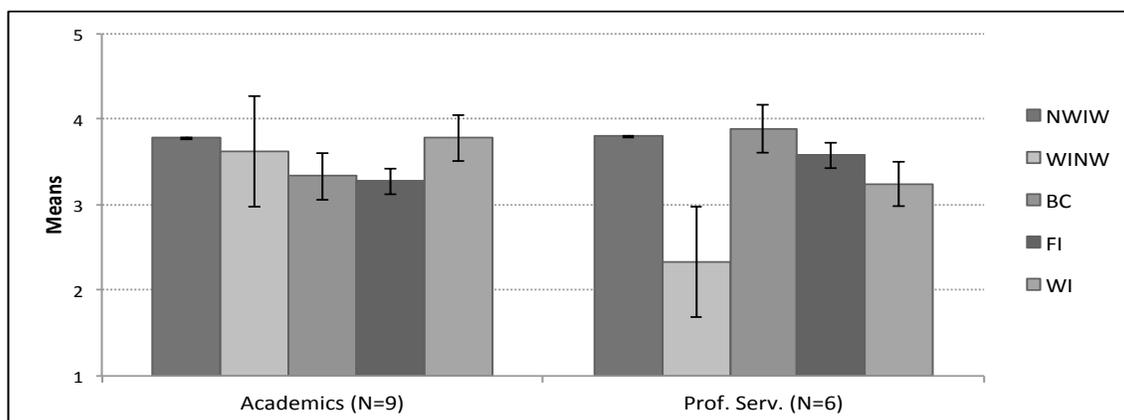


Figure 1: Mean values for the 5-factor Work-Life Indicator scale showing differences between the professional groups

Professional services participants occasionally checked their work emails during weekends or holidays as a way of maintaining awareness. Similarly, they checked their personal email accounts whilst at work, but as P13 explains, it was not viewed as a completely legitimate practice:

“In a way it's a demarcation [the fact that she cannot work from home] but actually it's not [...] because I have my personal email even when I'm at work, [whispers] it's a little bit cheeky isn't it?” – P13, Female, PS.

Conversely, the same situation is seen in a completely different manner by academics, who feel legitimized to check both personal and work accounts at all times.

“Some companies, they block your personal emails right? And I'm really glad I don't have that in case... you know, I really like that I can reply to a personal email and I don't need to have it so separately but then I also... if I can reply to personal stuff at work then I feel that I can reply to work stuff in my personal life.” – P9, Female, Academic (A).

In interviews, academics described how theirs was not a typical office job and hence how the boundaries between work and personal life were blurred.

“I know it sounds a bit silly, but this job doesn't feel as much as a job and I don't mean it's not like hard work, but academia always feels a bit different.” – P1, Female, A.

Although no significant difference was found in the survey between WINW and NWIW for academics, our interview data suggests that there is a symmetrical interference where work interrupts non-work and vice versa within academics. Rather than having clearly demarcated work hours, academics often reported that work and non-work are interweaved:

“The first check is probably right after I woke up, I will check everything that has come in the night [on the phone]. [...] I will probably have another look once I'm outside the house, so during my commute time I will check once again. And once I'm in my office, I don't have any specific rule, it's really case by case. [...] Once I'm home [...] I have a second work shift after [my son] goes to bed until quite late in the night.” – P15, Male, A.

“In the back of my head I would like to not check my work emails in my personal time but I guess, realistically speaking, research is not really a 9 to 5 thing anyway. I guess if I had a job [where] working happens between 9 to 5 and not outside that, then I would make more of an effort to not cross that boundary, but now it doesn't really fit with research I think.” – P9, Female, A.

In particular, one participant compared academia to other research jobs in industry, stressing the fact that email practices vary among professions and are influenced by company policies. While she was not allowed to take work emails outside the office in her previous industry research position, she now relies on being able to do so:

“I should say that when I was at [previous company] I never checked email outside of work because I couldn't. It was only on my laptop, it wasn't allowed on my phone, I wasn't allowed to access it remotely and I very rarely checked on my laptop. So I only checked email going in the door at 8.30 in the morning until 5.30 at night and I never checked at home. [...] I have long commutes so for me, especially now that I work part-time and I have to leave early, if I can get my emails done there and back that's a real advantage.” – P1, Female, A.

Despite these general differences between professional groups, individual differences highlight how two of the professional services participants showed similarities to academics: the boundary between work and personal emails was not as clear for them and they reported this as a benefit. In one case an HR manager was able to better organise her work and her personal life as a result of allowing work to interrupt non-work time:

“I don't see looking at emails that are from home or vice versa as an interference at all in work-life balance. This is my life. So actually they balance it.” – P14, Female, PS.

In the other case, a librarian underlined the positive benefits that mobile devices can bring to boundary management in the context of email:

“The environment is pushing you to have an imbalanced life towards of course work and that amazing smartphone is actually helping us not be unbalanced.” – P7, Male, PS.

Email Management

Types of Account

All of our participants had at least two main email accounts, one of which they considered personal and the other work-related. They each had an Outlook account for their university job. A little more than a third of participants also had access to an additional work account, and reasons for this included:

- Having a second job;
- Needing to access a shared email account;
- Needing to access other features (e.g. Google Calendar, Google Documents);
- Needing to access social media (e.g. Facebook, YouTube);
- Archiving forwarded emails from a previous job account to which they no longer have access to.

Moreover, the majority of our participants had at least one additional personal account, mostly used for signing up to mailing lists and receiving promotional email that did not fall in the spam category but were still considered unwanted messages. We can summarise the motivations as:

- A desire for a different online identity (e.g. anonymous, full name, or nickname accounts);
- A management strategy to reduce email overload, expressed well in this quote:

“For example, if you apply online to something and then, you know, I don't want my email inbox to be uploaded with a lot of rubbish, then I use a different account, and I use that account just whenever I need it. [...] Because then I don't want to be bombarded by all this commercial and promotion stuff.” – P14, Female, PS.

Email Accounts On Smartphones

Eleven respondents used their phone to check both personal and work accounts (all academics and two of the professional services staff). Five participants (the remaining professional services staff) accessed only their personal email account from mobile devices. Of the participants who accessed both work and personal accounts on their phone, five of them accessed the two types of account through separate applications. Of these five, four were Android users and the remaining owned an iPhone. Android users used two separate applications (one for work accounts and the other for personal accounts), while the iPhone user had two Internet browser bookmarks for the different accounts. When asked why, she explained that:

“I did used to have an app and then messages came up straight away but I would find that anytime that I would look at my phone I'd see messages unread and I'd always want to check and I don't always want to be doing that when I'm on my phone. Sometimes it's best not to know all the time if you have an unread message.” – P6, Female, A.

Four participants, all of whom were academics, accessed both account types from the same application on their phone, signifying they did not separate their personal and work inboxes.

Email Accounts On Computers and Tablets

Three participants (of which one was a professional services participant) had personal email synchronised to the same desktop application they used to access work emails in the office. The majority of participants instead checked their personal account at work through a browser window or tab, which they always left open. Of these, only one participant (a professional services participant) also had notifications enabled for their personal account, as a Firefox plug-in. Three participants also anecdotally mentioned having a tablet: one did not use it for accessing emails (P15, Male, A); one used it to check both work and personal emails (P14, Female, PS); and another used it only to access personal emails (P10, Female, A).

Device Management

Checking Habits

Most participants used their phones primarily at home, when commuting, when socialising, at weekends and on holidays. Computers were mainly used in the office, or at home only if work had to be done. Only two participants did not use their phone at home to check emails, using instead a computer or a tablet. Respondents explained that it was faster to check on their phone because, along with always being at their fingertips, it helped fill up moments

when one is bored, such as when commuting. One academic reported that using her smartphone meant she was: *“more in touch with what's going on more immediately than what I used to be before I got my new phone”* (P8, Female, A).

However, our interviews indicate that smartphones can intrude even in the most private of moments, and lead to work interfering with non-work, as highlighted by the questionnaire. For example, some participants use smartphones to check emails first thing in the morning when waking up and even in the bathroom:

“I get up, check my email, in bed, check my email on the toilet, check my email downstairs, maybe whilst I'm having breakfast, walk to work, generally don't check my email while I'm actually walking, when I'm waiting for the train, on the train, maybe in the lift getting up to work. Maybe then at work, then on the train on the way home, in front of the TV, during dinner, yeah, that's about everything I think.” – P5, Male, A.

Smartphones vs. Computers

Overall, our participants were happy to use their smartphone for scanning through new emails and saw clearing their inbox as a way of dealing with an overloaded account.

“[On my phone] I sometimes just look at my emails and delete all the [spam] ones at night so that I think ‘oh when I go in in the morning then I won't have to do that at work and my inbox will be a bit more clear.’” – P8, Female, A.

“I check my email very frequently [on my phone], especially to get rid of all the spam.” – P5, Male, A.

In addition the majority of respondents explained they generally only reply on their phone if it is an urgent or quick matter, because they find *“having a little keypad is not very good for writing long things”* (P11, Male, PS).

While all academics accessed both work and personal email through their phone, only two professional services participants had both personal and work accounts on their mobile devices – the same ones who have permeable boundaries between work and non-work. Only two academics and one professional services participant used their phone to manage most of their emails, including replying, explaining that *“it's just quicker”* (P4, Female, A).

Notifications

We found a substantial difference in the way devices are used when we asked about notifications: while all but one had work email notifications enabled on their computers, more than half of our participants chose to not be interrupted by email notifications on their phone. In fact, they either disabled them completely; consciously disabled them during certain hours; disabled pop-up/sound notifications that would increase the number of interruptions; or limited them only for particular senders or specific accounts.

“No I turned [notifications] off, it's really annoying [...] when I'm not at work I don't like being alerted about emails coming in. If I want to check my emails I'll check it, but I don't really like being alerted.” – P16, Female, A.

Interestingly, one participant, used her phone as a notification centre that triggered her to check directly on her computer while at work because *“it's a nice big screen and it's a nicer interface to sort of read the emails with”* (P8, Female, A).

Boundary Management Challenges

The interviews revealed situations where it was not possible to maintain clear boundaries between work and personal email, despite using devices for only one type of account or not checking emails at certain times. While weekends are generally considered personal time which require less checking *“'cause I know that most people are not at work”* (P16, Female, A), work emails might be dealt with as an exception for urgent matters, one participant explaining *“if I am on a deadline it can interfere”* (P4, Female, A).

P10 underlines a boundary management issue that can arise during holidays because not everyone has the same time off work:

“If I'm going on holidays not everybody is going at the same time and sometimes they really need something urgent and I feel they cannot wait.” – P10, Female, A.

Similarly, working part-time can also force people to deal with work emails during non-work time:

“Our students, they aren't part-time and because I take Fridays and Mondays off, if they need something on a Friday then I don't check again until Tuesday, that's a long time for them to wait. So I guess it's like yes my life is carrying on in a different way but other people's lives they also have needs and I have a responsibility to them.” – P1, Female, A.

Participants reported receiving complaints at home when work interrupted their personal life:

“It does irritate my partner. Like if we're in front of the TV and she's playing on a game on her phone and I check my work email then that would irritate her 'cause [...] she sees it like me being in work rather than spending time with her.” – P5, Male, A.

Even when participants tried to keep personal and work email accounts separate there were two cases of interference between work and non-work, again suggesting individual differences. One participant used Gmail for their personal account, but also got work notifications because it is automatically linked to features used primarily for collaborative work (e.g. Google Documents). Another participant's work account received personal messages from her close family/friends who chose to use it *“because they know that I see it more often”* (P10, Female, A).

Cross-Device Issues

Despite continuous improvements in technology, users still experience problems related to cross-device interaction that are mostly a result of technical issues. For example, several respondents reported feeling frustrated when email applications on different devices did not synchronise properly (e.g. an email sent on one device was not shown in the sent folder on the other device).

Another issue raised was related to cross-device task completion. Users who relied on messages being marked unread as a strategy to remember to do something, had trouble keeping track of their inbox to-do list because when they scanned emails on their phone while travelling to work these messages would then be marked as read and they would then forget to act upon them once they arrived in the office.

“What I'll do on my phone is [...] I'll go into my work email [...] at night time and then I'll say 'I'll sort all those tomorrow when I go to work' but because they're not marked as unread anymore, whenever I go to work I forget to reply to them because they're marked as read so I sort of feel I've handled them.” – P8, Female, A.

Other technical issues mentioned refer to tabs [11], a recently added feature in Gmail, which automatically sort new emails depending on the type of message. As of August 2014, the five tabs are: ‘primary’, ‘social’, ‘promotions’, ‘updates’ and ‘forums’. Despite appreciating this feature on the web client, users lamented the extra work it involved on other platforms where the filtering system did not work:

“I think [Gmail tabs] are good because generally the social stuff I'm not that interested in and the promotional stuff is mainly spam. [...] It's interesting because when I access my same account on my phone it doesn't have those filters, so it's just all in one block. [...] With the phone I need to delete things that are near the top [...] because that's getting in my way, whereas on the browser account because I've already filtered out those things I can just leave them there.” – P5, Male, A (an iPhone user with Gmail synced to Mail app).

“The online account creates three tabs, social, commercial, promotion, which is actually quite helpful for me, which I don't have here [Thunderbird] but I use quite a lot there because it divides stuff so I just go on the social tab and delete most of the things, I go to the third tab and I delete most of the things.” – P7, Male, PS.

DISCUSSION

This study extends previous research by providing insights into how different professional groups in the same organisation manage work and personal emails using different devices and how this impacts the way they manage the boundary between work and non-work. Initial findings from this study were reported in [5]. By triangulating the interview data with the findings from the

Work-Life Indicator questionnaire, several novel findings come out of the study. First, we show that, other than just individual preferences, professional context also has a large impact on email practices: when, where and how people manage emails and the impact these have on work-home boundaries. Second, we find that some users rely on *micro-boundary* email practices to support their transitions between work and personal life.

Profession Influences Email and Work-Home Boundary Management

Our study confirms Dearman et al.'s [8] findings that working environment influences people's boundary management practices and extends them to different professional groups. We found that both professional services staff and academics allow non-work emails to interrupt work, for both convenience as well as emergencies. However, there is a significant difference between the two groups in the extent to which work email interferes with non-work: in the interviews, academics report having symmetrical interference between work and non-work, whereas professional services staff report having an asymmetry and work does not tend to interfere with non-work.

We found that professional services participants generally have a work culture that rigidly separates work and non-work. 'Working 9 to 5' means they do not need to access work emails in their private time and there are fewer work interruptions during non-work time. In contrast, academics do not consider themselves to have a 9 to 5 job and have more permeable boundaries between work and non-work. Academics often reported that they needed to be available for work during personal time, particularly if they worked part-time, and for some this also extended to when they were on holiday. A potentially negative consequence is that academics reported work interrupting non-work more often than professional services participants and this is supported by the results of the Work-Life Indicator questionnaire.

A few exceptions were found in the patterns of interference between work and non-work typical of professional service staff and academics. Two professional services participants reported having symmetrical interference more similar to academics; and two academics said that they did not allow work to interrupt non-work as much as their peers. These exceptions can be partially explained by a personal preference in how to manage work-home boundaries. This does not mean however, that the working environment does not influence their behaviour. P1 in particular illustrated the importance of organizational culture on email management when comparing her previous research job in industry, where she was not allowed to check work emails outside the office, with her current academic role, where she benefitted from being able to manage her emails on her commute to and from work.

In summary, we provide evidence that the symmetry of interference between work and non-work email

management is a function of job type, which had previously only been hypothesised [18]. Capra et al. [3] also found an asymmetrical imbalance between work and personal life, but they did not distinguish between professional groups, nor did they consider the consequences of these interruptions. We found in our survey that work interfering with non-work led to complaints by other members of participants' households, and this was especially true for academics. This comes as no surprise, given that academics are known for having more challenging work-home boundaries compared to some other professions, due to the overarching work culture that goes beyond individual universities.

We also found that there is a difference in the way professional groups used smartphones to access their different email accounts. All academics used their privately-owned phone to check both personal and work accounts, supporting research that has argued that phones are sometimes considered both personal and work devices [8]. In contrast, only two professional services participants accessed their work email accounts on their phone. Participants had a tendency to use their devices in specific locations: smartphones were primarily used to access emails at home and on the move (e.g. on public transport), but usually not in the office; computers were primarily associated with work activities. The fact that only professional services staff restricted their email to personal accounts on their phones suggests that smartphones are considered differently between the two professional groups. In addition, confirming our finding that smartphones intrude even in the most private of moments, Pielot et al. [26] found that the number of emails received on smartphones is correlated with stress from receiving work emails after work. Moreover, we are able to confirm that Matthews et al.'s [20] findings are still valid after five years where people generally still use their phones to triage their email, and computers respond to messages, despite the fact that mobile behaviours are said to have changed over the course of that time [9].

Micro-Boundaries to Minimise Interruptions

Our study indicates how, in general, interviewed professional services participants are positioned towards the segmentation end of the work-home boundary continuum (i.e. have more rigid boundaries), while interviewed academics are placed more towards the integration end of the continuum (i.e. have more permeable boundaries). However, boundary management behaviours are context dependent and the pervasive nature of email and its accessibility across devices has increased the frequency of unexpected micro-role transitions, e.g. receiving a work email at home. We found these transitions can have negative consequences, such as participants reporting complaints in their household about their emails habits. The interviews show that, particularly within devices, users developed resilience strategies to help them minimise transitions between different work and home micro-roles

and their associated negative effects. We describe these strategies as *micro-boundaries* and define them as:

A strategy to limit the impact of micro-role transitions caused by cross-domain technology mediated interruptions.

Examples of micro-boundary strategies in email management that emerged from our interviews include:

- Checking personal and work emails on the same device (computer or phone) but on separate applications, thereby limiting the temptation of checking work emails during non-work time;
- Deliberately removing work email from their phone during time off, e.g. when on holiday;
- Creating dedicated folders for one domain in another domain account with automatic filtering, i.e. functionality that is similar to Gmail tabs.

All but three participants kept personal and work accounts separated while at work and used micro-boundary practices to switch between the two domains. We hypothesise that people who are highly engaged in their work and therefore suffer more from high levels of work interrupting non-work (such as academics) could benefit from these practices. More work is needed to explore micro-boundary practices within other professional groups to extend the novel findings presented in this paper.

DESIGN IMPLICATIONS

Strategies to overcome the stressful effects of email need to take into account boundary management preferences and cross-device interaction, and be updated regularly to keep up with technological advancements. As a result of our findings, we propose a set of recommendations that rely on personalisation and customisation, as previously suggested by Cecchinato et al. [4], to minimise the negative consequences of email and support micro-boundary practices:

- *Setting contextual notifications based on locations and account type.*

Our results suggest that people have personal preferences about notifications depending on the type of account and where they are (e.g. home, office, commute). Jackson et al. [15] found that users react to 70% of emails within six seconds from being notified. By disabling notifications outside office hours (an example of micro-boundary practice) our users reduced the number of interruptions caused by email. Hence, we recommend creating smart-notifications that allow users to decide when to be notified and from which account, based on their location. This is especially important for users who prefer having all accounts synchronised to a single mobile application, because it would give them more control on when and where interruptions occur.

- *Automatically tagging email with device icons based on where they were first opened.*

Some participants complained that while at work they would forget to reply to emails which had originally been opened on a mobile device and thus got lost in the sea of messages. Enabling automatic tagging of emails with a device icon based on where they were first opened could enable users to re-arrange their inbox and address this issue.

CONCLUSION

We have extended previous work on work-home boundary management and cross-device interaction by investigating the email practices of two professional groups at the same university. Despite the small sample size, our study shows differences between professional groups in terms of email and boundary management practices, and the way these are carried out on multiple devices. We found that the symmetry of interference between work and non-work reflects job function. Interviewed professional services staff typically have 9 to 5 jobs with rigid boundaries defined around working hours; interviewed academics have more permeable boundaries and report significantly more interference between work and non-work, which other studies have shown can result in increased stress. We therefore propose that people with more permeable boundary management styles create micro-boundaries to help them reduce micro-role transitions between work and personal domains, for example, using separate email clients for work and personal emails.

Overall, implications from this study may have a significant impact in areas beyond both email and a university context. As a result, further work could be completed in this direction to investigate how micro-boundary practices differ between other professional groups. More generally, we propose a set of design recommendations and argue that new email client features should be implemented to reduce the negative effects of email.

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REFERENCES

1. Ashforth, B., Kreiner, G., and Fugate, M. All in a day's work: boundaries and micro-role transitions. *Academy of Management review* 25, 3 (2000), 472–491.
2. Braun, V. and Clarke, V. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 2 (2006), 77–101.
3. Capra, R., Khanova, J., and Ramdeen, S. Work and personal e-mail use by university employees: PIM practices across domain boundaries. *Journal of the American Society for Information Science and Technology* 64, 5 (2013), 1029–1044.
4. Cecchinato, M.E., Bird, J., and Cox, A.L. Personalised Email Tools: A Solution to Email Overload? *CHI'14*

Workshop on Personalised Behaviour Change Technologies, (2014), 1–4.

5. Cecchinato, M.E., Cox, A.L., and Bird, J. “I check my emails on the toilet”: Email Practices and Work-Home Boundary Management. *MobileHCI'14 Workshop on Socio-Technical Systems and Work-Home Boundaries*, (2014), 1–4.
6. Dabbish, L., Kraut, R., Fussell, S., and Kiesler, S. Understanding email use: predicting action on a message. *Proc. of CHI*, (2005), 691–700.
7. Dabbish, L. and Kraut, R. Email overload at work: an analysis of factors associated with email strain. *Proc. of CSCW*, (2006), 431–440.
8. Dearman, D. and Pierce, J.S. “It’s on my other Computer!”: Computing with Multiple Devices. *Proc. of CHI*, (2008), 767–776.
9. Dery, K., Kolb, D., and MacCormick, J. Working with connective flow: how smartphone use is evolving in practice. *European Journal of Information Systems*, April (2014), 1–13.
10. Fisher, D., Brush, a. J., Gleave, E., and Smith, M. a. Revisiting Whittaker & Sidner’s “email overload” ten years later. *Proc. of CSCW* (2006), 309–312.
11. Google Help Center. Inbox tabs and category labels. 2013. <http://bit.ly/Zno8R4>.
12. Greenhaus, J. and Parasuraman, S. A Work-Nonwork Interactive Perspective of Stress and Its Consequences. *Journal of Organizational Behavior* 8, 2 (1987), 37–60.
13. Grevet, C., Choi, D., Kumar, D., and Gilbert, E. Overload is Overloaded : Email in the Age of Gmail. *Proc. of CHI*, (2014), 793–802.
14. Hogan, B. and Fisher, D. A scale for measuring email overload. *Microsoft Research* 7, 9 (2006).
15. Jackson, B.T.W., Dawson, R., and Wilson, D. Understanding email interaction increases organisational productivity. *Communications of the ACM* 46, 2003, 80–84.
16. Kamsin, A., Blandford, A., and Cox, A. Personal task management: my tools fall apart when I’m very busy! *CHI'12 Extended Abstracts on Human Factors in Computing Systems*, (2012), 1369–1374.
17. Karlson, A., Iqbal, S., and Meyers, B. Mobile taskflow in context: a screenshot study of smartphone usage. *Proc. of CHI*, (2010), 2009–2018.
18. Kossek, E.E., Ruderman, M.N., Braddy, P.W., and Hannum, K.M. Work–nonwork boundary management profiles: A person-centered approach. *Journal of Vocational Behavior* 81, 1 (2012), 112–128.
19. Mackay, W. Diversity in the use of electronic mail: A preliminary inquiry. *ACM Transactions on Information Systems (TOIS)* 6, 4 (1988), 380–397.
20. Matthews, T., Pierce, J., Road, H., Jose, S., and Tang, J. No smartphone is an island: the impact of places, situation and other device on smart phone use. *IBM RJ10452. 10452*, 2009, 1–10.
21. Mazmanian, M. and Erickson, I. The product of availability: understanding the economic underpinnings of constant connectivity. *Proc. of CHI*, (2014), 763–772.
22. Nippert-Eng, C. Calendars and keys: The classification of “home” and “work.” *Sociological Forum* 11, 3 (1996), 563–582.
23. Oulasvirta, A. and Sumari, L. Mobile kits and laptop trays: managing multiple devices in mobile information work. *Proc. of CHI*, (2007), 1127–1136.
24. Park, Y., Fritz, C., and Jex, S.M. Relationships between work-home segmentation and psychological detachment from work: The role of communication technology use at home. *Journal of Occupational Health Psychology* 16, 2011, 457–467.
25. Pew Research. Mobile Technology Fact Sheet. 2014. <http://pewrsr.ch/OotDJE>.
26. Pielot, M., Church, K., and Oliveira, R. De. An In-Situ Study of Mobile Phone Notifications. *Proc. of MobileHCI*, (2013), 233-242.
27. Radicati Group. Email Statistics Report, 2013-2017. <http://bit.ly/1l2gJ2z>.
28. Rector, K. and Hailpern, J. MinEMail: SMS alert system for managing critical emails. *Proc. of CHI*, (2014), 783–792.
29. Scharf, F., Wolters, C., Cassens, J., and Herczeg, M. Cross-Device Interaction. *AMBIENT 2013, The Third International Conference on Ambient Computing, Applications, Services and Technologies*, (2013), 35–41.
30. Soucek, R. and Moser, K. Coping with information overload in email communication: Evaluation of a training intervention. *Computers in Human Behavior* 26, 6 (2010), 1458–1466.
31. Sumecki, D., Chipulu, M., and Ojiako, U. Email overload: Exploring the moderating role of the perception of email as a ‘business critical’ tool. *International Journal of Information Management* 31, 5 (2011), 407–414.
32. Tang, J., Matthews, T., Cerruti, J., et al. Global differences in attributes of email usage. *Proceedings of the 2009 international workshop on Intercultural collaboration*, (2009), 185–194.
33. Whittaker, S. and Sidner, C. Email overload: exploring personal information management of email. *Proc. of CHI*, (1996), 276–283.